

**UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS**

INTERNATIONAL CODE COUNCIL, INC.
and ICC EVALUATION SERVICE, LLC,

Plaintiffs,

v.

DRJ ENGINEERING, LLC, a Wisconsin
limited liability company, and DRJ
ENGINEERING, LLC, an Illinois limited
liability company,

Defendants.

Civil Action No. 1:24-cv-4998

JURY DEMAND

COMPLAINT

Plaintiffs International Code Council, Inc. (“ICC”) and ICC Evaluation Service, LLC (“ICC-ES” and, together with ICC, “Plaintiffs”), as and for their Complaint against Defendants DrJ Engineering, LLC, a Wisconsin limited liability company (“DrJ Wisconsin”), and DrJ Engineering, LLC, an Illinois limited liability company (“DrJ Illinois”) (collectively, “Defendants” or “DrJ”), state as follows:

I. NATURE OF THE ACTION

1. This is an action for trademark infringement, false advertising, and unfair competition under the Lanham Act (15 U.S.C. §§ 1051 *et seq.*) and common law, and for related violations of Illinois law, by direct competitors intent on willfully causing confusion among consumers in the important nationwide market for evaluating building products (to assess their compliance with building codes) through the unauthorized use of ICC’s valuable trademarks and the false advertising of the parties’ respective goods and services. Building safety professionals and code enforcement officials rely on these goods and services to confirm that the manufacturer of a proposed building product is code-compliant and, thus, can be used or installed within a

particular jurisdiction. Defendants' false advertising, unfair competition, and/or unauthorized use of ICC's valuable trademarks are irreparably harming and, unless enjoined, will continue to irreparably harm ICC and its trademarks and name, business, reputation, and goodwill.

II. PARTIES

2. Plaintiff ICC is a non-stock, non-profit corporation organized under the laws of the State of Delaware with its principal place of business located at 200 Massachusetts Avenue, NW, Suite 250, Washington, D.C. 20001. ICC's Central Regional Office is located at 4051 West Flossmoor Road, Country Club Hills, Illinois 60478.

3. Plaintiff ICC-ES is a limited liability company organized under the laws of the State of Delaware with its principal place of business located at 3060 Saturn Street, Suite 100, Brea, California 92821. ICC-ES also has offices located at 4051 West Flossmoor Road, Country Club Hills, Illinois 60478.

4. ICC-ES is a subsidiary of ICC and part of the ICC family of companies, which are dedicated to the construction of safe, sustainable, affordable and resilient structures.

5. ICC is the sole member of ICC-ES.

6. Upon information and belief, Defendant DrJ Wisconsin is a limited liability company organized under the laws of the State of Wisconsin with its principal place of business located at 6300 Enterprise Lane, Madison, Wisconsin 53719.

7. Upon information and belief, the registered agent for DrJ Wisconsin is Kirk Grundahl with an office at 6300 Enterprise Lane, Madison, Wisconsin 53719.

8. Upon information and belief, Defendant DrJ Illinois is a limited liability company organized under the laws of the State of Illinois with its principal place of business located at 6300 Enterprise Lane, Madison, Wisconsin 53719.

9. Upon information and belief, the managers for DrJ Illinois on record with the Illinois Secretary of State are Kirk Grundahl, Ryan Dexter and Suzanne Grundahl, all having a business address at 6300 Enterprise Lane, Madison, Wisconsin 53719.

10. Upon information and belief, Kirk Grundahl is the President of DrJ Wisconsin, Suzanne Grundahl is Vice President of DrJ Wisconsin, and Ryan Dexter is V.P. of Engineering of DrJ Wisconsin.

11. Upon information and belief, Kirk Grundahl and Ryan Dexter are Professional Engineers licensed by the State of Illinois and their current status is “active.”

III. JURISDICTION AND VENUE

12. This action arises under the trademark and unfair competition laws of the United States and the state of Illinois. This Court has subject matter jurisdiction pursuant to 15 U.S.C. § 1121, and 28 U.S.C. §§ 1331 and 1338. This Court has supplemental subject matter jurisdiction over Plaintiffs’ state law claims pursuant to 28 U.S.C. § 1367(a), since they are so related to the federal claims that they form part of the same case or controversy and derive from a common nucleus of operative fact.

13. Defendants are subject to personal jurisdiction in this district by virtue of their presence in this State; having conducted business in this State; employing Professional Engineers licensed by, and actively practicing within, this State; having availed themselves of the rights and benefits of Illinois law such that they should reasonably anticipate being haled into court in this judicial district; having engaged in systematic and continuous contacts with the State of Illinois, and in particular within this judicial district; from the receipt of revenue from goods used or consumed or activities conducted in this State and in this judicial district; by committing acts of

infringement directly targeting this judicial district; and DrJ Illinois is registered with the Illinois Secretary of State to do business in this State.

14. Venue is proper in the district under 28 U.S.C. § 1391(b)(2) in that this is the judicial district in which a substantial part of the acts and omissions giving rise to the claims occurred.

IV. FACTUAL BACKGROUND

A. ICC and its Trademarks.

15. ICC is the leading global source of model codes and standards and building safety solutions that include product evaluation, accreditation, technology, training, and certification. ICC's mission is to provide the highest quality codes, standards, and solutions to ensure safe, affordable, and sustainable communities and buildings worldwide.

16. ICC's many offerings include product testing, evaluation and certification, which ICC primarily offers through ICC-ES. Among other things, ICC-ES publishes evaluation reports ("ICC-ES Reports") certifying building products, which provide building safety professionals and the general public with confidence and peace of mind that such products meet the highest standards of safety.

17. Specifically, an ICC-ES Report presents the findings, conclusions, and recommendations from a particular product evaluation. ICC-ES Reports verify that new and innovative building products comply with code requirements and provide information about what code requirements or acceptance criteria were used to evaluate a product, how the product should be identified and installed, and much more.

18. ICC-ES Reports and product listings guarantee that the relevant product has gone through a rigorous technical evaluation by expert staff, ensuring compliance with the latest applicable codes and standards.

19. ICC-ES owns a series of “Marks of Conformity” (examples below) that authorized third parties may use to signify that a product has gone through a rigorous technical evaluation by expert staff and received an ICC-ES Report, demonstrating compliance to the latest applicable codes and standards. ICC-ES Marks of Conformity are widely accepted and recognized indicators of compliance with applicable codes and standards and can be found on a wide variety of building, plumbing, and mechanical products around the world.



20. ICC-ES has a detailed “Usage Guide” that governs the use of its Marks of Conformity. *See Exhibit A.* In addition to discussing the proper size, placement, and colors of the Marks of Conformity, the guide specifically instructs an authorized user on how to reference an ICC-ES evaluated product in the authorized user’s marketing materials. *Id.* at p. 9. “It is important to accurately describe your product as ‘ICC-ES Evaluated’ in any print or digital marketing material including company website, flyers, presentations, and collateral. **Any other variations of this is unacceptable** (i.e. **ICC Evaluated, ICC Approved, or ICC-ES Approved**).” *Id.* (emphasis added). The reason for specifying that use of the phrase “ICC Approved” is an unacceptable use is “that building officials will be the ones to officially approve a product for installation. [Plaintiffs] are simply providing the tools to make this an easier and quicker process!” *Id.*

21. State and local code enforcement officials and government regulators rely on ICC-ES Reports and “Marks of Conformity” to confirm that the proposed building product is compliant with applicable codes and, therefore, can be permitted for use and installation within their respective jurisdictions.

22. ICC has for many years offered goods and services under a family of trademarks comprised of or incorporating the trademark ICC (collectively, the “ICC Marks”). The ICC logo depicted below is one example of an ICC Mark.






23. ICC has expended substantial resources in marketing, advertising, and promoting the ICC Marks and has derived substantial revenues from its sale of goods and services under the ICC Marks. ICC’s extensive and continuous marketing, advertising, and sale of goods and services under the ICC Marks has generated substantial goodwill and customer recognition in the ICC Marks.

24. Today, consumers recognize the ICC Marks as an indicator of high-quality goods and services emanating from a single source—ICC.

25. In addition to its extensive common law rights in the ICC Marks, Plaintiff ICC owns an extensive United States trademark portfolio, which includes, without limitation, the registrations below (the “Registrations”).

Trademark	Reg. No.	Classes	App. / Reg. Date
ICC	4,718,932	9, 16, 25, 35, 37, 38, 41, 42 and 45	Dec. 23, 2013 / Apr. 14, 2015

Trademark	Reg. No.	Classes	App. / Reg. Date
INTERNATIONAL CODE COUNCIL	4,665,966	9, 16, 25, 35, 37, 38, 41, 42 and 45	Dec. 23, 2013 / Jan. 6, 2015
 INTERNATIONAL CODE COUNCIL	3,578,864	9, 35 and 41	Jan. 16, 2008 / Feb. 24, 2009
 INTERNATIONAL CODE COUNCIL	3,998,452	37, 42 and 45	Jan. 09, 2008 / Jul. 19, 2011
	5,351,097	9, 16, 25, 35, 37, 38, 41, 42 and 45	Oct. 23, 2015 / Dec. 05, 2017

26. The Registrations are valid, subsisting, and incontestable within the meaning of 15 U.S.C. § 1065, constituting conclusive evidence of the validity of the registered marks, ICC's ownership of the marks, and ICC's exclusive right to use the marks in commerce in connection with the goods and services specified in the registrations. Copies of ICC's federal registration certificates for the Registrations—including full listings of the covered goods and services—are attached as **Exhibit B**.

B. Defendants and Their Unlawful Acts.

27. Upon information and belief, DrJ offers product testing and technical evaluation reports ("TERs") that assess the compliance of building products with various building codes and regulations. DrJ competes with ICC in a national market for the provision of these offerings.

28. Persons interested in viewing and/or obtaining copies of DrJ's TERs may view and/or download them from DrJ's publicly available website at drjengineering.org.

29. Upon information and belief, TERs are available for download by the general public in .pdf format.

30. Any person may also set up an account and download certain TERs bearing the seal of a licensed Professional Engineer, including from a Professional Engineer licensed by the State of Illinois.

31. In accordance with the Illinois Professional Engineering Practice Act of 1989:

- a. the “use of a professional engineer’s seal on technical submissions constitutes a representation by the professional engineer that the work has been prepared by or under the personal supervision of the professional engineer or developed in conjunction with the use of accepted engineering standards. The use of the seal further represents that the work has been prepared and administered in accordance with the standards of reasonable professional skill and diligence.” *See* 225 ILCS 325/14.
- b. “Technical submissions are the designs, drawings, and specifications that establish the scope of the professional engineering project, the standard of quality for materials, workmanship, equipment, and constructions systems, and the studies and other technical reports and calculations prepared in the course of the practice of professional engineering. All technical submissions prepared by or under the personal supervision of a professional engineer shall bear that professional engineer’s seal, signature, and license expiration date.” *See* 225 ILCS 325/15(a).
- c. “All technical submissions intended for use in the State of Illinois shall be prepared and administered in accordance with standards of reasonable professional skill and diligence. Care shall be taken to reflect the requirements of State statutes and, where applicable, county and municipal ordinances in such submissions. In recognition that professional engineers are licensed for the protection of the public, health, safety, and welfare, submissions shall be of such quality and scope, and be so administered, as to conform to professional standards.” *See* 225 ILCS 325/15(b).

32. According to the website of Pushing7, a company engaged by DrJ to build a custom software tool (<https://www.pushing7.com/work/case-studies/2021-12/drj-engineering>), DrJ delivers “close to 1,000” computer-generated, sealed “documents,” including sealed TERs, to its customers every month using the software designed for this purpose. *See Exhibit C* (“When DrJ told us that they wanted to build a site that could dynamically apply an engineer’s seal to a variety of PDF reports by state, we quickly realized that an off-the shelf solution wasn’t going to cut it.

After researching and testing a number of PDF manipulation libraries and a few cost-prohibitive software-as-service solutions, we built a custom Drupal site that allows staff to maintain content for two different domains from a single administrative interface. We also built a custom module that delivers close to 1,000 sealed documents to DrJ customers each month as well as a progressively decoupled single-page application that helps users quickly find the Technical Evaluation Reports they need.”).

33. By way of one example, and upon information and belief, DrJ makes available for viewing or download by the general public TER 1402-01, for rigid insulation panels “Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 Air Barrier, Water Resistive Barrier, and Fire Performance in Exterior & Interior Walls of Buildings of Type I-V Construction” sold by Hunter Panels, LLC. *See Exhibit D.*

34. For example, and upon information and belief, the substantively identical TER 1402-01 is also available for viewing and/or download (again, by any persons who have set up an account) bearing the seal of Ryan Dexter, Illinois Professional Engineer No. 62063066, a manager of DrJ Illinois (according to Illinois Secretary of State records) and Vice President of Engineering of DrJ Wisconsin. *See Exhibit E.* The sealed TER 1402-01 comes with a two-page cover letter, the first page of which bears the seal and signature of Ryan Dexter and the signature of Larry Wainright, Vice President Product Certification of DrJ Wisconsin.

35. Upon information and belief, TER 1402-01 is purposefully directed at persons or entities involved in construction projects within the jurisdiction of the City of Chicago, among other AHJs, “authority having jurisdiction (AHJ),” as DrJ refers to them. *See Exhibits D and E* at p. 15 (¶ 9.11), and Appendix A pp. 16-17. The rigid insulation panels that are the subject of TER

1402-01 are manufactured and made available by Hunter Panel, LLC in Franklin Park, Illinois, among other locations. *See id.*, p. 14 (¶ 9.9).

36. DrJ has launched a multi-faceted advertising campaign to confuse and deceive consumers into believing that DrJ and its goods and services are approved by, or associated with ICC, when they are not.

37. At the heart of DrJ's campaign is the "Certification" section of DrJ's website, located at www.drjcertification.org ("DrJ Website") and the computer-generated, sealed TERs, which contain numerous unauthorized uses of the ICC Marks and/or false and misleading statements about the parties' respective goods and services. Plaintiffs are currently aware of a number of examples of DrJ's misconduct, which are identified below.

i. The Infringing "Product Approval Checklist for Code Officials"

38. The DrJ Website homepage includes an "About Us" tab. *See Exhibit F*. Within the "About Us" dropdown menu of DrJ's Website is a tab entitled "ANAB Accredited." When a user clicks on the tab, the user is taken to a webpage bearing the title "ANAB Accredited Certification Body," which includes the sentence "ICC's approval procedure is called the ICC Product Approval Checklist for Code Officials." *See Exhibit G*. The portion "ICC Product Approval Checklist for Code Officials" is a hypertext link that takes the user to a one-page .pdf file entitled *Product Approval Checklist for Code Officials* ("Checklist Version 1") *See Exhibit H*.

39. The cover letter to TER 1402-01 includes the sentence "DRJ's code compliance work has been performed in concert with ICC's Product Approval Checklist for Code Officials." *See Exhibit E*. The portion "ICC Product Approval Checklist for Code Officials" is a hypertext link that takes the user to a one-page .pdf file entitled *Product Approval Checklist for Code*

Officials (“Checklist Version 2”), which is nearly identical to Checklist Version 1 (Checklist Version 1 and Version 2 are collectively referred to herein as “Checklists”). *See Exhibit I.*

40. The “document properties” metadata for Checklist Version 1 indicates it was created by author “Kirk Grundahl,” a manager of DrJ Illinois (according to Illinois Secretary of State records) and the President of DrJ Wisconsin, on May 25, 2021 at 12:18:48 PM and modified on December 26, 2022 at 10:55:02 AM. *See Exhibit J.*

41. The “document properties” metadata for Checklist Version 2 indicates it was created by author “tkutz” on October 4, 2023 at 1:42:30 PM and modified on October 4, 2023 at 2:07:54 PM. *See Exhibit K.* Upon information and belief, “tkutz” is Trish Kutz, Operations Management at DrJ Wisconsin.

42. The Checklists feature the ICC INTERNATIONAL CODE COUNCIL logo (shown below) prominently in the top left-hand corner, giving the reader the clear impression that ICC has created, approved or endorsed use of the Checklists. *See id.* However, Plaintiffs were not aware of the Checklists and did not authorize DrJ’s use of this ICC INTERNATIONAL CODE COUNCIL logo on the Checklists. This is trademark infringement and unfair competition, and violates the Lanham Act, 15 U.S.C. §§ 1114 and 1125(a).



ii. The False DrJ “ICC-Approval” and “ICC Accepted” Advertising Claims

43. On the DrJ Website and in other marketing collateral, DrJ makes numerous false claims relating to DrJ and/or its products or services being “ICC-Approved,” “ICC Accepted” and/or other false claims relating to “ICC” followed by “approved” or “approval” or “accepted.”

44. For example, the “ANAB Accredited Certification Body” page of the DrJ Website prominently states in large, bold letters that DrJ is “Simplifying the ‘ICC-Approval’ Process.” *See Exhibit G*. Immediately underneath that statement, DrJ includes the sentence “ICC’s approval procedure is called the ICC Product Approval Checklist for Code Officials.” *Id.* These claims are literally false as ICC does not have any “approval process” or “approval procedure,” much less an “approval procedure” that “is called ICC Product Approval Checklist for Code Officials.”

45. DrJ’s Website and marketing collateral are replete with these false or misleading and damaging “approval” claims, including these false statements: “‘ICC Approved’ can also be termed ICC Accepted, ICC Report, ICC Evaluation ... **These market-specific terms all refer to the acceptance of accredited agencies.** Therefore, in market terms, **DRJ is ‘ICC-Approved.’”** *See Exhibit G*. (emphasis in original). In a green bar graphic toward the bottom of the DrJ Website webpage “ANAB Accredited Certification Body,” DrJ repeats the claim that “In market terms, DrJ is ‘ICC-Approved.’” *Id.* “ICC Approved” *cannot* also be termed “ICC Accepted, ICC Report, ICC Evaluation” and, because Plaintiffs do not have a process or procedure for “approving” any companies, DrJ is not “ICC-Approved” in any way. These claims are false.

46. The cover letter to TER 1402-01, signed by and sealed with the Illinois Professional Engineer seal of Ryan Dexter and signed by Larry Wainright, Vice President of Certification (*see Exhibit E*), includes a hypertext link to the “ANAB Accredited Certification Body” page of the DrJ Website (**Exhibit G**) in the sentence “DrJ’s procedures are fully compliant with 17065 certification procedures and DrJ’s scope of expertise” where the words “DrJ’s procedures” are the hypertext link.

47. DrJ’s use of “ICC-Approved” is particularly damaging to Plaintiffs and the public in general because, as noted in Paragraph 20 above with respect to proper authorized third-party

use of ICC-ES's Marks of Conformity in the Usage Guide, Plaintiffs expressly prohibit the use of words like "ICC Approved" (and variations like "ICC Accepted") when referencing an ICC-ES evaluated product. The only proper reference for entities whose products have been evaluated is "ICC-ES Evaluated." Again, this is because only building code officials and government regulators are authorized to officially approve a building product for installation.

iii. The False and Misleading "Scope Comparison" Document

48. On information and belief, DrJ is accredited by the ANSI National Accreditation Board ("ANAB") in the standard ISO/IEC 17065, "Conformity Assessment – Requirements for Bodies Certifying Products, Processes and Services" (the "ANAB Product Certification Accreditation Program").

49. According to ANAB, product certification "attests that a product meets specified standards, especially for quality or safety and health issues." *See Exhibit L.* "ANAB accreditation recognizes the competence of bodies to carry out product or personnel certification in accordance with requirements defined in international standards." *Id.*

50. The ANAB Product Certification Accreditation Program includes sector programs for specific certifiers and covers a multitude of "fields" as defined by the International Organization for Standardization's International Classification for Standards Codes ("ICS Codes") (*see Exhibit M*), including, among many others, the following fields (which DrJ refers to as "sections"): "13 – Environment. Health protection. Safety;" "21 – Mechanical systems and components for general use;" and "91 – Construction materials and building." *See Exhibit N.*

51. DrJ's certificate of accreditation showing the scope of DrJ's accreditation under the ANAB Product Certification Accreditation Program is attached as **Exhibit O**.

52. ICC-ES’s certificates of accreditation showing the scope of ICC-ES’s accreditation under the ANAB Product Certification Accreditation Program are attached as **Exhibits P** and **Q**.

53. The DrJ Website contains multiple links to “DrJ’s Scope Comparison” document (“Scope Comparison Chart”). The Scope Comparison document is attached as **Exhibit R**, and an excerpt from that document is depicted below.

ICS No.	ICS Description	DrJ	ICC-ES	IAPMO	Intertek	UL
Section 71: CHEMICAL TECHNOLOGY						
71300	Products of the Chemical Industry	✓	✓	✓	✓	✓
71300.50	Wood-protecting chemicals	✓	✓			
Section 77: METALLURGY						
77060	Corrosion of Metals	✓	✓			✓
77140	Iron & Steel Products	✓	✓	✓		
77140.01	Iron & steel products in general	✓		✓		
77140.03	Heat-treatable steels	✓				
77140.05	Steels for reinforcement of concrete	✓	✓			
77140.20	Stainless steels	✓				
77140.25	Spring steels	✓				
77140.30	Steels for pressure purposes	✓				
77140.35	Tool steels	✓				
77140.40	Steels w/ special magnetic properties	✓				
77140.45	Non-alloyed steels	✓				
77140.50	Flat steel products & semi-products	✓	✓			
77140.60	Steel bars & rods	✓	✓			
77140.65	Steel wire, wire ropes & link chains	✓	✓			
77140.70	Steel profiles	✓	✓			
77140.75	Steel pipes & tubes for specific use	✓		✓		
77140.80	Iron & steel castings	✓				
77140.85	Iron & steel forgings	✓				
77140.99	Other iron & steel products	✓		✓		

54. The cover letter to TER 1402-01, signed by and sealed with the Illinois Professional Engineer seal of Ryan Dexter and signed by Larry Wainright, Vice President of Certification (*see Exhibit E*), includes a hypertext link to the Scope Comparison Chart (**Exhibit R**) in the sentence “DrJ’s procedures are fully compliant with 17065 certification procedures and DrJ’s scope of expertise” where the words “scope of expertise” are the hypertext link.

55. The Scope Comparison Chart purports to compare DrJ’s scope of expertise in various fields of the ANAB Product Certification Accreditation Program with other providers, including ICC-ES. DrJ selectively includes twelve sections (ICS Codes) of expertise and even more selectively includes certain ICS Code numbers within those sections in which DrJ is accredited.

56. Misleadingly, DrJ fails to include in the Scope Comparison Chart the sections—or ICS Code numbers within sections—in which ICC-ES is accredited but DrJ is not. This gives consumers the false or misleading impression that DrJ is more broadly qualified than ICC-ES when, in reality, ICC-ES has more accreditations than DrJ. *Compare Exhibit O with Exhibits P and Q.*

57. Finally, the Scope Comparison Chart also includes at the bottom of the page the same false “ICC approval” advertising claims as discussed above: **“IN MARKET TERMS, DrJ IS ‘ICC-APPROVED’”** and **“*ICC’s approval procedure is called the ICC Product Approval Checklist for Code Officials. ‘ICC Approved’ can also be termed ICC Accepted, ICC Report, ICC Evaluation ...”** *See Exhibit R* (emphasis in original).

iv. The False “Performed in Concert With” Claim

58. As stated in Paragraph 38 above, the cover letter to TER 1402-01 includes the sentence “DrJ’s code compliance work has been performed in concert with ICC’s Product Approval Checklist for Code Officials.” *See Exhibit E.*

59. This claim is literally false because ICC does not have a “Product Approval Checklist for Code Officials.” As alleged in Paragraphs 38-42 above, this is a document created by DrJ without ICC’s knowledge or authorization that infringes ICC’s trademark rights and was

prepared to create the false impression that ICC has created, approved or endorsed use of the Checklist.

60. This claim is also literally false because ICC does not perform code compliance work in concert with DrJ.

61. Upon information and belief, and further to the allegations in Paragraph 32 above, the cover letter accompanying TER 1402-01 is a form letter that is dynamically created (using a custom software tool) whenever a person has requested to view or download a TER bearing the seal of a licensed Professional Engineer of DrJ. *See* Paragraph 32 and **Exhibit C**.

62. Accordingly, the damage to ICC and the general public is significant because, using custom software it had developed for it, DrJ can easily reproduce these false claims and, upon information and belief, has done so in numerous reports provided to DrJ customers each year, including to consumers of TERs bearing the seal of an Illinois licensed Professional Engineer. *See Exhibit C* (“The Engineer’s seal, along with the current date and state-specific notes, are dynamically added to uploaded PDF reports. A series of validations run each time a new seal is requested to ensure that the report can be sealed. Staff receives reports summarizing the number of sealed reports that have been downloaded in a given period and the states in which they were sealed.”).

v. DrJ Refuses to Cease its Illegal Conduct

63. On March 26, 2024, counsel for Plaintiffs sent a cease and desist letter to DrJ demanding, among other things, that DrJ: (1) “Remove the ‘ICC Product Approval Checklist for Code Officials’ document from the DrJ Website and delete or destroy all physical and electronic copies of it;” (2) “Remove all references on the DrJ Website and other materials created or distributed by DrJ to the ‘ICC approval process,’ the ‘ICC approval procedure,” and DrJ’s

supposed “ICC-Approved” status;” (3) Remove the competitors’ columns from the ‘Scope of Expertise’ document or include the full scope of the parties’ accreditations to provide sufficient context so as not to mislead consumers;” and (4) “Agree in writing to refrain from using the ICC Marks or making false or misleading statements concerning ICC in the future.”

64. In a pugnacious, digressive written response from Kirk Grundahl, dated April 8, 2024, “updated” on April 14, 2024, rather than comply with Plaintiffs’ demands, DrJ attempted to defend its unlawful conduct with irrelevant and/or meritless arguments. To date, DrJ has not complied with any of Plaintiffs’ demands that its willful, unlawful conduct cease. In fact, although DrJ updated its website during this time period, DrJ did not remove any of the infringing content or the false and misleading statements.

vi. The Consequences of Defendants’ Unlawful Activities

65. DrJ’s use of the ICC Marks for directly competing services is likely to confuse and mislead consumers.

66. DrJ’s false or misleading claims in its commercial advertising misrepresenting Defendants’ goods and services and the goods and services of Defendants’ direct competitors ICC and ICC-ES have deceived, and are continuing to deceive, a substantial segment of the consuming public and are likely to influence consumer purchasing decisions.

67. Unless Defendants cease (1) their unauthorized, infringing, and intentionally confusing use of the ICC Marks; and (2) their false and misleading advertising, customers will continue to be confused by Defendants’ false and deceptive acts. Such confusion will allow Defendants to destroy and devalue the ICC Marks and irreparably harm Plaintiffs’ business, reputation, and goodwill.

68. Defendants' acts described above are knowing and willful. With full knowledge of ICC's objections, Defendants continued to disseminate the false and misleading claims described above and continued to use the ICC Marks.

69. Defendants' activities have damaged and will continue to damage the reputation, business and goodwill of Plaintiffs. Unless enjoined by the Court, Defendants will continue to infringe and make false and misleading statements.

70. Plaintiffs have no adequate remedy at law and Defendants' activities have caused and, if not enjoined, will continue to cause irreparable harm to Plaintiffs including their business, reputation and goodwill.

COUNT I
Federal Trademark Infringement
15 U.S.C. § 1114
Against Defendant DrJ Wisconsin

71. Plaintiffs incorporate by reference the allegations contained in the foregoing paragraphs as if set forth fully herein.

72. Defendant DrJ Wisconsin, without the consent of Plaintiffs, has made use in interstate commerce of one or more of the ICC Marks in connection with the sale, offering for sale, distribution and/or advertising of DrJ Wisconsin's goods and/or services.

73. Defendant DrJ Wisconsin's use of one or more of the ICC Marks is likely to cause confusion or to cause mistake or to deceive consumers into thinking that DrJ Wisconsin and its products and/or services are authorized by, or affiliated, connected or otherwise associated with Plaintiffs and/or their products and/or services.

74. Defendant DrJ Wisconsin's actions complained of herein constitute trademark infringement in violation of Section 32 of the Lanham Act, 15 U.S.C. § 1114.

75. Defendant DrJ Wisconsin's actions complained of herein have caused and, unless enjoined by this Court, are likely to continue to cause Plaintiffs to suffer irreparable harm. Plaintiffs have no adequate remedy at law. Plaintiffs are therefore entitled to and seeks injunctive relief pursuant to 15 U.S.C. § 1116.

76. Plaintiffs have also sustained damages as a direct and proximate result of Defendant DrJ Wisconsin's actions complained of herein in an amount to be proven at trial, including without limitation DrJ Wisconsin's profits and/or gains of any kind resulting from DrJ Wisconsin's unlawful acts.

77. Defendant DrJ Wisconsin's actions complained of herein have been willful, intentional, and made in bad faith. Plaintiffs are therefore entitled to enhanced and exemplary damages, including treble its actual damages, an award of costs, and, this being an exceptional case, reasonable attorneys' fees pursuant to 15 U.S.C. § 1117(a).

COUNT II
Federal Unfair Competition and False Designation of Origin
15 U.S.C. § 1125(a)
Against Both Defendants

78. Plaintiffs incorporate by reference the allegations contained in the foregoing paragraphs as if set forth fully herein.

79. As a result of ICC's extensive and continuous marketing, advertising, and sale of goods and services under the ICC Marks, the ICC Marks have become widely known and ICC has become identified in the public mind as the entity behind goods and services offered under the ICC Marks.

80. As a result of ICC's experience and care in providing goods and services under the ICC Marks, ICC's goods and services have become widely known and have acquired a reputation for excellence. Moreover, the ICC Marks have become associated with ICC's goods and services,

and have come to symbolize the reputation for quality and excellence of ICC's goods and services. As such, the ICC Marks are distinctive.

81. Defendants are not authorized to use the ICC Marks, any confusingly similar mark, or any mark that in any way represents or implies that DrJ's goods and services are in any way associated with or approved by ICC.

82. Defendants' unauthorized use of the ICC Marks, acting alone, or in concert with, or one at the direction of the other, as alleged herein constitutes unfair competition in violation of the common law. Defendants, with knowing, willful, and intentional disregard for ICC's rights, continues to advertise, promote, and sell goods and services bearing the ICC Marks through marketing and distribution channels also used by ICC. Such acts are likely to cause confusion and mistake among an appreciable number of reasonable customers as to the source or sponsorship of Defendants' goods and/or services.

83. Defendants' actions complained of herein constitute false designation of origin and false and misleading descriptions and representations in violation of Section 43(a) of the Lanham Act, 15 U.S.C. § 1125(a).

84. DrJ Illinois, acting alone, or in concert with, or at the direction of DrJ Wisconsin, furthers the unlawful acts complained of herein, and heightens the risks associated therewith, when it affixes, and/or causes to be affixed, to DrJ Technical Evaluation Reports offered to consumers, the Illinois-licensed Professional Engineer seal of Ryan Dexter on the same page as, and/or in close proximity to, the unauthorized use of the ICC Marks because (1) Illinois-licensed Professional Engineers are licensed for the protection of the public, health, safety, and welfare; and (2) the seal used by Illinois-licensed Professional Engineers serves as a symbol of the credibility and expertise of practicing engineers in the State of Illinois.

85. Defendants' actions complained of herein have caused and, unless enjoined by this Court, are likely to continue to cause ICC to suffer irreparable harm; ICC has no adequate remedy at law. ICC is therefore entitled to and seeks injunctive relief pursuant to 15 U.S.C. § 1116.

86. ICC has also sustained damages as a direct and proximate result of Defendants' actions complained of herein in an amount to be proven at trial, including without limitation Defendants' profits and/or gains of any kind resulting from Defendants' unlawful acts.

87. Defendants' actions complained of herein have been willful, intentional, and made in bad faith. ICC is therefore entitled to enhanced and exemplary damages, including treble its actual damages, an award of costs, and, this being an exceptional case, reasonable attorneys' fees pursuant to 15 U.S.C. § 1117(a).

COUNT III
False Advertising
15 U.S.C. § 1125(a)
Against Defendant DrJ Wisconsin

88. Plaintiffs incorporate by reference the allegations contained in the foregoing paragraphs as if set forth fully herein.

89. Defendant DrJ Wisconsin advertises, markets, offers to sell, and sells its products and services in interstate commerce.

90. Defendant DrJ Wisconsin willfully and deliberately made false or misleading descriptions and representations of fact in commercial advertising and promotion that misrepresent the nature, characteristics and qualities of DrJ Wisconsin's goods and services, and the goods and services of DrJ Wisconsin's competitors ICC and ICC-ES. The claims described above and incorporated herein are literally false, either on their face or by necessary implication, or, at a minimum, misleading.

91. Defendant DrJ Wisconsin's false and misleading statements either deceived or had the capacity to deceive a substantial segment of the consuming public.

92. Defendant DrJ Wisconsin's false and misleading statements are material; they are likely to influence the purchasing decisions of reasonable consumers of the parties' goods and services.

93. Defendant DrJ Wisconsin's unlawful acts described herein violate Section 43(a) of the Lanham Act, 15 U.S.C. §1125(a).

94. Plaintiffs have been and continue to be damaged by DrJ Wisconsin's false advertising, including through direct diversion of sales from Plaintiffs to DrJ Wisconsin and the lessening of the goodwill associated with Plaintiffs and their products and services.

95. Defendant DrJ Wisconsin's actions complained of herein have caused and, unless enjoined by this Court, are likely to continue to cause Plaintiffs to suffer irreparable harm. Plaintiffs have no adequate remedy at law. Plaintiffs are therefore entitled to and seek injunctive relief pursuant to 15 U.S.C. § 1116.

96. Plaintiffs have also sustained damages as a direct and proximate result of Defendant DrJ Wisconsin's actions complained of herein in an amount to be proven at trial, including without limitation DrJ Wisconsin's profits and/or gains of any kind resulting from DrJ Wisconsin's unlawful acts.

97. Defendant DrJ Wisconsin's actions complained of herein have been willful, intentional, and made in bad faith. Plaintiffs are therefore entitled to enhanced and exemplary damages, including treble its actual damages, an award of costs, and, this being an exceptional case, reasonable attorneys' fees pursuant to 15 U.S.C. § 1117(a).

COUNT IV
Illinois Common Law Unfair Competition
Against Both Defendants

98. Plaintiffs incorporate by reference the allegations contained in the foregoing paragraphs as if set forth fully herein.

99. As a result of ICC's extensive and continuous marketing, advertising, and sale of goods and services under the ICC Marks, the ICC Marks have become widely known and ICC has become identified in the public mind as the entity behind goods and services offered under the ICC Marks.

100. As a result of ICC's experience and care in providing goods and services under the ICC Marks, ICC's goods and services have become widely known and have acquired a reputation for excellence. Moreover, the ICC Marks have become associated with ICC's goods and services, and have come to symbolize the reputation for quality and excellence of ICC's goods and services. As such, the ICC Marks are distinctive.

101. Defendants are not authorized to use the ICC Marks, any confusingly similar mark, or any mark that in any way represents or implies that DrJ's goods and services are in any way associated with or approved by ICC.

102. Defendants' unauthorized use of the ICC Marks, acting alone, or in concert with, or one at the direction of the other, as alleged herein constitutes unfair competition in violation of the common law. Defendants, with knowing, willful, and intentional disregard for ICC's rights, continues to advertise, promote, and sell services bearing the ICC Marks through marketing and distribution channels used by ICC. Such acts are likely to cause confusion and mistake with an appreciable number of reasonable customers as to the source or sponsorship of Defendants' goods and/or services.

103. Defendants' actions complained of herein constitute false designation of origin and false and misleading descriptions and representations in violation of Illinois law.

104. DrJ Illinois, acting alone, or in concert with, or at the direction of DrJ Wisconsin, furthers the unlawful acts complained of herein, and heightens the risks associated therewith, when it affixes, and/or causes to be affixed, to DrJ Technical Evaluation Reports offered to consumers, the Illinois-licensed Professional Engineer seal of Ryan Dexter on the same page as, and/or in close proximity to, the unauthorized use of the ICC Marks because (1) Illinois-licensed Professional Engineers are licensed for the protection of the public, health, safety, and welfare; and (2) the seal used by Illinois-licensed Professional Engineers serves as a symbol of the credibility and expertise of practicing engineers in the State of Illinois.

105. Defendants' actions complained of herein have caused and, unless enjoined by this Court, are likely to continue to cause ICC to suffer irreparable harm. ICC has no adequate remedy at law. ICC is therefore entitled to and seeks injunctive relief.

106. ICC has also sustained damages as a direct and proximate result of Defendants' actions complained of herein in an amount to be proven at trial, including without limitation Defendants' profits and/or gains of any kind resulting from Defendants' unlawful acts.

107. Defendants' actions complained of herein have been willful, intentional, and made in bad faith. ICC is therefore entitled to enhanced and exemplary damages, including treble its actual damages, an award of costs, and, this being an exceptional case, reasonable attorneys' fees pursuant.

COUNT V
Violation of Illinois Uniform Deceptive Trade Practices Act
815 ILCS 510/1 *et seq.*
Against Both Defendants

108. Plaintiffs incorporate by reference the allegations contained in the foregoing paragraphs as if set forth fully herein.

109. Defendants' acts complained of herein, acting alone, or in concert with, or one at the direction of the other, including its false advertising, unfair competition, and trademark infringement, are creating a likelihood of confusion and mistake among, and deceiving consumers as to the as to the affiliation, connection or association with Plaintiffs, and/or the origin, sponsorship or approval of DrJ's goods and services and thus violate the Illinois Uniform Deceptive Trade Practices Act, 815 ILCS 510/1 *et seq.*

110. DrJ Illinois, acting alone, or in concert with, or at the direction of DrJ Wisconsin, furthers the unlawful acts complained of herein, and heightens the risks associated therewith, when it affixes, and/or causes to be affixed, to DrJ Technical Evaluation Reports offered to consumers, the Illinois-licensed Professional Engineer seal of Ryan Dexter on the same page as, and/or in close proximity to, the false advertising, unfair competition, and/or trademark infringement because (1) Illinois-licensed Professional Engineers are licensed for the protection of the public, health, safety, and welfare; and (2) the seal used by Illinois-licensed Professional Engineers serves as a symbol of the credibility and expertise of practicing engineers in the State of Illinois.

111. As a direct and proximate result of Defendants' unlawful acts, Plaintiffs have suffered and will continue to suffer substantial injury and irreparable damage to their business, reputation, and goodwill.

112. Defendants' actions complained of herein have caused and, unless enjoined by this Court, are likely to continue to cause Plaintiffs to suffer irreparable harm; Plaintiffs have no adequate remedy at law. Plaintiffs therefore are entitled to and seek injunctive relief.

113. Defendants' actions complained of herein have been willful, intentional, and made in bad faith. Plaintiffs are therefore entitled to an award of their costs and reasonable attorneys' fees.

COUNT VI
Violation of Illinois Consumer Fraud and Deceptive Business Practices Act
815 ILCS 505/1 *et seq.*
Against Both Defendants

114. Plaintiffs incorporate by reference the allegations contained in the foregoing paragraphs as if set forth fully herein.

115. Defendants' acts complained of herein, acting alone, or in concert with, or one at the direction of the other, including its false advertising, unfair competition, and trademark infringement in the course of trade, are creating a likelihood of confusion, mistake and deception among consumers as to the as to the affiliation, connection or association with Plaintiffs, and/or the origin, sponsorship or approval of DrJ's goods and services and thus violate the Illinois Consumer Fraud and Deceptive Business Practices Act, 815 ILCS 505/1 *et seq.*

116. DrJ Illinois, acting alone, or in concert with, or at the direction of DrJ Wisconsin, furthers the unlawful acts complained of herein, and heightens the risks associated therewith, when it affixes, and/or causes to be affixed, to DrJ Technical Evaluation Reports offered to consumers, the Illinois-licensed Professional Engineer seal of Ryan Dexter on the same page as, and/or in close proximity to, the false advertising, unfair competition, and/or trademark infringement because (1) Illinois-licensed Professional Engineers are licensed for the protection of the public,

health, safety, and welfare; and (2) the seal used by Illinois-licensed Professional Engineers serves as a symbol of the credibility and expertise of practicing engineers in the State of Illinois.

117. Defendants' actions complained of herein have caused and, unless enjoined by this Court, are likely to continue to cause Plaintiffs to suffer irreparable harm; Plaintiffs have no adequate remedy at law. Plaintiffs therefore are entitled to and seek injunctive relief.

118. Plaintiffs have also sustained damages as a direct and proximate result of Defendants' actions complained of herein in an amount to be proven at trial, including without limitation Defendants' profits and/or gains of any kind resulting from Defendants' unlawful acts.

119. Defendants' actions complained of herein have been willful, intentional, and made in bad faith. Plaintiffs are therefore entitled to an award of their costs and reasonable attorneys' fees.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs respectfully request that this Court:

A. Enter judgment that Defendant DrJ Wisconsin has violated the Lanham Act, 15 U.S.C. § 1114.

B. Enter judgment that both Defendants have violated the Lanham Act, 15 U.S.C. § 1125(a), the Deceptive Trade Practices Act, 815 ILCS 510/1, *et seq.*, the Consumer Fraud and Deceptive Business Practices, 815 ILCS 505/1, *et seq.*, and the common law of Illinois.

C. Enter judgment against Defendants that the above acts were willful and intentional, making this an exceptional case.

D. Preliminarily and permanently enjoin Defendants and its officers, directors, agents, employees, attorneys, successors, and assigns, and all others in active concert or participation with any of them, from:

- a. using (i) the ICC Marks, (ii) any confusingly similar marks or names, including misspellings or variations, and/or (iii) any marks or names that in any way represent or imply that Defendants' products or services are in any way associated with ICC or ICC-ES, in any way, including without limitation use as a trademark, service mark, trade name, domain name, social media account or page name, or any other usage that is likely to cause consumer confusion;
- b. making any further false or misleading claims that Defendants are "ICC Approved," "ICC-Approved, or has "ICC Approval," "ICC-Approval," or is "ICC Accepted," or claims to know "ICC's approval process," "ICC's approval procedure," and/or any similar claims;
- c. making any comparison of Defendants' scope of expertise using ICS Codes with Plaintiff's scope of expertise using ICS Codes without including all areas of expertise of Plaintiffs even where Defendants do not possess the same expertise;
- d. committing any acts calculated to cause consumers to believe that Defendants' goods or services are sold under the authorization, control or supervision of ICC or ICC-ES, or are sponsored by, approved by, or otherwise connected with ICC or ICC-ES;
- e. otherwise engaging in unfair competition or deceptive trade practices as alleged in this Complaint; and
- f. causing, engaging in or permitting others to do any of the aforesaid acts.

E. Order Defendants to remove from any print or digital materials, or the internet, including their websites and social media accounts, any advertising or promotion or other activities that use the ICC Marks or that otherwise state or imply that Defendants or their goods or services are approved by ICC, including but not limited to the claims “ICC Approved”, “ICC-Approved, “ICC Approval”, “ICC-Approval” “ICC Accepted”, “ICC’s approval process” and/or “ICC’s approval procedure.”

F. Order Defendants’ webhost(s) be required to permanently remove and takedown any websites and/or webpages of Defendants, or under Defendants’ control, that use the ICC Marks or that otherwise state or imply that Defendants or their goods or services are approved by ICC, including but not limited to the claims “ICC Approved”, “ICC-Approved, “ICC Approval”, “ICC-Approval” “ICC Accepted”, “ICC’s approval process” and/or “ICC’s approval procedure.”

G. Order Defendants to issue a corrective press release titled “Court-Ordered Statement Regarding DrJ’s False and Misleading Statements and Infringing Conduct” no later than thirty (30) days after the date on which an injunction is entered and post an active hypertext link to the press release in a prominent location on the home page of the certification section of the drjengineering.org website (<https://www.drjcertification.org/cert-home>) and/or the home page of any other website owned or controlled by DrJ through which DrJ advertises and conducts its certification business, for at least five (5) years after the entry of this injunction, that (i) states the press release is ordered by the Court in the *ICC v. DrJ* litigation to provide customers and prospective customers of DrJ with information about false and misleading statements and infringing conduct that DrJ has made in its advertisements and marketing and in its technical evaluation reports, (ii) states definitely that DrJ and its goods and services are not approved by

Plaintiffs; and (iii) lists each and every DrJ statement found to be false and misleading by the Court.

H. Order Defendants to file with the Court and serve on counsel for Plaintiffs within thirty (30) days after the entry of any injunction issued by the Court in this action, a sworn written statement as provided in 15 U.S.C. § 1116(a) setting forth in detail the manner and form in which Defendants have complied with the injunction.

I. Award Plaintiffs damages for the claims of this Complaint.

J. Order Defendants to account for and disgorge to Plaintiffs all profits Defendants have secured by reason of the unlawful acts complained of herein.

K. Treble damages resulting from Defendant DrJ Wisconsin's false advertising and trademark infringement, and both Defendants' unfair competition under the Lanham Act in accordance with the provisions of 15 U.S.C. § 1117; and award punitive damages under Illinois law for Defendants' violations of Illinois law.

L. Order Defendants to pay Plaintiffs pre-judgment interest on all damages.

M. Award Plaintiffs their reasonable attorneys' fees pursuant to 15 U.S.C. § 1117 and any other applicable provision of law.

N. Award Plaintiffs the costs of suit incurred herein.

O. For any such other or further relief as the Court may deem just and proper.

DEMAND FOR JURY TRIAL

Plaintiffs hereby demand a jury trial on all issues appropriately triable by a jury.

Dated: June 17, 2024

Respectfully submitted,

By: /s/ Brent A. Hawkins
Brent A. Hawkins
Illinois Bar No. 6243086
Brian P. O'Donnell
Illinois Bar No. 6275621

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CODE COUNCIL, INC. and ICC
EVALUATION SERVICE, LLC

EXHIBIT A



ICC-ES Logo and Marks of Conformity Usage Guide

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Registered logo options

The ICC-ES logo is a registered trademark. Use of the registered trademark symbol ® is essential! The ICC-ES logo is available in black or green, and may not be altered in any way.

There are different file resolutions for web and print, if requesting from an ES staff member please advise which you need.



ES Marks of Conformity

The ICC-ES marks of conformity are registered trademarks (unless otherwise designated as trademarked ™ only) and cannot be altered in any way.

Mark Options

ICC-ES has a new mark of conformity option. This mark can be used for clients who have the following with ICC-ES:

- Evaluation Report (ESR)
- Listing Report (ESL)
- Plumbing, Mechanical, Fuel Gas (PMG) Listing Report
- VAR Environmental Report (SAVE)

Current Marks

For ICC-ES clients who are already utilizing any of the below marks on their product, please note that these can continue to be used as inventory is depleted, until January 1, 2025.



If you are a new report holder, please use the NEW square mark of conformity

Special Designations

Country of Use – For report holders wishing to use the mark of conformity to signify compliance to codes other than the International Codes – there are identifiers located at the 8 o'clock position of the image.

Country specific marks are available for Canada (identified with a “C”) and Mexico (identified with an “MX”).



The new mark option is also available to show compliance to Canadian and Mexican standards, for use in those markets.



Some products are evaluated to specific schemes or programs, in which case an additional identifier is also provided below the mark. These marks must be used for products that fall under the applicable programs.



Placement, Size, Colors

Product Use – The ES mark of conformity may be placed anywhere on the product or packaging, as applicable. The mark should be legible and visible. It may be printed as a separate label or incorporated directly onto the product itself via laser cutting, heat stamp, etc.

The mark may be applied in black or green, as supplied by ICC-ES.

Examples:



Inline Mark

To better accommodate smaller building and plumbing products, an inline mark of conformity is also available. For specific questions on placement, please contact your assigned technical representative for the report.

ICC-ES®



Electronic Display of Conformity (EDC)

A machine-readable (QR) code is made available for each report for use in your marketing materials and/or product labeling. The code contains a link to the active evaluation report or listing, providing the code official or consumer with all the relevant information for your building product.



Benefits of the EDC:

- ✓ Easily meet regulatory requirements
- ✓ Quick access to product details
- ✓ Reduced environmental impact compared to label changes
- ✓ Ease of enforcement of compliance requirements

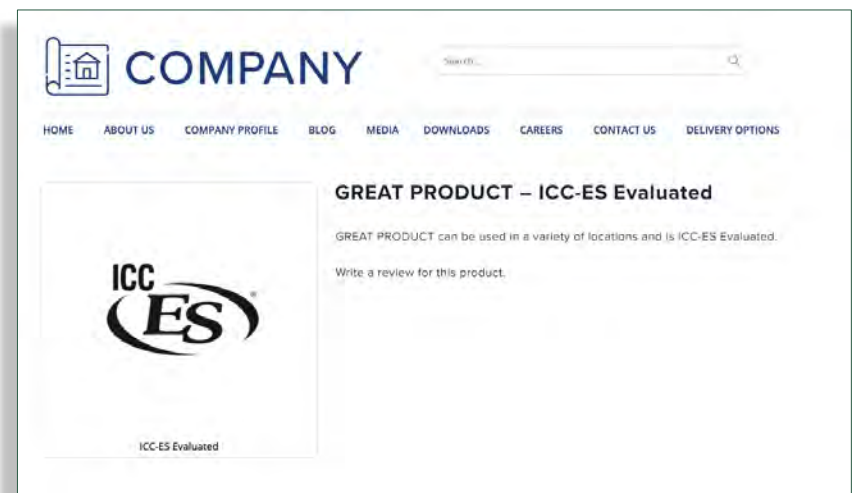
The purpose of the EDC is to provide electronic access to a product's conformity assessment marks and statements as an alternative to traditional methods such as a product label.

How to Reference an ICC-ES Evaluated Product in your Marketing Material

Being successfully evaluated by ICC-ES and getting your report or listing is a critical milestone. Now it's time to start spreading the word!

It is important to accurately describe your product as "ICC-ES Evaluated" in any print or digital marketing material including company website, flyers, presentations, and collateral. Any other variation of this is unacceptable (i.e. ICC Evaluated, ICC Approved, or ICC-ES Approved).

Keep in mind that building officials will be the ones to officially approve a product for installation. We are simply providing the tools to make this an easier and quicker process!



Promotional Use

You may use the mark of conformity and/or electronic display of conformity on any of your marketing material to show customers and code officials that your product has been evaluated to the strictest of standards.

Some examples might be print magazines, digital ads, product webpages, and social media.



Rules of Procedure

For your reference, we have included detailed instructions as also outlined in the ICC-ES [Rules of Procedure](https://www.icc-es.org), available at www.icc-es.org.

13.0 PERMITTED USE OF EVALUATION REPORTS AND THE ICC-ES NAME, MARK OF CONFORMITY AND REPORT NUMBER

13.1 Report holders must comply with these Rules of Procedure in their use of the ICC-ES name, mark, ICC-ES machine-readable code, their ICC-ES evaluation report number, the evaluation report itself, and any communications associated with the evaluation report. If it is determined that identification is being applied to materials or products that do not comply with the current evaluation report, applied before authorization or applied after a report has been closed, ICC-ES will immediately disseminate a notice of violation of the ICC-ES Rules of Procedure and take any and all actions necessary to secure compliance.

13.2 No listee shall use the ICC-ES mark or evaluation report number until authorized by ICC-ES.

13.3 The then-current evaluation report, as available on the ICC-ES website, may be reproduced in its entirety by the report holder in the report holder's literature, advertising, or promotional materials. No reference to ICC-ES, the evaluation report, the ICC-ES mark, or the ICC-ES machine-readable code shall be included with such reproduction in a manner which could be misleading.

13.4 In lieu of reproducing the entire evaluation report in specifications, literature, advertising, or promotional materials, the report holder may use references and statements such as: "See ICC-ES Evaluation Report No. ____ (insert current number) at www.icc-es.org"; and/or the ICC-ES machine-readable code. It is the report holder's responsibility not to misrepresent the evaluation report in any way, and not to use the report in such a manner as to bring ICC-ES into disrepute; and to secure ICC-ES approval in advance whenever there is a question about the use of the ICC-ES name and/or ICC-ES evaluation report. Report holders are expressly prohibited from using the ICC-ES name, mark, ICC-ES machine-readable code, or report number to claim or imply product recognition beyond what is specified in the evaluation report. Report holders are also expressly prohibited from using, in advertising, promotional, and informational materials, any language that would likely mislead the public about their evaluation reports. ICC-ES reserves to itself the right to interpret what would constitute misleading language.

13.5 The following provisions govern the use of the ICC-ES mark and ICC-ES machine-readable code on products and in advertising, promotional, and informational materials:

13.5.1 Use of the ICC-ES mark and ICC-ES machine-readable code is prohibited in any manner and in any media without authorization from ICC-ES. Use of or reference to any evaluation report after cancellation is also prohibited.

13.5.2 The ICC-ES mark and ICC-ES machine-readable code may be used only on or in connection with products, components, methods, and materials that are covered in currently valid evaluation reports. Use of the mark and ICC-ES machine-readable code is not a replacement or substitute for product identification provisions in the relevant evaluation report. In no circumstances may the mark and ICC-ES machine-readable code be used to imply ICC-ES approval of aesthetics or any other attributes not specifically addressed in the report.

13.5.3 The ICC-ES mark and ICC-ES machine-readable code may not be altered in any way, although it may be enlarged or reduced. Black is the basic color of the ICC-ES mark and the ICC-ES machine-readable code. Other colors may be used only when authorized in writing by ICC-ES.

13.5.4 It is the responsibility of the ICC-ES mark and ICC-ES machine-readable code user not to misrepresent in any way the status, conditions, or terms of the relevant ICC-ES evaluation report. It is also the user's responsibility to secure ICC-ES approval in advance whenever there is a question about how the ICC-ES mark and ICC-ES machine-readable code, and/or name is to be used.

13.6 The above does not excuse compliance with any ICC-ES requirement as a condition of securing or maintaining an evaluation report requiring identification, reference to standards or inspection, or other information to be affixed to or labeled upon products.

13.7 Violation of these rules, regarding the use of the ICC-ES name and mark, ICC-ES machine-readable code, reports and report numbers, as determined by ICC-ES, must cease immediately upon notification of the violator by ICC-ES. Failure to respond to the notification may lead to suspension or revocation of the report under these rules. ICC-ES also reserves the right to note violations in the public notices and publications of ICC-ES and its parent company, ICC, and on the ICC-ES website.

EXHIBIT B

United States of America

United States Patent and Trademark Office

ICC

Reg. No. 4,718,932

Registered Apr. 14, 2015

Int. Cls.: 9, 16, 25, 35, 37, 38, 41, 42 and 45

TRADEMARK

SERVICE MARK

PRINCIPAL REGISTER

INTERNATIONAL CODE COUNCIL, INC. (CALIFORNIA CORPORATION)
3060 SATURN STREET, SUITE 100
BREA, CA 928211732

FOR: COMPUTER SOFTWARE AND DOWNLOADABLE COMPUTER SOFTWARE FOR USE IN THE CREATION OF AND TO FACILITATE SEARCHING OF ELECTRONIC VERSIONS OF INTERNATIONAL, FEDERAL, STATE AND LOCAL BUILDING DESIGN AND CONSTRUCTION CODES, STANDARDS, REGULATIONS AND RULES, IDENTIFYING AND ACCESSING SAID CODES, STANDARDS, REGULATIONS AND RULES APPLICABLE IN A PARTICULAR JURISDICTION AND ACROSS JURISDICTIONS, CHECKING COMPLIANCE OF BUILDINGS OR OTHER STRUCTURES OR ENVIRONMENTS WITH SUCH CODES, STANDARDS, REGULATIONS AND RULES, AND IDENTIFYING AREAS OF NON-COMPLIANCE; COMPUTER SOFTWARE AND DOWNLOADABLE COMPUTER SOFTWARE FOR USE BY GOVERNMENT AGENCIES AND OFFICIALS, ARCHITECTS, ENGINEERS, CONSULTANTS AND OTHERS IN MONITORING COMPLIANCE WITH CODES, STANDARDS, REGULATIONS AND RULES; DOWNLOADABLE ELECTRONIC PUBLICATIONS, NAMELY, BOOKS, E-BOOKS AND MANUALS IN THE FIELD OF BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES; DOWNLOADABLE ELECTRONIC PUBLICATIONS, NAMELY, BOOKS, E-BOOKS AND MANUALS IN THE FIELD OF ENVIRONMENTALLY SOUND BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES; DOWNLOADABLE MOBILE APPLICATION FOR ACCESSING, PURCHASING AND READING BOOKS, E-BOOKS AND MANUALS IN THE FIELD OF BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES, CD-ROMS AND DVDS CONTAINING BUILDING CONSTRUCTION AND SAFETY CODES, STANDARDS, RULES AND REGULATIONS, COMMENTARY RELATED TO SAID CODES, STANDARDS, RULES AND REGULATIONS, AND TRAINING IN COMPLIANCE WITH SAID CODES, STANDARDS, RULES AND REGULATIONS, IN CLASS 9 (U.S. CLS. 21, 23, 26, 36 AND 38).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.



Michelle K. Lee
Director of the United States
Patent and Trademark Office

FOR: DICTIONARY SERIES, PERIODICAL MAGAZINES AND NEWSLETTERS DIRECTED TO GOVERNMENT OFFICIALS, ARCHITECTS, ENGINEERS, AND OTHERS CONCERNED WITH BUILDING, CONSTRUCTION, AND SAFETY CODES, STANDARDS, RULES AND REGULATIONS; SERIES OF MONOGRAPHS, SERIES OF BOOKS, PAMPHLETS AND PRINTED MATERIALS IN THE NATURE OF WRITTEN ARTICLES AND WRITTEN INFORMATIONAL MATERIALS COMPILED IN LOOSE LEAF AND BOUND VOLUME FORMAT.

Reg. No. 4,718,932

ALL DEALING WITH BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, RULES AND REGULATIONS DIRECTED TO GOVERNMENT OFFICIALS, ARCHITECTS, ENGINEERS AND OTHERS CONCERNED WITH SAID CODES, STANDARDS, RULES AND REGULATIONS; NEWSLETTERS, MAGAZINES AND CATALOGS RELATED TO THE CONSTRUCTION INDUSTRY; PRINTED MATERIALS, NAMELY, PUZZLE BOOKS AND ACTIVITY SHEETS, STICKERS, PAMPHLETS, BROCHURES, BOOKS, POSTERS, ALL IN THE FIELD OF PROMOTING THE PUBLIC AWARENESS IN CHILDREN OF BUILDING CONSTRUCTION AND BUILDING SAFETY, IN CLASS 16 (U.S. CLS. 2, 5, 22, 23, 29, 37, 38 AND 50).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.

FOR: SHIRTS, IN CLASS 25 (U.S. CLS. 22 AND 39).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.

FOR: ASSOCIATION SERVICES, NAMELY, PROMOTING THE INTERESTS OF BUILDING, CONSTRUCTION, AND SAFETY CODE DEVELOPERS, ENFORCERS, AND USERS, AND PROMOTING AWARENESS OF THE SPECIAL NEEDS OF DISABLED PERSONS FOR HOMES FREE OF OBSTACLES AND RESTRICTIONS; COMPUTERIZED ON-LINE ORDERING SERVICES FEATURING PRODUCTS RELATING TO CONSTRUCTION CODES, STANDARDS, REGULATIONS AND RULES IN THE NATURE OF MONOGRAPHS, SERIES OF BOOKS, MANUALS, MATERIALS IN THE NATURE OF WRITTEN ARTICLES AND WRITTEN INFORMATIONAL MATERIALS COMPILED IN LOOSE-LEAF AND BOUND VOLUME FORMAT, COMPUTER SOFTWARE, CD-ROMS AND DVDS DIRECTED TO GOVERNMENT OFFICIALS, ARCHITECTS, ENGINEERS AND OTHERS CONCERNED WITH CONSTRUCTION CODES, STANDARDS, REGULATIONS AND RULES; PROMOTING THE PUBLIC AWARENESS IN CHILDREN OF BUILDING SAFETY, IN CLASS 35 (U.S. CLS. 100, 101 AND 102).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.

FOR: PROVIDING AN ON-LINE SEARCHABLE DATABASE IN THE FIELDS OF BUILDING CONSTRUCTION, MAINTENANCE AND REPAIR FOR SEARCHING AND RETRIEVING INFORMATION FROM RECOMMENDED BUILDING, CONSTRUCTION, AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES FOR USE IN THE FIELDS OF BUILDING CONSTRUCTION, MAINTENANCE AND REPAIR, IN CLASS 37 (U.S. CLS. 100, 103 AND 106).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.

FOR: ONLINE FORUM THAT ALLOWS USERS AND PARTICIPANTS TO PARTICIPATE AND ASSIST IN THE DEVELOPMENT OF, DISCUSS, SHARE COMMENTS ABOUT, MONITOR, REVIEW, AND VOTE ON DEVELOPMENT OF, AND CHANGES, ENHANCEMENTS OR IMPROVEMENTS IN, INTERNATIONAL, FEDERAL, STATE AND LOCAL BUILDING DESIGN AND CONSTRUCTION CODES, STANDARDS, REGULATIONS AND RULES, IN CLASS 38 (U.S. CLS. 100, 101 AND 104).

FIRST USE 11-30-2013; IN COMMERCE 11-30-2013.

FOR: EDUCATIONAL SERVICES, NAMELY, CONDUCTING CLASSES, SEMINARS, CONFERENCES, AND WORKSHOPS FOR CHILDREN IN THE FIELD OF BUILDING CONSTRUCTION AND BUILDING SAFETY; EDUCATIONAL SERVICES, NAMELY, CONDUCTING INFORMAL ON-LINE PROGRAMS FOR CHILDREN IN THE FIELD OF BUILDING CONSTRUCTION AND BUILDING SAFETY; ENTERTAINMENT SERVICES, NAMELY, PROVIDING A WEBSITE TARGETED TO CHILDREN FEATURING PUZZLES, PRE-RECORDED, NONDOWNLOADABLE MUSIC, AND ONLINE VIDEO GAMES AND ONLINE COMPUTER GAMES, ALL IN THE FIELD OF BUILDING CONSTRUCTION AND BUILDING

Reg. No. 4,718,932 SAFETY; EDUCATION, TRAINING AND CERTIFICATION SERVICES, NAMELY, CONDUCTING AND PROVIDING GROUP, INDIVIDUAL AND ONLINE CLASSES, TRAINING, WORKSHOPS, SEMINARS, CONFERENCES IN THE FIELD OF BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES; PROVIDING ONLINE PUBLICATIONS, NAMELY, BOOKS, E-BOOKS, MAGAZINES, NEWSLETTERS, ARTICLES, ANNOUNCEMENTS AND INFORMATIONAL MATERIALS IN THE NATURE OF BROCHURES, ALL DEALING WITH BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES, DIRECTED TO GOVERNMENT AGENCIES AND OFFICIALS, ARCHITECTS, ENGINEERS, CONSULTANTS AND OTHERS CONCERNED WITH BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES, IN CLASS 41 (U.S. CLS. 100, 101 AND 107).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.

FOR: PROVIDING AN ON-LINE SEARCHABLE DATABASE IN THE FIELDS OF COMMERCIAL AND RESIDENTIAL BUILDING DESIGN FOR SEARCHING AND RETRIEVING INFORMATION FROM RECOMMENDED BUILDING, CONSTRUCTION AND SAFETY DESIGNS; PROVIDING A WEBSITE THAT GIVES COMPUTER USERS THE ABILITY TO SUBSCRIBE TO ONLINE PUBLICATIONS PERMITTING SEARCHES OF ELECTRONIC VERSIONS OF INTERNATIONAL, FEDERAL, STATE AND LOCAL BUILDING DESIGN AND CONSTRUCTION CODES AND STANDARDS; PROVIDING ONLINE NON-DOWNLOADABLE SOFTWARE FOR USE IN THE DEVELOPMENT OF BUILDING, CONSTRUCTION, AND SAFETY CODES STANDARDS, REGULATIONS AND RULES; PROVIDING TEMPORARY USE OF ON-LINE NON-DOWNLOADABLE SOFTWARE FOR TRANSMITTING MESSAGES AMONG ONLINE USERS IN THE FIELD OF INTERNATIONAL, FEDERAL, STATE AND LOCAL BUILDING DESIGN AND CONSTRUCTION CODES, STANDARDS, REGULATIONS AND RULES, TESTING, ANALYSIS AND EVALUATION OF THE GOODS AND SERVICES OF OTHERS FOR THE PURPOSE OF CERTIFICATION; TESTING, ANALYSIS, AND EVALUATION OF THE KNOWLEDGE, SKILLS AND ABILITIES OF OTHERS FOR THE PURPOSES OF LICENSING AND CERTIFICATION IN THE FIELD OF BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES; ACCREDITATION SERVICES, NAMELY, DEVELOPING AND ADMINISTERING STANDARDS, TESTS AND PROCEDURES FOR LICENSING AND CERTIFYING INDIVIDUALS IN THE FIELD OF BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES, IN CLASS 42 (U.S. CLS. 100 AND 101).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.

FOR: PROVIDING AN ON-LINE SEARCHABLE DATABASE OF RECOMMENDED LAWS AND REGULATIONS IN THE FIELDS OF BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES, PROVIDING AN ON-LINE DATABASE FOR SEARCHING AND RETRIEVING LEGAL INFORMATION FROM RECOMMENDED INTERNATIONAL, FEDERAL, STATE AND LOCAL BUILDING AND CONSTRUCTION CODES, STANDARDS, REGULATIONS AND RULES, IN CLASS 45 (U.S. CLS. 100 AND 101).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.

THE MARK CONSISTS OF STANDARD CHARACTERS WITHOUT CLAIM TO ANY PARTICULAR FONT, STYLE, SIZE, OR COLOR.

OWNER OF U.S. REG. NOS. 3,815,299, 4,198,797 AND OTHERS.

SER. NO. 86-151,661, FILED 12-23-2013.

SALLY SHIH, EXAMINING ATTORNEY

**REQUIREMENTS TO MAINTAIN YOUR FEDERAL
TRADEMARK REGISTRATION**

**WARNING: YOUR REGISTRATION WILL BE CANCELLED IF YOU DO NOT FILE THE
DOCUMENTS BELOW DURING THE SPECIFIED TIME PERIODS.**

Requirements in the First Ten Years*

What and When to File:

First Filing Deadline: You must file a Declaration of Use (or Excusable Nonuse) between the 5th and 6th years after the registration date. See 15 U.S.C. §§1058, 1141k. If the declaration is accepted, the registration will continue in force for the remainder of the ten-year period, calculated from the registration date, unless cancelled by an order of the Commissioner for Trademarks or a federal court.

Second Filing Deadline: You must file a Declaration of Use (or Excusable Nonuse) and an Application for Renewal between the 9th and 10th years after the registration date.* See 15 U.S.C. §1059.

Requirements in Successive Ten-Year Periods*

What and When to File:

You must file a Declaration of Use (or Excusable Nonuse) and an Application for Renewal between every 9th and 10th-year period, calculated from the registration date.*

Grace Period Filings*

The above documents will be accepted as timely if filed within six months after the deadlines listed above with the payment of an additional fee.

***ATTENTION MADRID PROTOCOL REGISTRANTS:** The holder of an international registration with an extension of protection to the United States under the Madrid Protocol must timely file the Declarations of Use (or Excusable Nonuse) referenced above directly with the United States Patent and Trademark Office (USPTO). The time periods for filing are based on the U.S. registration date (not the international registration date). The deadlines and grace periods for the Declarations of Use (or Excusable Nonuse) are identical to those for nationally issued registrations. See 15 U.S.C. §§1058, 1141k. However, owners of international registrations do not file renewal applications at the USPTO. Instead, the holder must file a renewal of the underlying international registration at the International Bureau of the World Intellectual Property Organization, under Article 7 of the Madrid Protocol, before the expiration of each ten-year term of protection, calculated from the date of the international registration. See 15 U.S.C. §1141j. For more information and renewal forms for the international registration, see <http://www.wipo.int/madrid/en/>.

NOTE: Fees and requirements for maintaining registrations are subject to change. Please check the USPTO website for further information. With the exception of renewal applications for registered extensions of protection, you can file the registration maintenance documents referenced above online at <http://www.uspto.gov>.

NOTE: A courtesy e-mail reminder of USPTO maintenance filing deadlines will be sent to trademark owners/holders who authorize e-mail communication and maintain a current e-mail address with the USPTO. To ensure that e-mail is authorized and your address is current, please use the Trademark Electronic Application System (TEAS) Correspondence Address and Change of Owner Address Forms available at <http://www.uspto.gov>.

United States of America

United States Patent and Trademark Office

INTERNATIONAL CODE COUNCIL

Reg. No. 4,665,966

Registered Jan. 6, 2015

**Int. Cls.: 9, 16, 25, 35, 37,
38, 41, 42 and 45**

TRADEMARK

SERVICE MARK

PRINCIPAL REGISTER

INTERNATIONAL CODE COUNCIL, INC. (CALIFORNIA CORPORATION)
3060 SATURN STREET, SUITE 100
BREA, CA 928211732

FOR: COMPUTER SOFTWARE AND DOWNLOADABLE COMPUTER SOFTWARE FOR USE IN THE CREATION OF AND TO FACILITATE SEARCHING OF ELECTRONIC VERSIONS OF INTERNATIONAL, FEDERAL, STATE AND LOCAL BUILDING DESIGN AND CONSTRUCTION CODES, STANDARDS, REGULATIONS AND RULES, IDENTIFYING AND ACCESSING SAID CODES, STANDARDS, REGULATIONS AND RULES APPLICABLE IN A PARTICULAR JURISDICTION AND ACROSS JURISDICTIONS, CHECKING COMPLIANCE OF BUILDINGS OR OTHER STRUCTURES OR ENVIRONMENTS WITH SUCH CODES, STANDARDS, REGULATIONS AND RULES, AND IDENTIFYING AREAS OF NON-COMPLIANCE; COMPUTER SOFTWARE AND DOWNLOADABLE COMPUTER SOFTWARE FOR USE BY GOVERNMENT AGENCIES AND OFFICIALS, ARCHITECTS, ENGINEERS, CONSULTANTS AND OTHERS IN MONITORING COMPLIANCE WITH CODES, STANDARDS, REGULATIONS AND RULES; DOWNLOADABLE ELECTRONIC PUBLICATIONS, NAMELY, BOOKS, E-BOOKS AND MANUALS IN THE FIELD OF BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES; DOWNLOADABLE ELECTRONIC PUBLICATIONS, NAMELY, BOOKS, E-BOOKS AND MANUALS IN THE FIELD OF ENVIRONMENTALLY SOUND BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES; DOWNLOADABLE MOBILE APPLICATION FOR ACCESSING, PURCHASING AND READING BOOKS, E-BOOKS AND MANUALS IN THE FIELD OF BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES, CD-ROMS AND DVDS CONTAINING BUILDING CONSTRUCTION AND SAFETY CODES, STANDARDS, RULES AND REGULATIONS, COMMENTARY RELATED TO SAID CODES, STANDARDS, RULES AND REGULATIONS, AND TRAINING IN COMPLIANCE WITH SAID CODES, STANDARDS, RULES AND REGULATIONS, IN CLASS 9 (U.S. CLS. 21, 23, 26, 36 AND 38).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.



Michelle K. Lee

Deputy Director of the United States
Patent and Trademark Office

FOR: DICTIONARY SERIES, PERIODICAL MAGAZINES AND NEWSLETTERS DIRECTED TO GOVERNMENT OFFICIALS, ARCHITECTS, ENGINEERS, AND OTHERS CONCERNED WITH BUILDING, CONSTRUCTION, AND SAFETY CODES, STANDARDS, RULES AND REGULATIONS; SERIES OF MONOGRAPHS, SERIES OF BOOKS, PAMPHLETS AND PRINTED MATERIALS IN THE NATURE OF WRITTEN ARTICLES AND WRITTEN INFORMATIONAL MATERIALS COMPILED IN LOOSE LEAF AND BOUND VOLUME FORMAT.

Reg. No. 4,665,966 ALL DEALING WITH BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, RULES AND REGULATIONS DIRECTED TO GOVERNMENT OFFICIALS, ARCHITECTS, ENGINEERS AND OTHERS CONCERNED WITH SAID CODES, STANDARDS, RULES AND REGULATIONS; NEWSLETTERS, MAGAZINES AND CATALOGS RELATED TO THE CONSTRUCTION INDUSTRY; PRINTED MATERIALS, NAMELY, PUZZLE BOOKS AND ACTIVITY SHEETS, STICKERS, PAMPHLETS, BROCHURES, BOOKS, POSTERS, ALL IN THE FIELD OF PROMOTING THE PUBLIC AWARENESS IN CHILDREN OF BUILDING CONSTRUCTION AND BUILDING SAFETY, IN CLASS 16 (U.S. CLS. 2, 5, 22, 23, 29, 37, 38 AND 50).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.

FOR: SHIRTS, IN CLASS 25 (U.S. CLS. 22 AND 39).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.

FOR: ASSOCIATION SERVICES, NAMELY, PROMOTING THE INTERESTS OF BUILDING, CONSTRUCTION, AND SAFETY CODE DEVELOPERS, ENFORCERS, AND USERS, AND PROMOTING AWARENESS OF THE SPECIAL NEEDS OF DISABLED PERSONS FOR HOMES FREE OF OBSTACLES AND RESTRICTIONS, COMPUTERIZED ON-LINE ORDERING SERVICES FEATURING PRODUCTS RELATING TO CONSTRUCTION CODES, STANDARDS, REGULATIONS AND RULES IN THE NATURE OF MONOGRAPHS, SERIES OF BOOKS, MANUALS, MATERIALS IN THE NATURE OF WRITTEN ARTICLES AND WRITTEN INFORMATIONAL MATERIALS COMPILED IN LOOSE-LEAF AND BOUND VOLUME FORMAT, COMPUTER SOFTWARE, CD-ROMS AND DVDS DIRECTED TO GOVERNMENT OFFICIALS, ARCHITECTS, ENGINEERS AND OTHERS CONCERNED WITH CONSTRUCTION CODES, STANDARDS, REGULATIONS AND RULES; PROMOTING THE PUBLIC AWARENESS IN CHILDREN OF BUILDING SAFETY, IN CLASS 35 (U.S. CLS. 100, 101 AND 102).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.

FOR: PROVIDING AN ON-LINE SEARCHABLE DATABASE IN THE FIELDS OF BUILDING CONSTRUCTION, MAINTENANCE AND REPAIR FOR SEARCHING AND RETRIEVING INFORMATION FROM RECOMMENDED BUILDING, CONSTRUCTION, AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES FOR USE IN THE FIELDS OF BUILDING CONSTRUCTION, MAINTENANCE AND REPAIR, IN CLASS 37 (U.S. CLS. 100, 103 AND 106).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.

FOR: ONLINE FORUM THAT ALLOWS USERS AND PARTICIPANTS TO PARTICIPATE AND ASSIST IN THE DEVELOPMENT OF, DISCUSS, SHARE COMMENTS ABOUT, MONITOR, REVIEW, AND VOTE ON DEVELOPMENT OF, AND CHANGES, ENHANCEMENTS OR IMPROVEMENTS IN, INTERNATIONAL, FEDERAL, STATE AND LOCAL BUILDING DESIGN AND CONSTRUCTION CODES, STANDARDS, REGULATIONS AND RULES, IN CLASS 38 (U.S. CLS. 100, 101 AND 104).

FIRST USE 11-30-2013; IN COMMERCE 11-30-2013.

FOR: EDUCATIONAL SERVICES, NAMELY, CONDUCTING CLASSES, SEMINARS, CONFERENCES, AND WORKSHOPS FOR CHILDREN IN THE FIELD OF BUILDING CONSTRUCTION AND BUILDING SAFETY; EDUCATIONAL SERVICES, NAMELY, CONDUCTING INFORMAL ON-LINE PROGRAMS FOR CHILDREN IN THE FIELD OF BUILDING CONSTRUCTION AND BUILDING SAFETY; ENTERTAINMENT SERVICES, NAMELY, PROVIDING A WEBSITE TARGETED TO CHILDREN FEATURING PUZZLES, PRE-RECORDED, NON-DOWNLOADABLE MUSIC, AND ONLINE VIDEO GAMES AND ONLINE COMPUTER GAMES, ALL IN THE FIELD OF BUILDING CONSTRUCTION AND BUILDING

Reg. No. 4,665,966 SAFETY; EDUCATION, TRAINING AND CERTIFICATION SERVICES, NAMELY, CONDUCTING AND PROVIDING GROUP, INDIVIDUAL AND ONLINE CLASSES, TRAINING, WORKSHOPS, SEMINARS, CONFERENCES, AND CERTIFICATION PROGRAMS IN THE FIELD OF BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES; EDUCATIONAL EXAMINATION SERVICES, NAMELY, TESTING, LICENSING AND CERTIFYING OF INDIVIDUALS, NAMELY, DEVELOPING, PREPARING, ADMINISTERING AND SCORING STANDARDIZED TESTS FOR THE PURPOSE OF CERTIFICATION IN THE FIELD OF BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES; PROVIDING ONLINE PUBLICATIONS, NAMELY, BOOKS, E-BOOKS, MAGAZINES, NEWSLETTERS, ARTICLES, ANNOUNCEMENTS AND INFORMATIONAL MATERIALS IN THE NATURE OF BROCHURES, ALL DEALING WITH BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES, DIRECTED TO GOVERNMENT AGENCIES AND OFFICIALS, ARCHITECTS, ENGINEERS, CONSULTANTS AND OTHERS CONCERNED WITH BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES, IN CLASS 41 (U.S. CLS. 100, 101 AND 107).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.

FOR: PROVIDING AN ON-LINE SEARCHABLE DATABASE IN THE FIELDS OF COMMERCIAL AND RESIDENTIAL BUILDING DESIGN FOR SEARCHING AND RETRIEVING INFORMATION FROM RECOMMENDED BUILDING, CONSTRUCTION AND SAFETY DESIGNS; PROVIDING A WEBSITE THAT GIVES COMPUTER USERS THE ABILITY TO SUBSCRIBE TO ONLINE PUBLICATIONS PERMITTING SEARCHES OF ELECTRONIC VERSIONS OF INTERNATIONAL, FEDERAL, STATE AND LOCAL BUILDING DESIGN AND CONSTRUCTION CODES AND STANDARDS; PROVIDING ONLINE NON-DOWNLOADABLE SOFTWARE FOR USE IN THE DEVELOPMENT OF BUILDING, CONSTRUCTION, AND SAFETY CODES STANDARDS, REGULATIONS AND RULES; PROVIDING TEMPORARY USE OF ON-LINE NON-DOWNLOADABLE SOFTWARE FOR TRANSMITTING MESSAGES AMONG ONLINE USERS IN THE FIELD OF INTERNATIONAL, FEDERAL, STATE AND LOCAL BUILDING DESIGN AND CONSTRUCTION CODES, STANDARDS, REGULATIONS AND RULES; TESTING, ANALYSIS AND EVALUATION OF THE GOODS AND SERVICES OF OTHERS FOR THE PURPOSE OF CERTIFICATION, IN CLASS 42 (U.S. CLS. 100 AND 101).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.

FOR: PROVIDING AN ON-LINE SEARCHABLE DATABASE OF RECOMMENDED LAWS AND REGULATIONS IN THE FIELDS OF BUILDING, CONSTRUCTION AND SAFETY CODES, STANDARDS, REGULATIONS AND RULES, PROVIDING AN ON-LINE DATABASE FOR SEARCHING AND RETRIEVING LEGAL INFORMATION FROM RECOMMENDED INTERNATIONAL, FEDERAL, STATE AND LOCAL BUILDING AND CONSTRUCTION CODES, STANDARDS, REGULATIONS AND RULES, IN CLASS 45 (U.S. CLS. 100 AND 101).

FIRST USE 12-31-2005; IN COMMERCE 12-31-2005.

THE MARK CONSISTS OF STANDARD CHARACTERS WITHOUT CLAIM TO ANY PARTICULAR FONT, STYLE, SIZE, OR COLOR.

OWNER OF U.S. REG. NOS. 2,769,486, 4,093,277 AND OTHERS.

SEC. 2(F).

SER. NO. 86-151,666, FILED 12-23-2013.

SALLY SHIH, EXAMINING ATTORNEY

**REQUIREMENTS TO MAINTAIN YOUR FEDERAL
TRADEMARK REGISTRATION**

**WARNING: YOUR REGISTRATION WILL BE CANCELLED IF YOU DO NOT FILE THE
DOCUMENTS BELOW DURING THE SPECIFIED TIME PERIODS.**

Requirements in the First Ten Years*

What and When to File:

First Filing Deadline: You must file a Declaration of Use (or Excusable Nonuse) between the 5th and 6th years after the registration date. See 15 U.S.C. §§1058, 1141k. If the declaration is accepted, the registration will continue in force for the remainder of the ten-year period, calculated from the registration date, unless cancelled by an order of the Commissioner for Trademarks or a federal court.

Second Filing Deadline: You must file a Declaration of Use (or Excusable Nonuse) and an Application for Renewal between the 9th and 10th years after the registration date.*
See 15 U.S.C. §1059.

Requirements in Successive Ten-Year Periods*

What and When to File:

You must file a Declaration of Use (or Excusable Nonuse) and an Application for Renewal between every 9th and 10th-year period, calculated from the registration date.*

Grace Period Filings*

The above documents will be accepted as timely if filed within six months after the deadlines listed above with the payment of an additional fee.

**The United States Patent and Trademark Office (USPTO) will NOT send you any future notice or
reminder of these filing requirements.**

***ATTENTION MADRID PROTOCOL REGISTRANTS:** The holder of an international registration with an extension of protection to the United States under the Madrid Protocol must timely file the Declarations of Use (or Excusable Nonuse) referenced above directly with the USPTO. The time periods for filing are based on the U.S. registration date (not the international registration date). The deadlines and grace periods for the Declarations of Use (or Excusable Nonuse) are identical to those for nationally issued registrations. See 15 U.S.C. §§1058, 1141k. However, owners of international registrations do not file renewal applications at the USPTO. Instead, the holder must file a renewal of the underlying international registration at the International Bureau of the World Intellectual Property Organization, under Article 7 of the Madrid Protocol, before the expiration of each ten-year term of protection, calculated from the date of the international registration. See 15 U.S.C. §1141j. For more information and renewal forms for the international registration, see <http://www.wipo.int/madrid/en/>.

NOTE: Fees and requirements for maintaining registrations are subject to change. Please check the USPTO website for further information. With the exception of renewal applications for registered extensions of protection, you can file the registration maintenance documents referenced above online at <http://www.uspto.gov>.

Int. Cls.: 9, 35 and 41

Prior U.S. Cls.: 21, 23, 26, 36, 38, 100, 101, 102 and 107

Reg. No. 3,578,864

United States Patent and Trademark Office

Registered Feb. 24, 2009

**TRADEMARK
SERVICE MARK
PRINCIPAL REGISTER**



INTERNATIONAL CODE COUNCIL, INC. (CALIFORNIA CORPORATION)
5360 WORKMAN MILL ROAD
WHITTIER, CA 90601

FOR: ELECTRONIC PUBLICATIONS, NAMELY, BOOKS AND MANUALS IN THE FIELD OF BUILDING, CONSTRUCTION AND SAFETY CODES AND STANDARDS RECORDED ON COMPUTER MEDIA AND DOWNLOADABLE BOOKS AND MANUALS IN THE FIELD OF BUILDING, CONSTRUCTION AND SAFETY CODES AND STANDARDS, IN CLASS 9 (U.S. CLS. 21, 23, 26, 36 AND 38).

FIRST USE 1-5-2007; IN COMMERCE 1-5-2007.

FOR: ASSOCIATION SERVICES, NAMELY, PROMOTING THE INTERESTS OF BUILDING, CONSTRUCTION AND SAFETY CODES AND STANDARDS DEVELOPERS, ENFORCERS AND USERS, IN CLASS 35 (U.S. CLS. 100, 101 AND 102).

FIRST USE 1-5-2007; IN COMMERCE 1-5-2007.

FOR: TRAINING SERVICES IN THE FIELD OF BUILDING, CONSTRUCTION AND SAFETY CODES AND STANDARDS; EDUCATIONAL SERVICES, NAMELY, CONDUCTING CLASSES, SEMI-

NARS, CONFERENCES, AND WORKSHOPS IN THE FIELD OF BUILDING, CONSTRUCTION AND SAFETY CODES AND STANDARDS, IN CLASS 41 (U.S. CLS. 100, 101 AND 107).

FIRST USE 1-5-2007; IN COMMERCE 1-5-2007.

OWNER OF U.S. REG. NOS. 2,242,343, 3,259,781 AND OTHERS.

THE MARK CONSISTS OF THE STYLIZED LETTERS "ICC", THE STYLIZED WORDING "INTERNATIONAL CODE COUNCIL" AND THE DESIGN OF A PORTION OF A GLOBE FORMED BY LINES INSIDE A SHADED SQUARE. THE LETTERS "ICC" APPEAR IN THE TOP RIGHT OF THE SHADED SQUARE, AND THE WORDING "INTERNATIONAL CODE COUNCIL" APPEARS TO THE RIGHT OF THE SHADED SQUARE.

SEC. 2(F) AS TO "INTERNATIONAL CODE COUNCIL".

SER. NO. 77-373,374, FILED 1-16-2008.

JAY BESCH, EXAMINING ATTORNEY

United States of America

United States Patent and Trademark Office



Reg. No. 3,998,452

Registered Jul. 19, 2011

Renewal Term Begins Jul. 19, 2021

10 Year Renewal/Amended

Int. Cl.: 37, 42, 45

Service Mark

Principal Register

INTERNATIONAL CODE COUNCIL, INC. (DELAWARE CORPORATION)
3060 SATURN STREET, SUITE 100
BREA, CALIFORNIA 92821

CLASS 37: Providing an on-line searchable database in the fields of building construction; Providing an on-line searchable database in the fields of building construction, maintenance and repair for searching and retrieving information from recommended building, construction, and safety codes, standards, regulations and rules

FIRST USE 4-1-2008; IN COMMERCE 4-1-2008

CLASS 42: Providing an on-line searchable database in the fields of commercial and residential building design for searching and retrieving information from recommended building, construction and safety codes, standards, regulations and rules; providing a website that gives computer users the ability to subscribe to online publications permitting searches of recommended building, construction and safety codes, standards, regulations and rules

FIRST USE 4-1-2008; IN COMMERCE 4-1-2008

CLASS 45: Providing an on-line searchable database of recommended laws and regulations in the fields of building codes and standards, construction codes and standards, and safety codes and standards

FIRST USE 4-1-2008; IN COMMERCE 4-1-2008

The mark consists of the stylized letters "ICC", the stylized wording "INTERNATIONAL CODE COUNCIL" and the design of a portion of a globe formed by lines inside a shaded square. The letters "ICC" appear in the top right of the shaded square, and the wording "INTERNATIONAL CODE COUNCIL" appears below the shaded square.

OWNER OF U.S. REG. NO. 3259781, 2242343, 3259779



Performing the Functions and Duties of the
Under Secretary of Commerce for Intellectual Property and
Director of the United States Patent and Trademark Office



REQUIREMENTS TO MAINTAIN YOUR FEDERAL TRADEMARK REGISTRATION

WARNING: YOUR REGISTRATION WILL BE CANCELLED IF YOU DO NOT FILE THE DOCUMENTS BELOW DURING THE SPECIFIED TIME PERIODS.

Requirements in the First Ten Years*

What and When to File:

- **First Filing Deadline:** You must file a Declaration of Use (or Excusable Nonuse) between the 5th and 6th years after the registration date. See 15 U.S.C. §§1058, 1141k. If the declaration is accepted, the registration will continue in force for the remainder of the ten-year period, calculated from the registration date, unless cancelled by an order of the Commissioner for Trademarks or a federal court.
- **Second Filing Deadline:** You must file a Declaration of Use (or Excusable Nonuse) and an Application for Renewal between the 9th and 10th years after the registration date.* See 15 U.S.C. §1059.

Requirements in Successive Ten-Year Periods*

What and When to File:

- You must file a Declaration of Use (or Excusable Nonuse) and an Application for Renewal between every 9th and 10th-year period, calculated from the registration date.*

Grace Period Filings*

The above documents will be accepted as timely if filed within six months after the deadlines listed above with the payment of an additional fee.

***ATTENTION MADRID PROTOCOL REGISTRANTS:** The holder of an international registration with an extension of protection to the United States under the Madrid Protocol must timely file the Declarations of Use (or Excusable Nonuse) referenced above directly with the United States Patent and Trademark Office (USPTO). The time periods for filing are based on the U.S. registration date (not the international registration date). The deadlines and grace periods for the Declarations of Use (or Excusable Nonuse) are identical to those for nationally issued registrations. See 15 U.S.C. §§1058, 1141k. However, owners of international registrations do not file renewal applications at the USPTO. Instead, the holder must file a renewal of the underlying international registration at the International Bureau of the World Intellectual Property Organization, under Article 7 of the Madrid Protocol, before the expiration of each ten-year term of protection, calculated from the date of the international registration. See 15 U.S.C. §1141j. For more information and renewal forms for the international registration, see <http://www.wipo.int/madrid/en/>.

NOTE: Fees and requirements for maintaining registrations are subject to change. Please check the USPTO website for further information. With the exception of renewal applications for registered extensions of protection, you can file the registration maintenance documents referenced above online at <http://www.uspto.gov>.

NOTE: A courtesy e-mail reminder of USPTO maintenance filing deadlines will be sent to trademark owners/holders who authorize e-mail communication and maintain a current e-mail address with the USPTO. To ensure that e-mail is authorized and your address is current, please use the Trademark Electronic Application System (TEAS) Correspondence Address and Change of Owner Address Forms available at <http://www.uspto.gov>.

United States of America

United States Patent and Trademark Office



Reg. No. 5,351,097

Registered Dec. 05, 2017

Int. Cl.: 9, 16, 25, 35, 37, 38, 41, 42, 45

Service Mark

Trademark

Principal Register

International Code Council, Inc. (CALIFORNIA CORPORATION)
Suite 100
3060 Saturn Street
Brea, CALIFORNIA 928211732

CLASS 9: Computer software and downloadable computer software for use in the creation of and to facilitate searching of electronic versions of international, federal, state and local building design and construction codes, standards, regulations and rules, identifying and accessing said codes, standards, regulations and rules applicable in a particular jurisdiction and across jurisdictions, checking compliance of buildings or other structures or environments with such codes, standards, regulations and rules, and identifying areas of non-compliance; computer software and downloadable computer software for use by government agencies and officials, architects, engineers, consultants and others in monitoring compliance with codes, standards, regulations and rules; downloadable electronic publications, namely, books, e-books and manuals in the field of building, construction and safety codes, standards, regulations and rules; downloadable electronic publications, namely, books, e-books and manuals in the field of environmentally sound building, construction and safety codes, standards, regulations and rules; downloadable mobile application for accessing, purchasing and reading books, e-books and manuals in the field of building, construction and safety codes, standards, regulations and rules, CD-ROMs and DVDs containing building construction and safety codes, standards, rules and regulations, commentary related to said codes, standards, rules and regulations, and training in compliance with said codes, standards, rules and regulations

FIRST USE 4-00-2015; IN COMMERCE 4-00-2015

CLASS 16: Dictionary series, periodical magazines and newsletters directed to government officials, architects, engineers, and others concerned with building, construction, and safety codes, standards, rules and regulations; series of monographs, series of books, pamphlets and printed materials in the nature of written articles and written informational materials compiled in loose leaf and bound volume format, all dealing with building, construction and safety codes, standards, rules and regulations directed to government officials, architects, engineers and others concerned with said codes, standards, rules and regulations; newsletters, magazines and catalogs related to the construction industry; printed materials, namely, activity sheets and stickers, in the field of promoting the public awareness in children of building construction and building safety

FIRST USE 4-00-2015; IN COMMERCE 4-00-2015



Joseph Matol

Performing the Functions and Duties of the
Under Secretary of Commerce for
Intellectual Property and Director of the
United States Patent and Trademark Office

FIRST USE 4-00-2015; IN COMMERCE 4-00-2015

CLASS 35: Association services, namely, promoting the interests of building, construction, and safety code developers, enforcers, and users, and promoting awareness of the special needs of disabled persons for homes free of obstacles and restrictions; computerized on-line ordering services featuring products relating to construction codes, standards, regulations and rules in the nature of monographs, series of books, manuals, materials in the nature of written articles and written informational materials compiled in loose-leaf and bound volume format, computer software, CD-ROMs and DVDs directed to government officials, architects, engineers and others concerned with construction codes, standards, regulations and rules; promoting the public awareness in children of building safety

FIRST USE 4-00-2015; IN COMMERCE 4-00-2015

CLASS 37: Providing an on-line searchable database in the fields of building construction, maintenance and repair for searching and retrieving information from recommended building, construction, and safety codes, standards, regulations and rules for use in the fields of building construction, maintenance and repair

FIRST USE 4-00-2015; IN COMMERCE 4-00-2015

CLASS 38: Online forum that allows users and participants to participate and assist in the development of, discuss, share comments about, monitor, review, and vote on development of, and changes, enhancements or improvements in, international, federal, state and local building design and construction codes, standards, regulations and rules

FIRST USE 4-00-2015; IN COMMERCE 4-00-2015

CLASS 41: Education, training and certification services, namely, conducting and providing group, individual and online classes, training, workshops, seminars, conferences in the field of building, construction and safety codes, standards, regulations and rules; providing online publications, namely, books, e-books, magazines, newsletters, articles, announcements and informational materials in the nature of brochures, all dealing with building, construction and safety codes, standards, regulations and rules, directed to government agencies and officials, architects, engineers, consultants and others concerned with building, construction and safety codes, standards, regulations and rules

FIRST USE 4-00-2015; IN COMMERCE 4-00-2015

CLASS 42: Providing an on-line searchable database in the fields of commercial and residential building design for searching and retrieving information from recommended building, construction and safety designs; providing a website that gives computer users the ability to subscribe to online publications permitting searches of electronic versions of international, federal, state and local building design and construction codes and standards; providing online non-downloadable software for use in the development of building, construction, and safety codes standards, regulations and rules; providing temporary use of on-line non-downloadable software for transmitting messages among online users in the field of international, federal, state and local building design and construction codes, standards, regulations and rules; testing, analysis and evaluation of the goods and services of others for the purpose of certification; testing, analysis, and evaluation of the knowledge, skills and abilities of others for the purposes of licensing and certification in the field of building, construction and safety codes, standards, regulations and rules; accreditation services, namely, developing and administering standards, tests and procedures for licensing and certifying individuals in the field of building, construction and safety codes, standards, regulations and rules

FIRST USE 4-00-2015; IN COMMERCE 4-00-2015

CLASS 45: Providing an on-line searchable database of recommended laws and regulations in the fields of building, construction and safety codes, standards, regulations and rules; providing an on-line database for searching and retrieving legal information from

FIRST USE 4-00-2015; IN COMMERCE 4-00-2015

The mark consists of a 1/4 globe design with the word "ICC" to the right of the globe.

OWNER OF U.S. REG. NO. 2242343, 4718932, 3998452

SER. NO. 86-797,859, FILED 10-23-2015

WARNING: YOUR REGISTRATION WILL BE CANCELLED IF YOU DO NOT FILE THE DOCUMENTS BELOW DURING THE SPECIFIED TIME PERIODS.

Requirements in the First Ten Years*

What and When to File:

- **First Filing Deadline:** You must file a Declaration of Use (or Excusable Nonuse) between the 5th and 6th years after the registration date. See 15 U.S.C. §§1058, 1141k. If the declaration is accepted, the registration will continue in force for the remainder of the ten-year period, calculated from the registration date, unless cancelled by an order of the Commissioner for Trademarks or a federal court.
- **Second Filing Deadline:** You must file a Declaration of Use (or Excusable Nonuse) and an Application for Renewal between the 9th and 10th years after the registration date.* See 15 U.S.C. §1059.

Requirements in Successive Ten-Year Periods*

What and When to File:

- You must file a Declaration of Use (or Excusable Nonuse) and an Application for Renewal between every 9th and 10th-year period, calculated from the registration date.*

Grace Period Filings*

The above documents will be accepted as timely if filed within six months after the deadlines listed above with the payment of an additional fee.

***ATTENTION MADRID PROTOCOL REGISTRANTS:** The holder of an international registration with an extension of protection to the United States under the Madrid Protocol must timely file the Declarations of Use (or Excusable Nonuse) referenced above directly with the United States Patent and Trademark Office (USPTO). The time periods for filing are based on the U.S. registration date (not the international registration date). The deadlines and grace periods for the Declarations of Use (or Excusable Nonuse) are identical to those for nationally issued registrations. See 15 U.S.C. §§1058, 1141k. However, owners of international registrations do not file renewal applications at the USPTO. Instead, the holder must file a renewal of the underlying international registration at the International Bureau of the World Intellectual Property Organization, under Article 7 of the Madrid Protocol, before the expiration of each ten-year term of protection, calculated from the date of the international registration. See 15 U.S.C. §1141j. For more information and renewal forms for the international registration, see <http://www.wipo.int/madrid/en/>.

NOTE: Fees and requirements for maintaining registrations are subject to change. Please check the USPTO website for further information. With the exception of renewal applications for registered extensions of protection, you can file the registration maintenance documents referenced above online at <http://www.uspto.gov>.

NOTE: A courtesy e-mail reminder of USPTO maintenance filing deadlines will be sent to trademark owners/holders who authorize e-mail communication and maintain a current e-mail address with the USPTO. To ensure that e-mail is authorized and your address is current, please use the Trademark Electronic Application System (TEAS) Correspondence Address and Change of Owner Address Forms available at <http://www.uspto.gov>.

EXHIBIT C

DrJ Engineering and Certification

A dual-identity site with a blazing-fast customized search

DrJ Engineering provides full-service structural engineering and product certification services to simplify the code compliance process and bring innovative building products to market. DrJ's Technical Evaluation Reports (TERs) evaluate a product or process and are used frequently to show building officials throughout the U.S. and Canada that a given product (often newly-developed) complies with the applicable building codes.

[VISIT THE DRJ ENGINEERING SITE](#) [↗]

[CHECK OUT THE TER DIRECTORY SEARCH](#) [↗]

Technologies Used:

[Drupal](#) [React](#)

When DrJ told us that they wanted to build a site that could dynamically apply an engineer's seal to a variety of PDF reports by state, we quickly realized that an off-the shelf solution wasn't going to cut it. After researching and testing a number of PDF manipulation libraries and a few cost-prohibitive software-as-service solutions, we built a custom Drupal site that allows staff to maintain content for two different domains from a single administrative interface. We also built a custom module that delivers close to 1,000 sealed documents to DrJ customers each month as well as a progressively decoupled single-page application that helps users quickly find the Technical Evaluation Reports they need.

Challenges & Requirements

1. To help separate the two sides of their business, the client runs multiple domains ([drjengineering.org](#) [↗] and [drjcertification.org](#) [↗]), but content types, permissions and basic CMS functionality were similar for each.
2. Staff needed to be able to use the same login credentials on each domain and have the ability to manage content for each domain using a unified interface.
3. TER reports would be uploaded by staff in PDF format and needed to have an engineer's professional seal applied on request. The seal is a distinguishing mark of the engineering profession and is used as an indication to users of the documents that the contents of the document were prepared by or under the personal supervision of the engineer who sealed it. An important goal of the project was to keep staff from needing to manage multiple copies of the PDF reports for each state as well as to avoid having to store multiple copies of essentially the same document on the server.
4. When they first started, DrJ's engineers were not licensed in all states and Canadian provinces. This meant that we had to create a customizable map that visually represents which states could be sealed automatically. Behind the scenes, the site had to be able to calculate which Engineer's seal to apply to a given report based on where that engineer is licensed as well as whether the report could be sealed in that location.
5. Due to variations in building codes, some reports were developed for use only in specific states or Canadian provinces.
6. Staff and licensing changes often and is sometimes specific to the report being served. In some cases, DrJ partners with outside engineers to provide sealed versions of specific reports.
7. Reports are revised frequently and the client needed to be able to track and revert to previous revisions of reports for both page content and for uploaded reports. The report URLs could not change over time and past revisions needed to be secured to ensure that outdated reports could not be downloaded after they had been updated.
8. A request form was added for instances when seals are needed for states where DrJ engineers are not licensed.
9. A feature allowing users to quickly find reports was also important. The search needed to provide filters based on various attributes of the reports as well as a keyword search for the PDF content the reports themselves.



The DrJ Engineering and DrJ Certification sites highlight professional engineering, product certification, and code compliance services.

Solutions

A Robust Content Management System

Given that multiple staff members would be making regular changes to reports and content within the site, Drupal was a clear choice for this project. While we knew that some customization would be required, Drupal's strengths as a content management system and its module ecosystem provided an excellent starting point.

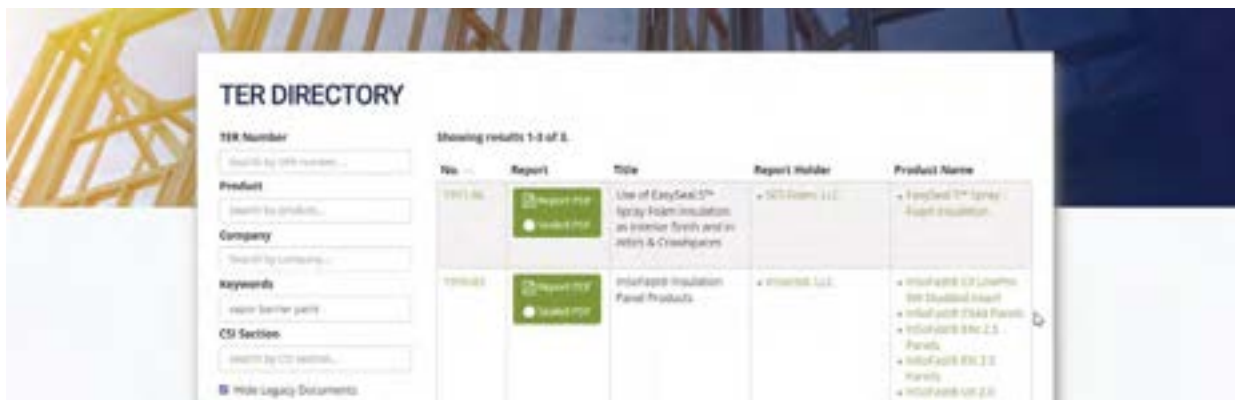
Key Modules

- Search API, Solr Search and Search API Attachments provide a generic API for searching content including the text of uploaded report files in PDF.
- jVectorMap provides a wrapper for the [jVectorMap library](#), which helped us create customized interactive US State and Canadian Province maps that help users access sealed reports.
- Global Redirect helps manage redirects and aliases.
- Taxonomy provides a structure for categorizing reports and is also used to manage the list of engineers who can seal reports and the list of states where DrJ can provide seals.
- Domain Access (Domain Path, Domain Source) makes it possible to manage content for multiple domains from the same installation.
- Path and Pathauto provides options to automatically generate and manage aliases for content.
- Revisioning and Diff allows content editors to view, compare, and restore past revisions of content.
- Upload Replace allows the most recent version of uploaded files retain the original file name.
- Webform handles quote requests, sealed document requests, and contact forms.

A Custom Module and API

- The Engineer's seal, along with the current date and state-specific notes, are dynamically added to uploaded PDF reports. A series of validations run each time a new seal is requested to ensure that the report can be sealed.
- Staff receives reports summarizing the number of sealed reports that have been downloaded in a given period and the states in which they were sealed.
- An internal API enables various authorized internal and external applications to obtain sealed documents.

A Custom Search Interface



To create the [TER Directory search](#), we leveraged [Apache Solr](#), a popular open source search platform, and [React](#), a JavaScript library for building interactive user interfaces, to create an application-like search experience within the existing Drupal site. The approach we used is known as partial decoupling, a process that allowed us to leverage the existing Drupal site and Solr backend to replace Drupal's default search view with a highly interactive end-user search experience.

[VISIT THE TER DIRECTORY](#)

The TER Directory is a custom module that includes a keyword search as well as a series of faceted search fields that can be used to refine results. On load, the application queries a series of API endpoints on the Drupal site to get a list of available filters. This includes metadata like the report number, product name, company name, and the Division from Construction Specifications Institute's MasterFormat to which the report relates. The custom facets make it possible to quickly return all results in a given category. For example, if a user knows the report number they are looking for, they can type it into the corresponding field. Faceted search fields are implemented as searchable select lists, which means that options are narrowed as the user types.

Additional search features include:

- Keyword searches comb both the report record stored in the Drupal database as well as the contents of the PDF-based report itself.
- A real-time results widget at the top of the page helps users understand how changes to their search affect results.
- A toggle filter hides legacy (no longer maintained) documents from search results by default.
- The Company and Product filters allow users to quickly view all reports related to a specific product or company.

The custom TER Directory search application allowed us to combine Drupal's strengths as a content management system with a blazing-fast, application-like user experience from React that helps DrJ customers find what they're looking for quickly and efficiently. The improved search experience we provided is one we think many of our sites would benefit from and we look forward to building and refining it further in the future.



THE QUALTIM FAMILY OF SERVICES

Where building innovation thrives.

EXHIBIT D



Technical Evaluation Report™

TER 1402-01

Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 Air Barrier, Water-Resistive Barrier, and Fire Performance in Exterior & Interior Walls of Buildings of Type I-V Construction

Hunter Panels LLC

Product:

Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286

Issue Date:

July 21, 2014

Revision Date:

September 8, 2023

Subject to Renewal:

October 1, 2024



Use the QR code to access the most recent version or a sealed copy of this Technical Evaluation Report (TER) at drjcertification.org.



COMPANY
INFORMATION:

ADDITIONAL
LISTEES:

Hunter Panels LLC
15 Franklin St Ste B2
Portland, ME 04101-7119

TF: 888-746-1114
TF: 877-775-1769

www.hunterpanels.com

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION SECTION: 07 27 23 - Board Product Air Barriers

SECTION: 07 21 00 - Thermal Insulation SECTION: 07 48 00 - Exterior Wall Assemblies

1 Innovative Products Evaluated^{1,2}

- 1.1 Xci CG (Class A)
- 1.2 Xci Ply (Class A)
- 1.3 Xci Foil (Class A)
- 1.4 Xci Foil (Class A) PLUS
- 1.5 Xci 286

2 Applicable Codes and Standards^{3,4}

- 2.1 Codes
 - 2.1.1 IBC—15, 18, 21: International Building Code®
 - 2.1.2 IRC—15, 18, 21: International Residential Code®
 - 2.1.3 IECC—15, 18, 21: International Energy Conservation Code®

¹ For more information, visit drjcertification.org or call us at 808-310-8748.

² **Federal Regulation Definition.** 24 CFR 3280.2 "Listed or certified" means included in a list published by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner. **International Building Code (IBC) Definition of Listed.** Equipment, materials, products or services included in a list published by an organization acceptable to the building official and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose Listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. **IBC Definition of Labeled.** Equipment, materials or products to which has been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, approved agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

³ This Listing is a code defined research report, which is also known as a duly authenticated report, provided by an approved agency (see IBC Section 1703.1) and/or an approved source (see IBC Section 1703.4.7). An approved agency is "approved" when it is ANAB accredited. Dr.J Engineering, LLC (Dr.J) is listed in the ANAB directory. A professional engineer is "approved" as an approved source when that professional engineer is properly licensed to transact engineering commerce. Where sealed by a professional engineer, it is also a duly authenticated report certified by an approved source. (i.e., Registered Design Professional). Dr.J is an ANAB accredited product certification body.

⁴ Unless otherwise noted, all references in this Listing are from the 2021 version of the codes and the standards referenced therein. This material, product, design, service and/or method of construction also complies with the 2000-2021 versions of the referenced codes and the standards referenced therein.



2.2 Standards and Referenced Documents

- 2.2.1 ASTM C1289: Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
- 2.2.2 ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials
- 2.2.3 ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials
- 2.2.4 ASTM E119: Standard Test Methods for Fire Tests of Building Construction and Materials
- 2.2.5 ASTM E136: Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C
- 2.2.6 ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- 2.2.7 ASTM E1354: Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter
- 2.2.8 ASTM E2178: Standard Test Method for Air Permeance of Building Materials
- 2.2.9 ASTM E2357: Standard Test Method for Determining Air Leakage Rate of Air Barrier Assemblies
- 2.2.10 NFPA 259: Standard Test Method for Potential Heat of Building Materials
- 2.2.11 NFPA 285-12: Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components⁵
- 2.2.12 NFPA 286: Standard Methods of Fire Test for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth
- 2.2.13 UL 1715: Fire Test of Interior Finish Material
- 2.2.14 UL 263: Standard for Fire Tests of Building Construction and Materials
- 2.2.15 UL 723: Test for Surface Burning Characteristics of Building Materials

3 Performance Evaluation

- 3.1 Tests, test reports, research reports, duly authenticated reports and related engineering evaluations are defined as intellectual property and/or trade secrets and protected by Defend Trade Secrets Act 2016 (DTSA).⁶
- 3.2 Testing and/or inspections conducted for this TER were performed an ISO/IEC 17025 accredited testing laboratory,⁷ an ISO/IEC 17020 accredited inspection body,⁸ which are internationally recognized accreditations through International Accreditation Forum (IAF), and/or a licensed Registered Design Professional (RDP).

⁵ References to NFPA 285-12 in this TER are code compliant through the 2018 version of the IBC.

⁶ <https://www.law.cornell.edu/uscode/text/18/part-4/chapter-90>. Given our professional duty to inform, please be aware that whoever, with intent to convert a trade secret (TS), that is related to a product or service used in or intended for use in interstate or foreign commerce, to the economic benefit of anyone other than the owner thereof, and intending or knowing that the offense will, injure any owner of that trade secret, knowingly without authorization copies, duplicates, sketches, draws, photographs, downloads, uploads, alters, destroys, photocopies, replicates, transmits, delivers, sends, mails, communicates, or conveys such information; shall be fined under this title or imprisoned not more than 10 years, or both. Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of \$5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided. The federal government and each state have a public records act. As the National Society of Professional Engineers states, "Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve." Therefore, to protect intellectual property (IP) and TS, and to achieve compliance with public records and trade secret legislation, requires approval through the use of Listings, certified reports, technical evaluation reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources. For more information, please review this website: Intellectual Property and Trade Secrets.

⁷ Internationally recognized accreditations are performed by members of the International Accreditation Forum (IAF). Accreditation Body and Regional Accreditation Group Members of IAF are admitted to the IAF MLA only after a stringent evaluation of their operations by a peer evaluation team, which is charged to ensure that the applicant complies fully with both international standards and IAF requirements. Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope.

⁸ Ibid.



- 3.3 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 were evaluated to determine:
- 3.3.1 Performance for use in exterior walls of buildings of any height and of Type I-V construction in accordance with IBC Section 2603.5 and IRC Section R316.5.12.
 - 3.3.2 Performance in accordance with UL 723 for flame spread and smoke-development index ratings in accordance with IBC Section 2603.5.4 and IRC Section R316.3.
 - 3.3.3 Performance for use without a thermal barrier in accordance with IBC Section 2603.5.2 and IRC Section R316.4.
 - 3.3.4 Performance with regard to the potential heat generated by the foam plastic insulating sheathing (FPIS) in accordance with IBC Section 2603.5.3 and IRC Section R316.4.
 - 3.3.5 Performance with regard to vertical and lateral fire propagation in accordance with 2018 IBC Section 2603.5.5.
 - 3.3.6 Performance with regard to ignition in accordance with IBC Section 2603.5.7.
 - 3.3.7 Performance for use in exterior walls of buildings as a Water-Resistive Barrier (WRB) in accordance with IBC Section 1403.2⁹ and IRC Section R703.2.
 - 3.3.8 Performance for use in exterior walls of buildings as Continuous Insulation (ci) in accordance with IECC Section C402.1.3.
 - 3.3.9 Performance in exterior walls of buildings as vapor retarding FPIS in accordance with IBC Section 1404.3.¹⁰
 - 3.3.10 Performance for use in exterior walls of buildings as an air barrier in accordance with IECC Section C402.5.1.
- 3.4 Other structural requirements in accordance with IBC Chapter 16 are outside the scope of this TER.
- 3.5 Any building code and/or accepted engineering evaluations (i.e. research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ Engineering, LLC (DrJ), an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDPs / approved sources. DrJ is qualified¹¹ to practice product and code compliance services within its scope of accreditation and engineering expertise, respectively.
- 3.6 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope, which are also its areas of professional engineering competence.
- 3.7 Any regulation specific issues not addressed in this section are outside the scope of this TER.

⁹ 2015 IBC Section 1404.2

¹⁰ 2015 IBC Section 1405.3

¹¹ Qualification is performed by a legislatively defined Accreditation Body. ANSI National Accreditation Board (ANAB) is the largest independent accreditation body in North America and provides services in more than 75 countries. DrJ is an ANAB accredited product certification body.



4 Product Description and Materials

- 4.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are proprietary FPIS products.
- 4.1.1 Xci CG (Class A) is a polyisocyanurate insulation board adhered to coated glass facers.
- 4.1.2 Xci Ply (Class A) is a polyisocyanurate insulation board bonded to APA-TECO Exposure 1, fire treated plywood.
- 4.1.3 Xci Foil (Class A) and Xci 286 are composite boards consisting of a 25 psi closed cell polyisocyanurate insulation foam core, coated on both sides with a glass-backed aluminum foil facer (ASTM C1289 Type I, Class 1).
- 4.1.4 Xci Foil (Class A) PLUS is a composite board consisting of a 25 psi closed cell polyisocyanurate insulation foam core with increased fire retardant, with tri-laminate foil facers on both sides.
- 4.2 *Material Availability*
- 4.2.1 *Thickness:*
- 4.2.1.1 Xci Ply (Class A): either a $\frac{5}{8}$ " or $\frac{3}{4}$ " fire treated plywood with 1" (25.4 mm) through 3.5" (88.9 mm) coated glass polyiso
- 4.2.1.2 Xci CG (Class A), Xci Foil (Class A), and Xci 286: 1" (25.4 mm) through 4" (102 mm). Xci Foil (Class A) PLUS is available in thicknesses from 1" (25.4 mm) through 3" (76 mm)
- 4.2.2 *Standard Product Width:*
- 4.2.2.1 48" (1219 mm)
- 4.2.3 *Standard Length:*
- 4.2.3.1 Xci Ply (Class A): 96" (2438 mm)
- 4.2.3.2 Xci CG (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286: 96" (2438 mm), 120" (3048 mm), and 144" (3657 mm)
- 4.2.4 Custom widths, lengths, and thicknesses are available upon request.

5 Applications

- 5.1 *General*
- 5.1.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are FPIS products complying with IBC Section 2603 and IRC Section R316.
- 5.1.2 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are used in exterior walls of buildings of any height and of Type I-V construction in accordance with IBC Section 2603.5 and IRC Section R316.5.12.
- 5.1.3 Environmental Product Declarations (EPD) for Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are available at polyiso.org.
- 5.1.4 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.



5.2 Vapor-Retarding Insulated Sheathing

- 5.2.1 Xci Foil (Class A), Xci Foil (Class A) PLUS and Xci 286 have a permeance rating of <1. Per [IBC Section 1404.3.2](#),¹² only Class III vapor retarders shall be used on the interior side of walls framed with insulated sheathing with <1 perm installed on the exterior side of the framed wall. Water vapor permeance of Xci Foil (Class A) and Xci 286 is indicated in Table 1.

Table 1. Xci Foil (Class A) Xci Foil (Class A) PLUS, and Xci 286 Water Vapor Permeance

Test Method	Water Vapor Permeance (grains/h·ft ² ·in Hg) ¹
ASTM E96 A (Desiccant Method)	0.000
ASTM E96 B (Water Method)	0.009

1. Results for 1" thickness board

5.3 Air Barrier

- 5.3.1 Xci 286 is an air barrier material and meets the requirements of [IECC Section C402.5.1.3](#)¹³ for use as part of an air barrier material and an air barrier assembly when installed in accordance with the manufacturer installation instructions, this TER and with all seams (including the top and bottom edges) taped.
- 5.3.2 Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci CG (Class A) meet the requirements of [IECC Section C402.5.1.4](#)¹⁴ for use as part of an air barrier assembly when installed in accordance with the manufacturer installation instructions, this TER and with all seams (including the top and bottom edges) taped. See Table 2.
- 5.3.2.1 As an alternative to the tape specified in Section 5.3.2, Xci Foil (286) sheathing joints and penetrations are permitted to be sealed with Hunter Panels Xci BarriBond Liquid Flashing and Detail Sealant.

Table 2. Xci Foil (Class A), Xci Foil (Class A) PLUS, Xci CG (Class A), and Xci 286 Air Barrier Properties

Test Method	Air Barrier Performance
ASTM E2178	≤0.00012 L/s.m ² @ 75 Pa [0.000024 CFM/R ² @ 1.57 PSF]
ASTM E2357	≤ 0.020 L/s.m ² @ 75 Pa [0.0004 CFM/R ² @ 1.57 PSF] ^{1,2}

SI: 1 psf = 0.0479 kN/m², 1 psi = 0.00689 MPa

1. All seams and joints between boards shall be covered by 4" wide Carlisle® Coatings & Waterproofing Foil-Grip™ 1402 pressure sensitive foil-faced flashing tape.

2. All fenestrations and penetrations shall be sealed with 9" wide Carlisle® Coatings & Waterproofing Alum-Grip™ 701 foil-faced self-adhering flashing tape with the top of the flashing sealed with a butyl-based sealant.

¹² 2015 IBC Section 1405.3.2

¹³ 2018 IECC Section C402.5.1.2.1

¹⁴ 2018 IECC Section C402.5.1.2.2



5.4 Water-Resistive Barrier

- 5.4.1 Xci Foil (Class A) and Xci Foil (Class A) PLUS are approved for use as a WRB as prescribed in IBC Section 1403.2¹⁵ and IRC Section R703.2¹⁶ when installed on exterior walls as described in this section.
- 5.4.2 Xci Foil (Class A) shall be installed horizontally or vertically with board joints placed directly over exterior framing spaced a maximum of 24" (610 mm) o.c. The fasteners used to attach the board shall be installed in accordance with Section 6.
- 5.4.3 All seams and joints between boards shall be covered by 4" wide Carlisle® Coatings & Waterproofing Foil Grip™ 1402 pressure sensitive foil-faced flashing tape.
- 5.4.4 A separate WRB may also be provided. If a separate WRB method is used, taping of the sheathing joints is not required.
- 5.4.5 Flashing of penetrations is required and shall comply with the applicable code.

5.5 Fire Safety Performance

5.5.1 Surface Burn Characteristics:

- 5.5.1.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 were evaluated to assess performance with regard to flame spread and smoke-developed index in accordance with ASTM E84 as shown in Table 3.

Table 3. Surface Burn Characteristics¹

Product Name	Flame Spread Index	Smoke-Developed Index
Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286	≤ 25	< 450
1. Foam core tested in accordance with UL 723 (ASTM E84). Flame spread and smoke-developed indexes are shown for comparison purposes only and are not intended to represent the performance under actual fire conditions.		

5.5.2 Ignition

- 5.5.2.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), and Xci 286 were evaluated to assess performance with regard to ignition in accordance with IBC Section 2603.5.7. Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 comply with this section when the exterior side of the sheathing is protected with one of the following materials:
- 5.5.2.1.1 A thermal barrier complying with IBC Section 2603.4.
- 5.5.2.1.2 A minimum 1" (25.4 mm) thickness of concrete or masonry.
- 5.5.2.1.3 Glass fiber reinforced concrete panels with a minimum thickness of $\frac{3}{8}$ " (9.5 mm).
- 5.5.2.1.4 Metal faced panels having a minimum 0.019" (0.48 mm) thick aluminum or 0.016" (0.41 mm) thick corrosion resistant steel outer facings.
- 5.5.2.1.5 A minimum $\frac{7}{8}$ " (22.2 mm) thickness of stucco complying with IBC Section 2510.
- 5.5.2.1.6 A minimum $\frac{1}{4}$ " (6.4 mm) thickness of fiber cement siding complying with IBC Section 1404.16.1¹⁷ and IBC Section 1404.16.1¹⁸ or IBC Section 1404.16.2¹⁹.

¹⁵ 2015 IBC Section 1404.2

¹⁶ WRB is not required for detached accessory buildings.

¹⁷ 2015 IBC Section 1405.16

¹⁸ 2015 IBC Section 1405.16.1

¹⁹ 2015 IBC Section 1405.16.2



5.5.3 Potential Heat:

- 5.5.3.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), and Xci 286 were tested in accordance with NFPA 259 to assess the potential heat generated by the FPIS in accordance with IBC Section 2603.5.3 and IRC Section R316.5.7, as shown in Table 4.

Table 4. Potential Heat

Product	Potential Heat (Btu/lb) ¹
Xci CG (Class A)	11,503
Xci Ply (Class A)	11,503
Xci Foil (Class A)	11,587
Xci Foil (Class A) PLUS	11,587
Xci 286	11,587

St: 1 lb. = 4.45 N
1. Tested in accordance with NFPA 259.

5.5.4 Vertical and Lateral Fire Propagation:

- 5.5.4.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 were tested to assess their performance with regard to vertical and lateral fire propagation in accordance with NFPA 285 and 2018 IBC Section 2603.5.5.
- 5.5.4.2 Engineering analysis has also been conducted to assess substitution of other products within the approved wall assemblies.
- 5.5.4.3 The wall assemblies listed in Appendix B are approved for use in buildings of Type I-IV construction.

5.5.5 Special Approval:

- 5.5.5.1 Xci Foil (Class A), , and Xci 286 up to 3 1/2" (88.9 mm) thick has been tested for use as a thermal barrier on walls only or ceilings only to NFPA 286 in accordance with IBC Section 2603.9 and IRC Section 316.6 and met the criteria of IBC Section 803.1.1.²⁰ Therefore, Xci Foil (Class A) and Xci 286 require no thermal barrier or ignition barrier protection.
- 5.5.5.2 Xci Foil (Class A), , and Xci 286 up to 3 1/2" (88.9 mm) thick has been tested for use as an ignition barrier on walls and/or ceilings in attics and crawl spaces to NFPA 286 in accordance with IBC Section 2603.9 and IRC Section 316.6 and has met the criteria of IBC Section 803.1.1.²¹ Therefore, Xci Foil (Class A) and Xci 286 require no ignition barrier protection in attics and crawl spaces.
- 5.5.5.3 Xci Foil (Class A), , and Xci 286 up to 8" (203 mm) thick has been tested to UL 1715 in accordance with IBC Section 2603.9 and IRC Section R316.6 and met the requirements of the standard. Therefore, Xci Foil (Class A) and 286 up to 8" thick is approved for use on ceilings and floors without a thermal barrier.
- 5.5.5.4 Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are not recommended for applications requiring an aesthetic or wear resistant surface.

- 5.6 Where the application falls outside of the performance evaluation, conditions of use and/or installation requirements set forth herein, alternative techniques shall be permitted in accordance with accepted engineering practice and experience. This includes but is not limited to the following areas of engineering: mechanics or materials, structural, building science, and fire science.

²⁰ 2015 IBC Section 803.1.2

²¹ 2015 IBC Section 803.1.2



6 Installation

- 6.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this TER and the applicable building code.
- 6.2 In the event of a conflict between the manufacturer installation instructions and this TER, the more restrictive shall govern.
- 6.3 *Installation Procedure*
- 6.3.1 Protect surrounding areas and surfaces from damage.
- 6.3.2 If wall assembly design calls for WRB installed over the base wall, ensure that the WRB is one of those identified in Table 10 (Appendix B) and the WRB is installed correctly and in good condition before covering with FPIS.
- 6.3.3 For installation of FPIS on interior, over air/water resistive barrier on base wall: ensure that the WRB is one of those identified in Table 10 (Appendix B) and the WRB is installed correctly and in good condition before covering with FPIS.
- 6.3.4 FPIS shall not be applied over walls while they are vulnerable to water intrusion from above or behind.
- 6.3.5 Do not block flashing, weeps, or other drainage paths with FPIS.
- 6.3.6 Do not span expansion joints with FPIS.
- 6.3.7 During installation, take precautions to minimize moisture intrusion behind insulation.
- 6.3.8 Beginning at the base of the wall, apply horizontally using maximum board lengths to minimize number of joints.
- 6.3.9 Offset FPIS board joints in neighboring rows a minimum of 6". Do not form four-corner intersections.
- 6.3.10 Form a "corner lock" pattern by staggering vertical joints at inside and outside corners.
- 6.3.11 FPIS may be applied vertically, as required.
- 6.3.12 Pre-cut FPIS to fit openings and penetrations.
- 6.3.13 Cut with a knife, using a square to guide the cut, or use a table saw.
- 6.3.14 Abut all joints tightly and ensure an overall flush, level surface.
- 6.3.15 Mechanically fasten using the fastening pattern as indicated.
- 6.3.15.1 Space fasteners 12" o.c. (305 mm) at the perimeter and 16" o.c. (406 mm) in the field.
- 6.3.15.2 Set back perimeter fasteners $\frac{3}{8}$ " (9.5 mm) from board edges.
- 6.3.15.3 **Note for Exterior Application:** Where Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are installed by the same trade as the cladding, or in close cooperation with that trade, cladding attachment hardware can supplement or replace the insulation fasteners and insulation adhesive. Cladding fasteners fulfilling the Xci Foil (Class A) and Xci 286 attachment function shall be designed for this function. If the cladding attachment is 16" o.c. (406 mm) or closer and it tightly secures the insulation, no additional fastening or adhesive is required.
- 6.3.15.4 **Note for Interior Application:** Where Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are installed by the same trade as the interior drywall, or in close cooperation with that trade, drywall attachment hardware can supplement or replace the insulation fasteners and insulation adhesive. Drywall fasteners fulfilling the Xci Foil (Class A) and Xci 286 attachment function shall be designed for this function. If the drywall attachment is 16" o.c. (406 mm) or closer and it tightly secures the insulation, no additional fastening or adhesive is required.



- 6.3.16 When an approved adhesive is used, periodically verify adhesion. Properly installed adhesively applied Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 will cohesively break the adhesive while still wet and destroy the substrate when dry.
- 6.3.16.1 Consult the detailed manufacturer installation instructions for the proper adhesive pattern to maintain the drainage plane.
- 6.3.16.2 When used in a NFPA 285 approved assembly, adhesives must be one of those listed in the tables found in Appendix B.
- 6.3.17 Fill gaps greater than $\frac{1}{8}$ " (3 mm) between FPIS boards with expanding spray foam or butter edge of board with approved sealant and strike flush. Expanding spray foam may also be applied onto the FPIS board edges during installation.
- 6.3.18 Verify all materials are installed in accordance with current Hunter Panels published literature and local code requirements.
- 6.3.19 Additional information on the installation and detailing of Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 can be found at hunterpanels.com.
- 6.4 *Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 as an Air and Water-Resistive Barrier*
- 6.4.1 When used in a NFPA 285 approved assembly as an air/water resistive barrier, see also Section 5.3 and Table 10 in Appendix B.
- 6.4.2 When used in a NFPA 285 approved assembly as a WRB, see also Section 5.4 and Table 10 (Appendix B) with all notes.
- 6.4.3 Use minimum 1" (25.4 mm) thickness Xci Foil (Class A) and Xci 286.
- 6.4.4 Install directly over wood or steel studs or over exterior sheathing fastened to wood or steel studs.
- 6.4.5 Fasten Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 boards with corrosion-resistant screws or HeckMann Pos-I-Tie®, either fitted with Thermal-Grip CI plastic washers by Rodenhouse or equivalent. Space fasteners 16" o.c. (406 mm) in the field and 12" o.c. (305 mm) at the perimeter.
- 6.4.5.1 Other fastening used shall be installed 16" o.c. (406 mm) in the field and 12" o.c. (305 mm) at the perimeter. Other fastening shall be verified as air and water tight through ASTM E2357 and ASTM E331 testing, or it shall be sealed with caulk or flashing tape.
- 6.4.6 Tape over board joints with 4" (102 mm) width Aluma-GRIP™ 1402 tape by Carlisle Coatings & Waterproofing (CCW).
- 6.4.7 Cover inside/outside corners with Aluma-GRIP™ 701 by CCW. Aluma-GRIP™ 701 shall bear 3" (76 mm) minimum onto each side of angle.
- 6.4.8 Wrap window openings with Aluma-GRIP™ 701. Aluma-GRIP™ 701 shall wrap at least 3" (76 mm) onto wall and shall return far enough into the window opening to provide a continuous air/water seal to window frame.
- 6.4.9 Flash pipe and duct penetrations through Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 with Aluma-GRIP™ 701.
- 6.4.10 Consult Hunter Panels details and instructions for complete information about installation of Xci Foil (Class A) and Xci 286 as an air and water-resistive barrier.



- 6.5 *Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci CG (Class A)*
- 6.5.1 Refer to the manufacturer installation instructions in addition to this TER, for complete details and requirements.
- 6.5.2 Cut with a knife using a square to guide the cut or use a table saw.
- 6.5.3 Abut all joints tightly and ensure an overall flush, level surface.
- 6.5.4 Mechanically fasten using the fastening pattern as indicated.
- 6.5.4.1 Space fasteners 12" o.c. (305 mm) at the perimeter and 16" o.c. (406 mm) in the field.
- 6.5.4.2 Set back perimeter fasteners $\frac{3}{8}$ " (9.5 mm) from board edges.
- 6.5.4.3 **Note:** where Xci Foil (Class A), Xci Foil (Class A) PLUS, or Xci CG (Class A) are installed by the same trade as the cladding, or in close cooperation with that trade, cladding attachment hardware can supplement or replace the insulation fasteners and insulation adhesive. Cladding fasteners fulfilling the Xci Foil (Class A), Xci Foil (Class A) PLUS, or Xci CG (Class A) attachment function shall be designed for this function. If the cladding attachment is 16" o.c. (406 mm) or closer and it tightly secures the insulation, no additional fastening or adhesive is required.
- 6.5.5 When adhesive is used, periodically verify adhesion. Properly installed adhesively applied Xci Foil (Class A), Xci Foil (Class A) PLUS, or Xci CG (Class A) will cohesively break the adhesive while still wet and destroy the substrate when dry.
- 6.5.6 Consult the detailed manufacturer installation instructions for the proper adhesive pattern to maintain the drainage plane.
- 6.6 *Xci Ply (Class A)*
- 6.6.1 Refer to the manufacturer installation instructions, in addition to this TER, for complete details and requirements.
- 6.6.2 Provide separation of the edge of Xci Ply (Class A) from concrete at grade with pressure-treated lumber sill plate, sill gasket, or non-permeable flashing material.
- 6.6.3 Begin at base of wall from firm, permanent support.
- 6.6.4 Fasten Xci Ply (Class A) with proper fasteners and spacing to accommodate design. Fasten Xci Ply (Class A) to the structure using SIPs fasteners or similar hardware driven into steel studs, wood studs, concrete, or CMU substrate. Fastening shall be approved by a structural engineer as the fastening must be sufficient to support both the weight of the Xci Ply (Class A) and the weight of the cladding for the project conditions.
- 6.6.5 Allow a minimum $\frac{1}{8}$ " (3.2 mm) and a maximum $\frac{1}{4}$ " (6.4 mm) gap between Xci Ply (Class A) boards to accommodate hydric movement of wood. Fasten boards tightly to provide a flush, level surface.
- 6.6.6 Apply WRB over plywood side of Xci Ply (Class A) according to WRB manufacturer instructions.

7 Substantiating Data

- 7.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:
- 7.1.1 Flame spread and smoke developed rating testing in accordance with UL 723
- 7.1.2 Fire performance criteria testing in accordance with NFPA 285
- 7.1.3 Fire performance criteria testing in accordance with NFPA 286
- 7.1.4 Fire performance criteria testing in accordance with UL 1715
- 7.1.5 Potential heat testing in accordance with NFPA 259
- 7.1.6 Air barrier material testing in accordance with ASTM E2178
- 7.1.7 Air barrier assembly testing in accordance with ASTM E2357



- 7.1.8 Vapor impermeability testing in accordance with ASTM E96 Method A and Method B
- 7.1.9 Water-resistive barrier testing in accordance with ASTM E331
- 7.2 Engineering analysis comparing the fire resistance properties of Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 by Priest and Associates
- 7.3 Engineering analysis assessing the substitution of products within the approved NFPA 285 tested wall assemblies by Priest and Associates
- 7.4 Engineering analysis comparing the fire resistance properties of Xci Foil, Xci Foil Plus, Xci CG, and Xci Ply by Priest and Associates
- 7.5 Engineering analysis assessing the substitution of products within the approved NFPA 285 tested wall assemblies by Priest and Associates
- 7.6 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies (i.e., ANAB accredited agencies), approved sources (i.e., RDPs), and/or professional engineering regulations. Accuracy of external test data and resulting analysis is relied upon.
- 7.7 Where pertinent, testing and/or engineering analysis is based upon provisions that have been codified into law through state or local adoption of codes and standards. The developers of these codes and standards are responsible for the reliability of published content. DrJ's engineering practice may use a code-adopted provision as the control sample. A control sample versus a test sample establishes a product as being equivalent to the code-adopted provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.
- 7.8 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, Listings, certified reports, duly authenticated reports from approved agencies, and research reports prepared by approved agencies and/or approved sources provided by the suppliers of products, materials, designs, assemblies and/or methods of construction. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this TER, may be dependent upon published design properties by others.
- 7.9 Testing and engineering analysis: The strength, rigidity and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.²²
- 7.10 Where additional condition of use and/or code compliance information is required, please search for Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 on the DrJ Certification website.

8 Findings

- 8.1 As delineated in Section 3, Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 have performance characteristics that were tested and/or meet pertinent standards and is suitable for use pursuant to its specified purpose.
- 8.2 When used and installed in accordance with this TER and the manufacturer installation instructions, Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 shall be approved for the following applications:
 - 8.2.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are approved for use in exterior walls of buildings of any height of Type I-V construction in accordance with IBC Section 2603.5 and IRC Section R316.5.12.
 - 8.2.2 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are approved for use in wall assemblies meeting the requirements of NFPA 285 testing when constructed in accordance with the tables in Appendix B.

²² See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.



- 8.2.3 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 described in this TER comply with or are a suitable alternative to, the applicable sections of the codes listed in Section 2.
- 8.2.4 Xci 286, and Xci Foil (Class A) up to 3 1/2" (88.9 mm) thick are approved as a thermal barrier on walls only or ceilings only to NFPA 286, in accordance with IBC Section 2603.9 and IRC Section R316.6 and meet the criteria of IBC Section 803.1.1.²³ Therefore, Xci 286, Xci Foil (Class A) PLUS, and Xci Foil (Class A) may be left exposed and requires no thermal barrier or ignition barrier protection.
- 8.2.5 Xci Foil (Class A), and Xci 286 up to 3 1/2" (88.9 mm) thick are approved for use as an ignition barrier on walls and/or ceilings in attics and crawl spaces to NFPA 286 in accordance with IBC Section 2603.9 and IRC Section R316.6 and meets the criteria of IBC Section 803.1.1.²⁴ Therefore, Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 require no ignition barrier protection in attics and crawl spaces.
- 8.2.6 Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are approved for use in exterior walls of buildings as a WRB in accordance with IBC Section 1403.2²⁵ and IRC Section R703.2 when constructed in accordance with Table 10 (Appendix B).
- 8.2.7 Xci CG (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are approved for use in exterior walls of buildings as an air barrier in accordance with IECC Section C402.5.1 when constructed in accordance with the tables in Appendix B.
- 8.3 Unless exempt by state statute, when the Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are to be used as a structural and/or building envelope component in the design of a specific building, the design shall be performed by an RDP.
- 8.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Hunter Panels LLC.
- 8.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10)²⁶ are similar) in pertinent part states:
- 104.11 Alternative materials, design and methods of construction and equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.
- 8.6 **Approved.**²⁷ Building codes require that the building official shall accept duly authenticated reports²⁸ or research reports²⁹ from approved agencies and/or approved sources (i.e., licensed RDP) with respect to the quality and manner of use of new products, materials, designs, services, assemblies, or methods of construction.
- 8.6.1 Acceptance of an approved agency, by a building official, is performed by verifying that the agency is accredited by a recognized accreditation body of the International Accreditation Forum (IAF).
- 8.6.2 Acceptance of a licensed RDP, by a building official, is performed by verifying that the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.

²³ 2015 IBC Section 803.1.2

²⁴ 2015 IBC Section 803.1.2

²⁵ 2015 IBC Section 1404.2

²⁶ 2018 IFC Section 104.9

²⁷ Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC Section 201.4 where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

²⁸ <https://up.codes/viewer/wyoming/ibc-2021/chapter17/special-inspections-and-tests#1707.1>

²⁹ <https://up.codes/viewer/wyoming/ibc-2021/chapter17/special-inspections-and-tests#1703.4.2>



- 8.6.3 Federal law, Title 18 US Code Section 242, requires that where the alternative product, material, service, design, assembly, and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved, as denial without written reason deprives a protected right to free and fair competition in the marketplace.
- 8.7 DrJ is an engineering company, employs RDPs and is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131.
- 8.8 Through ANAB accreditation and the IAF Multilateral Agreements, this TER can be used to obtain product approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – “*certified once, accepted everywhere.*” IAF specifically says, “*Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope.*”³⁰

9 Conditions of Use

- 9.1 Material properties shall not fall outside the boundaries defined in Section 3.
- 9.2 As defined in Section 3, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.
- 9.3 As listed herein, Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 shall not be used:
- 9.3.1 To resist lateral loads. Walls shall be braced by other materials in accordance with the applicable code, and the exterior wall covering shall be capable of resisting the full design wind pressure.
- 9.4 This TER and the installation instructions, when required by a code official, shall be submitted at the time of permit application.
- 9.5 When the insulation boards are used in assemblies requiring compliance with NFPA 285 and are installed on the exterior side of exterior walls, construction must be as described in Appendix B.
- 9.6 When the insulation boards are used in assemblies requiring compliance with NFPA 285 and are installed on the interior side of exterior walls, construction must be as described in Table 9 (Appendix B).
- 9.7 Xci Ply (Class A) may be used as a nail base provided cladding attachments are designed in accordance with IRC Section R703.3.3 or an approved design. Xci CG (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 shall not be used as a nail base.
- 9.8 When installed in areas where the probability of termite infestation is “very heavy”, the installation must meet the requirements of IBC Section 2603.8 and IRC Section R316.7.
- 9.9 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are available in Montgomery, New York; Tooele, Utah; Terrell, Texas; Smithfield, Pennsylvania; Franklin Park, Illinois; Puyallup, Washington and Lake City, Florida, and are manufactured in Smithfield, Pennsylvania; Franklin Park, Illinois and Puyallup, Washington under a quality control program with quality control inspections in accordance with IBC Section 110.3.10³¹ and IBC Section 110.3.11,³² and IRC Section R109.1.5.
- 9.10 The wall assemblies listed in Appendix B are based on compliance to the fire provisions of the codes listed in Section 2. Consideration of wall assembly performance with regard to other attributes, such as water vapor control, condensation, and energy code requirements are outside the scope of this TER.

³⁰ <https://iaf.nu/en/about-iaf-mla#~:text=required%20to%20recognise>

³¹ 2018 IBC Section 110.3.8, 2015 IBC Section 110.3.8

³² 2018 IBC Section 110.3.10, 2015 IBC Section 110.3.9



- 9.11 When required by adopted legislation and enforced by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed:
- 9.11.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice, and, when prepared by an approved source, shall be approved when signed and sealed.
 - 9.11.2 This TER and the installation instructions shall be submitted at the time of permit application.
 - 9.11.3 These innovative products have an internal quality control program and a third-party quality assurance program.
 - 9.11.4 At a minimum, these innovative products shall be installed per Section 6 of this TER.
 - 9.11.5 The review of this TER, by the AHJ, shall be in compliance with IBC Section 104 and IBC Section 105.4.
 - 9.11.6 These innovative products have an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4 and IRC Section R109.2.
 - 9.11.7 The application of these innovative products in the context of this TER are dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2 and any other regulatory requirements that may apply.
- 9.12 The approval of this TER by the AHJ shall comply with IBC Section 1707.1, where legislation states in pertinent part, *"the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in Section 104.11"*, all of IBC Section 104, and IBC Section 105.4.
- 9.13 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).
- 9.14 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the owner or the owner's authorized agent.

10 Identification

- 10.1 The innovative products listed in Section 1.1 are identified by a label on the board or packaging material bearing the manufacturer name, product name, TER number, and other information to confirm code compliance.
- 10.2 Additional technical information can be found at www.hunterpanels.com.

11 Review Schedule

- 11.1 This TER is subject to periodic review and revision. For the most recent version, visit drjcertification.org.
- 11.2 For information on the status of this TER, contact DrJ Certification.

12 Approved for Use Pursuant to US and International Legislation Defined in Appendix A

- 12.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are included in this TER published by an approved agency that is concerned with evaluation of products or services, maintains periodic inspection of the production of listed materials or periodic evaluation of services, and whose TER Listing states either that the material, product, or service meets identified standards or has been tested and found suitable for a specified purpose. This TER meets the legislative intent and definition of being acceptable to the AHJ.



Appendix A

1 Legislation that Authorizes AHJ Approval

- 1.1 **Fair Competition:** State legislatures have adopted Federal regulations for the examination and approval of building code referenced and alternative products, materials, designs, services, assemblies and/or methods of construction that:
- 1.1.1 Advance Innovation,
 - 1.1.2 Promote competition so all businesses have the opportunity to compete on price and quality in an open market on a level playing field unhampered by anticompetitive constraints, and
 - 1.1.3 Benefit consumers through lower prices, better quality, and greater choice.
- 1.2 **Adopted Legislation:** The following local, state, and federal regulations affirmatively authorize Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 to be approved by AHJs, delegates of building departments, and/or delegates of an agency of the federal government:
- 1.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies and/or methods of construction. The goal is to "protect economic freedom and opportunity by promoting free and fair competition in the marketplace."
 - 1.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation, and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.
 - 1.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2016 (DTSA),³³ where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than 10 years³⁴ and/or a \$5,000,000 fine or 3 times the value of³⁵ the Intellectual Property (IP) and Trade Secrets (TS).
 - 1.2.3.1 Compliance with public records and trade secret legislation requires approval through the use of listings, certified reports, Technical Evaluation Reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources.
 - 1.2.4 For new materials³⁶ that are not specifically provided for in any building code, the design strengths and permissible stresses shall be established by tests, where suitable load tests simulate the actual loads and conditions of application that occur.
 - 1.2.5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design using accepted engineering practice.³⁷
 - 1.2.6 The commerce of approved sources (i.e., registered PEs) is regulated by professional engineering legislation. Professional engineering commerce shall always be approved by AHJs, except where there is evidence, provided in writing, that specific legislation has been violated by an individual registered PE.
 - 1.2.7 The AHJ shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in IBC Section 104.11.³⁸

³³ <http://www.drjengineering.org/AppendixC> and <https://www.drjcertification.org/cornell-2016-protection-trade-secrets>.

³⁴ <https://www.law.cornell.edu/uscode/text/18/1832#-text=imprisoned%20not%20more%20than%2010%20years>

³⁵ <https://www.law.cornell.edu/uscode/text/18/1832#-text=Any%20organization%20that%20has%20thereby%20avoided>

³⁶ <https://up.codes/viewer/wyoming/lbc-2021/chapter17/special-inspections-and-tests#1706.2>

³⁷ IBC 2021, Section 1706.1 Conformance to Standards

³⁸ IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General



- 1.3 **Approved³⁹ by Los Angeles:** The Los Angeles Municipal Code (LAMC) states in pertinent part that the provisions of LAMC are not intended to prevent the use of any material, device, or method of construction not specifically prescribed by LAMC. The Department shall use Part III, Recognized Standards in addition to Part II, Uniform Building Code Standards of Division 35, Article 1, Chapter IX of the LAMC in evaluation of products for approval where such standard exists for the product or the material and may use other approved standards, which apply. Whenever tests or certificates of any material or fabricated assembly are required by Chapter IX of the LAMC, such tests or certification shall be made by a testing agency approved by the Superintendent of Building to conduct such tests or provide such certifications. The testing agency shall publish the scope and limitation(s) of the listed material or fabricated assembly.⁴⁰ The Superintendent of Building roster of approved testing agencies is provided by the Los Angeles Department of Building and Safety (LADBS). The Center for Building Innovation (CBI) Certificate of Approval License is TA24945. Tests and certifications found in a CBI Listing are LAMC approved. In addition, the Superintendent of Building shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the California Building Code (CBC) Section 1707.1.⁴¹
- 1.4 **Approved by Chicago:** The Municipal Code of Chicago (MCC) states in pertinent part that an Approved Agency is a Nationally Recognized Testing Laboratory (NRTL) acting within its recognized scope and/or a certification body accredited by the American National Standards Institute (ANSI) acting within its accredited scope. Construction materials and test procedures shall conform to the applicable standards listed in the MCC. Sufficient technical data shall be submitted to the building official to substantiate the proposed use of any product, material, service, design, assembly and/or method of construction not specifically provided for in the MCC. This technical data shall consist of research reports from approved sources (i.e., MCC defined Approved Agencies).
- 1.5 **Approved by New York City:** The NYC Building Code 2022 (NYCBC) states in pertinent part that an approved agency shall be deemed⁴² an approved testing agency via ISO/IEC 17025 accreditation, an approved inspection agency via ISO/IEC 17020 accreditation, and an approved product evaluation agency via ISO/IEC 17065 accreditation. Accrediting agencies, other than federal agencies, must be members of an internationally recognized cooperation of laboratory and inspection accreditation bodies subject to a mutual recognition agreement⁴³ (i.e., ANAB, International Accreditation Forum (IAF), etc.).

³⁹ See Section 8 for the distilled building code definition of Approved

⁴⁰ Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

⁴¹ https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1

⁴² New York City, The Rules of the City of New York, § 191-07 Approved Agencies

⁴³ New York City, The Rules of the City of New York, § 191-07 Approved Agencies



- 1.6 **Approved by Florida:** Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation, by 1) A certification mark or listing of an approved certification agency, 2) A test report from an approved testing laboratory, 3) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity, 4) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a professional engineer or architect, licensed in Florida. For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods; 1) A certification mark, listing, or label from a commission-approved certification agency indicating that the product complies with the code; 2) A test report from a commission-approved testing laboratory indicating that the product tested complies with the code; 3) A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code; 4) A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code; 5) A statewide product approval issued by the Florida Building Commission. The Florida Department of Business and Professional Regulation (DBPR) website provides a listing of companies certified as a Product Evaluation Agency (i.e., EVLMiami 13692), a Product Certification Agency (i.e., CER10642), and as a Florida Registered Engineer (i.e., ANE13741).
- 1.7 **Approved by Miami-Dade County (i.e., Notice of Acceptance [NOA]):** A Florida statewide approval is an NOA. An NOA is a Florida local product approval. By Florida law, Miami-Dade County shall accept the statewide and local Florida Product Approval as provided for in Florida legislation 553.842 and 553.8425.
- 1.8 **Approved by New Jersey:** Pursuant to Building Code 2018 of New Jersey in IBC Section 1707.1 General,⁴⁴ it states: "In the absence of approved rules or other approved standards, the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the administrative provisions of the Uniform Construction Code (N.J.A.C. 5:23)."⁴⁵ Furthermore N.J.A.C 5:23-3.7 states: Municipal approvals of alternative materials, equipment, or methods of construction. **(a) Approvals:** Alternative materials, equipment, or methods of construction shall be approved by the appropriate subcode official provided the proposed design is satisfactory and that the materials, equipment, or methods of construction are suitable for the intended use and are at least the equivalent in quality, strength, effectiveness, fire resistance, durability and safety of those conforming with the requirements of the regulations. 1. A field evaluation label and report or letter issued by a nationally recognized testing laboratory verifying that the specific material, equipment, or method of construction meets the identified standards or has been tested and found to be suitable for the intended use, shall be accepted by the appropriate subcode official as meeting the requirements of (a) above. 2. Reports of engineering findings issued by nationally recognized evaluation service programs, such as, but not limited to, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), the Southern Building Code Congress International (SBCCI), the International Code Council (ICC), and the National Evaluation Service, Inc., shall be accepted by the appropriate subcode official as meeting the requirements of (a) above. The New Jersey Department of Community Affairs has confirmed that technical evaluation reports, from any accredited entity listed by ANAB, meets the requirements of item 2 given that the listed entities are no longer in existence and/or do not provide "reports of engineering findings".

⁴⁴ <https://up.codes/viewed/new-jersey/fbc-2018/chapter/17/special-inspections-and-tests#1707.1>

⁴⁵ <https://www.nj.gov/ical/divisions/codes/codereg/ucc.html>



- 1.9 Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards:** Pursuant to Title 24, Subtitle B, Chapter XX, [Part 3282.14](#)⁴⁶ and [Part 3280](#),⁴⁷ the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform with the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow: 1) "All construction methods shall be in conformance with accepted engineering practices"; 2) "The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur."; and 3) "The design stresses of all materials shall conform to accepted engineering practice."
- 1.10 Approval by US, Local, and State Jurisdictions in General:** In all other local and state jurisdictions, the adopted building code legislation states in pertinent part that:
- 1.10.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.⁴⁸
- 1.10.2 For innovative alternative products, materials, designs, services and/or methods of construction, in the absence of approved rules or other approved standards...the building official shall accept duly authenticated reports (i.e., listing and/or research report) from approved agencies with respect to the quality and manner of use of new materials or assemblies.⁴⁹ A building official approved agency is deemed to be approved via certification from an accreditation body that is listed by the International Accreditation Forum⁵⁰ or equivalent.
- 1.10.3 The design strengths and permissible stresses of any structural material...shall conform to the specifications and methods of design of accepted engineering practice performed by an approved source.⁵¹ An approved source is defined as a PE subject to professional engineering laws, where a research and/or a technical evaluation report certified by a PE, shall be approved.
- 1.11 Approval by International Jurisdictions:** The USMCA and GATT agreements provide for approval of innovative materials, products, designs, services, assemblies and/or methods of construction through the Technical Barriers to Trade agreements and the International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA), where these agreements:
- 1.11.1 Permit participation of conformity assessment bodies located in the territories of other Members (defined as GATT Countries) under conditions no less favourable than those accorded to bodies located within their territory or the territory of any other country,
- 1.11.2 State that conformity assessment procedures (i.e., ISO/IEC 17020, 17025, 17065, etc.) are prepared, adopted, and applied so as to grant access for suppliers of like products originating in the territories of other Members under conditions no less favourable than those accorded to suppliers of like products of national origin or originating in any other country, in a comparable situation.
- 1.11.3 State that conformity assessment procedures are not prepared, adopted, or applied with a view to or with the effect of creating unnecessary obstacles to international trade. This means that conformity assessment procedures shall not be more strict or be applied more strictly than is necessary to give the importing Member adequate confidence that products conform to the applicable technical regulations or standards.

⁴⁶ <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>

⁴⁷ <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>

⁴⁸ IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials, Adopted law pursuant to IBC model code language 1706.2.

⁴⁹ IBC 2021, Section 1707 Alternative Test Procedures, 1707.1 General, Adopted law pursuant to IBC model code language 1707.1.

⁵⁰ Please see the [ANAB directory](#) for building official approved agencies.

⁵¹ IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards, Adopted law pursuant to IBC model code language 1706.1.



1.11.4 **Approved:** The purpose of the IAF MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories to the MLA, and subsequently acceptance of accredited certification and validation/verification statements in many markets based on one accreditation for the timely approval of innovative materials, products, designs, services, assemblies and/or methods of construction. Accreditations granted by IAF MLA signatories are recognised worldwide based on their equivalent accreditation programs, therefore reducing costs and adding value to businesses and consumers.



Appendix B

Table 5. NFPA 285 Approved Wall Assemblies with Xci Foil (Class A) or Xci 286 Exterior Insulation 1,4

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	<ol style="list-style-type: none"> 1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge min. 3⁵/₈" (min.) steel studs spaced 24" o.c. (max.) <ol style="list-style-type: none"> a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW (fire-retardant-treated wood) studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) <ol style="list-style-type: none"> a. 5/8" Type X gypsum wallboard interior b. Bracing as required by code
Fire-Stopping at Floor Lines	<ol style="list-style-type: none"> 1. Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. 2. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any Item 1-15 Items 8, 9, 10, 11, 12, 13, 14, or 15 may be used with Exterior Sheathing 2 or the sheathing thickness specified	<ol style="list-style-type: none"> 1. None 2. 1 1/2" (min.) of Carlisle® SPI SealTite PRO (up to full cavity thickness), SealTite PRO Closed Cell, or SealTite PRO One Zero (up to full cavity thickness for each) 3. 1 1/2" (min.) of BASF Walltite SPF (up to full cavity thickness) 4. Any noncombustible insulation per ASTM E136 5. Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) 6. Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) 7. Any foam plastic insulation (SPF or board type) that has been tested per ASTM E1354 (at a min. of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T₉₀, PK, HRR) than Covestro EcoBay CC or BASF Walltite 8. NCFI InsulBloc SPF (up to full cavity thickness) 9. Icynene MD-C-200v3 (Proseal) up to 5 1/2" (only with 1/2" [min.] exterior gypsum sheathing) 10. SWD Urethane Quik-Shield 112 up to 6" (max.) stud cavities with an air gap not exceeding 2 1/2" 11. 1 1/2" (min.) Thermoseal 2000 (up to full cavity thickness) 12. Carlisle SealTite PRO High Yield, SealTite PRO Open Cell, SealTite PRO No Mix, SealTite PRO No Trim 21, or SealTite PRO OCX – up to full cavity thickness with 1/2" (min.) exterior gypsum sheathing 13. Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 – 3 1/2" (max.) for use with 5/8" Exterior Gypsum Sheathing 14. JM Corbond III or Corbond IV – Full stud cavity depth or less for use with 5/8" exterior gypsum sheathing 15. Huntsman ProSeal HFO (8 in. max. thickness with no air gap, 6 inch max. thickness with air gap) for use with 1/2" or thicker exterior gypsum sheathing
Exterior Sheathing Use either 1, 2 or 3	<ol style="list-style-type: none"> 1. None (only with cavity insulation 1, 2, 3, 4, 5 or 6) 2. 1/2" or thicker exterior gypsum sheathing 3. 1/2" (min.) FRTW structural panels in Type III construction
Multi-Function Sheathing and WRB Products Use 1 or 2	<ol style="list-style-type: none"> 1. USG Securock® Exoair® 430 System – See note and Table 10 2. 5/8" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints <p>Note: Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRB's on base wall surface in Table 10</p>
WRB Over Base Wall Surface	See Table 10



Wall Component	Materials
<p>Exterior Insulation Use either 1 or 2 depending on cladding.</p> <p>Note: A construction which utilizes no exterior sheathing may not use spray foam cavity insulation</p>	<ol style="list-style-type: none"> 3½" thick (max.) Xci Foil (Class A) or Xci-286 for all claddings 4" thick Xci Foil (Class A) or Xci-286 for claddings 1-6
<p>WRB Over Exterior Insulation</p>	<p>See Table 10</p> <p>The exterior insulation may be used with or without CavClear® Masonry Mat over the insulation with a maximum 1" air gap between the CavClear® and the cladding. When CavClear® is used, this may only be used with Cladding 1, 2, 3, 4, 5, or 6 or with thin brick/thin stone adhered to stucco as long as the total thickness is ¾" min.</p>
<p>Exterior Cladding Use any item 1-17</p> <p>Item 7 may use any tested/approved installation technique.</p> <p>Items 8, 9, or 12 may use any standard installation technique.</p> <p>If Claddings 2, 3, 4, 5, 13, 14, 15, or 16 are on stucco base with lath, a secondary WRB (WRB items above allowed over foam) can be installed between the insulation and lath and must not be full coverage asphalt or self-adhering membranes, but may be slip sheet (stapled) with no adhesive.</p>	<ol style="list-style-type: none"> Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (max.) Stucco – Minimum ¾" thick, exterior cement plaster and lath. For systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/external insulation and the lath. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. Cast Artificial Stone – Minimum 1½" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. Terra Cotta Cladding – Minimum 1¼" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. Any MCM that has passed NFPA 285. Uninsulated sheet metal building panels including steel, copper, aluminum or zinc. ¼" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. Stone, porcelain, ceramic/aluminum honeycomb composite building panels that have successfully passed NFPA 285 criteria. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 criteria. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. ½" thick) with ventilated shiplap. ½" Stucco – Any one coat stucco (½" min.) that meets AC11 acceptance criteria or is approved for use in Type I-IV construction or has been tested per NFPA 285 or stays in place when tested per ASTM E119 (stucco exposed to fire) for at least 30 minutes. Thin brick/cultured stone set in thin set adhesive and metal lath that has been tested to ASTM E119 (brick exposed to furnace) and remains in place for a minimum of 30 minutes, or has passed a NFPA 285 test. Minimum ¾". For these systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/AVP and the lath. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with ½" thick bricks using TABS Wall Adhesive. Natural Stone Veneer – minimum 1¼" thick using any standard installation technique. FunderMax M.Look – minimum ¼" thick using any standard installation technique
<p>St: 1 in = 25.4 mm</p> <ol style="list-style-type: none"> The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis. Acceptance criteria for ASTM E 1354 testing have not been well established in the referenced building codes and foam sheathing related sections. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis. T_{ig} is the time to ignition from the start of the test until the sheathing ignites. Pk. HRR is the peak heat release rate during the test. 	

**Table 6.** NFPA 285 Approved Wall Assemblies with Xci CG (Class A) Exterior Insulation^{1,4}

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	<ol style="list-style-type: none"> Cast concrete walls CMU concrete walls 25-gauge min. 3⁵/₁₆" (min.) steel studs spaced 24" o.c. (max.) <ol style="list-style-type: none"> ⁵/₈" Type X gypsum wallboard interior Lateral bracing every 4' FRTW (fire-retardant-treated wood) studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) <ol style="list-style-type: none"> ⁵/₈" Type X gypsum wallboard interior Bracing as required by building code
Fire-Stopping at Floor Lines Use Item 1 or 2	<ol style="list-style-type: none"> Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any Item 1-15 Items 8-15 may only be used with exterior sheathing 2 or the specified thickness	<ol style="list-style-type: none"> None 1¹/₂" (min.) of Carlisle® SPI SealTite PRO (up to full cavity thickness), SealTite PRO Closed Cell, or SealTite PRO One Zero (up to full cavity thickness for each) 1¹/₂" (min.) of BASF Walltite SPF (up to full cavity thickness) Any noncombustible insulation per ASTM E136 Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) Any foam plastic insulation (SPF or board type) that has been tested per ASTM E1354 (at a min. of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{ign}, PK, HRR) than Covestro EcoBay CC or BASF Walltite NCFI InsulBloc SPF (up to full cavity thickness) Icynene MD-C-200v3 (Proseal) up to 5¹/₂" (only with ¹/₂" [min.] exterior gypsum sheathing) SWD Urethane Quik-Shield 112 up to 6" in 6" (max.) stud cavities with an air gap not exceeding 2¹/₂" 1¹/₂" (min.) Thermoseal 2000 (up to full cavity thickness) Carlisle SealTite PRO High Yield, SealTite PRO Open Cell, SealTite PRO No Mix, SealTite PRO No Trim 21, or SealTite PRO OCX – up to full cavity thickness with ¹/₂" (min.) exterior gypsum sheathing Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 – 3¹/₂" (max.) for use with ⁵/₈" Exterior Gypsum Sheathing JM Corbond III or Corbond IV – Full stud cavity depth or less for use with ⁵/₈" exterior gypsum sheathing Huntsman ProSeal HFO (8 in. max. thickness with no air gap, 6 inch max. thickness with air gap) for use with ¹/₂" or thicker exterior gypsum sheathing
Exterior Sheathing Use either 1, 2 or 3	<ol style="list-style-type: none"> None (only with claddings 1-6, and cavity insulation 1, 2, 3, 4, 5, 6, or 11). ¹/₂" or thicker exterior gypsum sheathing ¹/₂" (min.) FRTW structural panels in Type III construction
Multi-Function Sheathing & WRB Products Use 1 or 2	<ol style="list-style-type: none"> USG Securock® Exoair® 430 System – See note and Table 10 ⁵/₈" Georgia Pacific DensElement, flashed with ProsoCo R-Guard FastFlash on sheathing joints. <p>Note: Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRB's on base wall surface in Table 10.</p>
WRB Over Base Wall Surface	See Table 10
Exterior Insulation Use either 1 or 2 depending on cladding.	<ol style="list-style-type: none"> 3¹/₂" thick (max.) Xci CG or Xci CG (Class A) for all claddings. 4" thick (max.) Xci CG or Xci CG (Class A) for claddings 1-6.
WRB Over Exterior Insulation	See Table 10



	<p>The exterior insulation may be used with or without CavClear® Masonry Mat over the insulation with a maximum 1" air gap between the CavClear® and the cladding. When CavClear® is used, this may only be used with Cladding 1, 2, 3, 4, 5, or 6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" min.</p>
<p>Exterior Cladding Use any Item 1-17</p> <p>Item 7 may use any tested/approved installation technique.</p> <p>Items 8, 9, or 12 may use any standard installation technique.</p> <p>If Claddings 2, 3, 4, 5, 13, 14, 15, or 16 are on stucco base with lath, a secondary WRB (WRB items above allowed over foam) can be installed between the insulation and lath and must not be full coverage asphalt or self-adhering membranes, but may be slip sheet (stapled) with no adhesive.</p>	<ol style="list-style-type: none"> 1. Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (max.) 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath. For systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/external insulation and the lath. 3. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. 4. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. 5. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. 6. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Any MCM that has passed NFPA 285. 8. Uninsulated sheet metal building panels including steel, copper, aluminum (or zinc only with Xci CG [Class A]) 9. 1/2" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 10. Stone, porcelain, ceramic/aluminum honeycomb composite building panels that have successfully passed NFPA 285 criteria. 11. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 criteria. 12. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 13. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria or is approved for use in Type I-IV construction or has been tested per NFPA 285 or stays in place when tested per ASTM E119 (stucco exposed to fire) for at least 30 minutes. 14. Thin brick/cultured stone set in thin set adhesive and metal lath that has been tested to ASTM E119 (brick exposed to furnace) and remains in place for a minimum of 30 minutes, or has passed a NFPA 285 test. Minimum 3/4". For these systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/AVP and the lath. 15. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. 16. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. 17. FunderMax M.Look – minimum 1/4" thick using any standard installation technique
<p>St: 1 in = 25.4 mm</p> <ol style="list-style-type: none"> 3. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis. 4. Acceptance criteria for ASTM E 1354 testing have not been well established in the referenced building codes and foam sheathing related sections. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis. 5. T_{ig} is the time to ignition from the start of the test until the sheathing ignites. Pk HRR is the peak heat release rate during the test. 	

**Table 7.** NFPA 285 Approved Wall Assemblies with Xci Ply (Class A) Exterior Insulation^{1,4}

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	<ol style="list-style-type: none"> Cast concrete walls CMU concrete walls 25-gauge min. 3⁵/₁₆" (min.) steel studs spaced 24" o.c. (max.) <ol style="list-style-type: none"> ⁵/₈" Type X gypsum wallboard interior Lateral bracing every 4' FRTW (fire-retardant-treated wood) studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) <ol style="list-style-type: none"> ⁵/₈" Type X gypsum wallboard interior Bracing as required by code
Fire-Stopping at Floor Lines	<ol style="list-style-type: none"> Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any Item 1-15 Items 3, 8, 9, 10, 11, 12, 13, 14 or 15 may only be used with exterior sheathing 2 or the specified thickness	<ol style="list-style-type: none"> None 1¹/₂" (min.) of Carlisle® SPI SealTite PRO (up to full cavity thickness), SealTite PRO Closed Cell, or SealTite PRO One Zero (up to full cavity thickness for each) 1¹/₂" (min.) of BASF Wulfitite SPF (up to full cavity thickness) Any noncombustible insulation per ASTM E136 Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) Any foam plastic insulation (SPF or board type) that has been tested per ASTM E1354 (at a min. of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{up}, PK, HRR) than Covestro EcoBay CC or BASF Wulfitite NCFI InsulBloc SPF (up to full cavity thickness) Icynene MD-C-200v3 (Proseal) up to 5¹/₂" (only with ¹/₂" [min.] exterior gypsum sheathing) SWD Urethane Quik-Shield 112 up to 6" in 6" (max.) stud cavities with an air gap not exceeding 2¹/₂" 1¹/₂" (min.) Thermoseal 2000 (up to full cavity thickness) Carlisle SealTite PRO High Yield, SealTite PRO Open Cell, SealTite PRO No Mix, SealTite PRO No Trim 21, or SealTite PRO OCX – up to full cavity thickness with ¹/₂" (min.) exterior gypsum sheathing Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 – 3¹/₂" (max.) for use with ⁵/₈" Exterior Gypsum Sheathing JM Corbond III or Corbond IV – Full stud cavity depth or less for use with ⁵/₈" exterior gypsum sheathing Huntsman ProSeal HFO (8 in. max. thickness with no air gap, 6 inch max. thickness with air gap) for use with ⁵/₈" or thicker exterior gypsum sheathing
Exterior Sheathing Use either 1, 2 or 3	<ol style="list-style-type: none"> None (only with cavity insulation 1, 2, 4, 5 or 6). Also see note for Cavity Insulation ¹/₂" or thicker exterior gypsum sheathing ¹/₂" (min.) FRTW structural panels in Type III construction.
Multi-Function Sheathing and WRB Products Use 1 or 2	<ol style="list-style-type: none"> USG Securock®Exoair®430 System – See note and Table 10. ⁵/₈" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints. <p>Note: Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRB's on base wall surface Table 10.</p>
WRB Over Base Wall Surface	See Table 10
Exterior Insulation Use either 1 or 2 depending on cladding.	<ol style="list-style-type: none"> 4¹/₄" thick (max.) Xci Ply (Class A) (3¹/₂" foam max., ³/₄" FR Plywood max.) with all claddings. 4¹/₄" thick (max.) Xci Ply (Class A) (4" foam max., ³/₄" FR Plywood max.) may be used with claddings 1-6.



Wall Component	Materials
WRB Over Exterior Insulation	See Table 10 The exterior insulation may be used with or without CavClear® Masonry Mat over the insulation with a maximum 1" air gap between the CavClear® and the cladding. When CavClear® is used, this may only be used with Cladding 1-6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" min.
Exterior Cladding Use any Item 1-17 Item 9 may use any tested/approved installation technique. Items 10, 11 and 14 may use any standard installation technique. If Claddings 2, 3, 4, 5, 13, 14, 15, or 16 are on stucco base with lath, a secondary WRB (WRB items above allowed over foam) can be installed between the insulation and lath and must not be full coverage asphalt or self-adhering membranes, but may be slip sheet (stapled) with no adhesive.	<ol style="list-style-type: none"> 1. Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (max.) 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath. For systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/external insulation and the lath. 3. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. 4. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. 5. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. 6. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Thin brick/cultured stone set in thin set adhesive and metal lath that has been tested to ASTM E119 (brick exposed to furnace) and remains in place for a minimum of 30 minutes, or has passed a NFPA 285 test. Minimum 3/4". For these systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/AVP and the lath. 8. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. 9. Any MCM that has passed NFPA 285. 10. Uninsulated sheet metal building panels including steel, copper, aluminum (or zinc only with Xci Ply [Class A]) 11. 1/4" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 12. Stone, porcelain, ceramic/aluminum honeycomb composite building panels that have successfully passed NFPA 285 criteria. 13. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 criteria. 14. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 15. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria or is approved for use in Type I-IV construction or has been tested per NFPA 285 or stays in place when tested per ASTM E119 (stucco exposed to fire) for at least 30 minutes. 16. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. 17. FunderMax M.Look – minimum 1/4" thick using any standard installation technique
<p>St: 1 in = 25.4 mm</p> <ol style="list-style-type: none"> 1. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis. 2. Acceptance criteria for ASTM E 1354 testing have not been well established in the referenced building codes and foam sheathing related sections. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis. 3. T_{ig} is the time to ignition from the start of the test until the sheathing ignites. Pk. HRR is the peak heat release rate during the test. 	

**Table 8. NFPA 285 Approved Wall Assemblies with Xci Foil (Class A) PLUS Exterior Insulation^{1,4}**

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	<ol style="list-style-type: none"> Cast concrete walls CMU concrete walls 25-gauge min. 3¹/₂" (min.) steel studs spaced 24" o.c. (max.) <ol style="list-style-type: none"> ⁵/₈" Type X gypsum wallboard interior Lateral bracing every 4' FRTW (fire-retardant-treated wood) studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) <ol style="list-style-type: none"> ⁵/₈" Type X gypsum wallboard interior Bracing as required by code
Fire-Stopping at Floor Lines	<ol style="list-style-type: none"> Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any item 1-15 Items 8, 9, 10, 11, 12, 13, 14, or 15 may be used with Exterior Sheathing 2 or the sheathing thickness specified	<ol style="list-style-type: none"> None 1¹/₂" (min.) of Carlisle® SPI SealTite PRO (up to full cavity thickness), SealTite PRO Closed Cell, or Seal Tite PRO One Zero (up to full cavity thickness for each) 1¹/₂" (min.) of BASF Walltite SPF (up to full cavity thickness) Any noncombustible insulation per ASTM E136 Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) Any foam plastic insulation (SPF or board type) that has been tested per ASTM E1354 (at a min. of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{on}, PK, HRR) than Covestro EcoBay CC or BASF Walltite NCFI InsulBloc SPF (up to full cavity thickness) Icynene MD-C-200v3 (Proseal) up to 5¹/₂" (only with ¹/₂" [min.] exterior gypsum sheathing) SWD Urethane Quik-Shield 112 up to 6" (max.) stud cavities with an air gap not exceeding 2¹/₂" 1¹/₂" (min.) Thermoseal 2000 (up to full cavity thickness) Carlisle SealTite PRO High Yield, SealTite PRO Open Cell, SealTite PRO No Mix, SealTite PRO No Trim 21, or SealTite PRO OCX – up to full cavity thickness with ¹/₂" (min.) exterior gypsum sheathing Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 – 3¹/₂" (max.) for use with ⁵/₈" Exterior Gypsum Sheathing JM Corbond III or Corbond IV – Full stud cavity depth or less for use with ⁵/₈" exterior gypsum sheathing Huntsman ProSeal HFO (8 in. max. thickness with no air gap, 6 inch max. thickness with air gap) for use with ¹/₂" or thicker exterior gypsum sheathing
Exterior Sheathing Use either 1, 2 or 3	<ol style="list-style-type: none"> None (only with cavity insulation 1, 2, 3, 4, 5 or 6) ¹/₂" or thicker exterior gypsum sheathing ¹/₂" (min.) FRTW structural panels in Type III construction
Multi-Function Sheathing and WRB Products Use 1 or 2	<ol style="list-style-type: none"> USG Securock®Exoair®430 System – See note and Table 10 ⁵/₈" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints <p>Note: Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRB's on base wall surface in Table 10</p>
WRB Over Base Wall Surface	See Table 10
Exterior Insulation	<ol style="list-style-type: none"> 4" thick (max.) Xci Foil (Class A) PLUS for all claddings listed



Wall Component	Materials
WRB Over Exterior Insulation	See Table 10 The exterior insulation may be used with or without CavClear® Masonry Mat over the insulation with a maximum 1" air gap between the CavClear® and the cladding. When CavClear® is used, this may only be used with Cladding 1, 2, 3, 4, 5, or 6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" min.
Exterior Cladding Use any item 1-17 Item 7 may use any tested/approved installation technique. Items 8, 9, or 12 may use any standard installation technique. If Claddings 2, 3, 4, 5, 13, 14, 15, or 16 are on stucco base with lath, a secondary WRB (WRB items above allowed over foam) can be installed between the insulation and lath and must not be full coverage asphalt or self-adhering membranes, but may be slip sheet (stapled) with no adhesive.	<ol style="list-style-type: none"> 1. Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (max.). 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath. For systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/external insulation and the lath. 3. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. 4. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. 5. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. 6. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Any MCM that has passed NFPA 285. 8. Uninsulated sheet metal building panels including steel, copper, aluminum or zinc. 9. 1/4" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 10. Stone, porcelain, ceramic/aluminum honeycomb composite building panels that have successfully passed NFPA 285 criteria. 11. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 criteria. 12. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 13. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria or is approved for use in Type I-IV construction or has been tested per NFPA 285 or stays in place when tested per ASTM E 119 (stucco exposed to fire) for at least 30 minutes. 14. Thin brick/cultured stone set in thin set adhesive and metal lath that has been tested to ASTM E 119 (brick exposed to furnace) and remains in place for a minimum of 30 minutes, or has passed a NFPA 285 test. Minimum 3/4". For these systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/AVP and the lath. 15. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. 16. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. 17. FunderMax M.Look – minimum 1/4" thick using any standard installation technique
St. 1 in = 25.4 mm <ol style="list-style-type: none"> 1. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis. 2. Acceptance criteria for ASTM E 1354 testing have not been well established in the referenced building codes and foam sheathing related sections. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis. 3. T_{ig} is the time to ignition from the start of the test until the sheathing ignites. Pk HRR is the peak heat release rate during the test. 	

**Table 9.** NFPA 285 Approved Mass Wall Assemblies with Xci as Interior Insulation¹

Wall Component	Materials
Base Wall System Use either 1, or 2	<ol style="list-style-type: none"> 1. Cast concrete walls (min. 2" thick) 2. CMU concrete walls (min. 4" thick)
Exterior Coating Use either 1, 2, 3 or 4	<ol style="list-style-type: none"> 1. Portland cement or lime stucco 2. Any ASTM E84 Class A Paint or Elastomeric Coating 3. Any ASTM E84 Class A Clear Sealer 4. None
Air/Vapor Barrier Membrane Position 1 Over Base Wall Interior Note: Some WRBs are only allowed with specific systems.	See Table 10 - WRB over Base Wall Surface.
Continuous Insulation Use 1, 2 or 3	<ol style="list-style-type: none"> 1. Xci Foil (Class A) (or Xci-286), 3 1/2" thick (max.) 2. Xci CG (Class A) or Xci CG, 3 1/2" thick (max.) 3. Xci Foil, 3 1/2" thick (max.)
Air/Vapor Barrier Membrane Position 2 Over Insulation Note: Some WRB's are only allowed with specific systems	See Table 10 - WRB over Base Wall Surface. Note: Insulation Joints may be taped with Foil-Grip™ 1402, 4" width (max.)
Interior Cladding	<p>5/8" type X interior gypsum sheathing installed directly over the insulation or installed to 3 1/2" (max. depth) studs or Metal Hat or Z Furring directly (no gap between stud/hat/Z and insulation). If an air gap between the stud/hat/Z and insulation is created, fire blocking with mineral wool per <u>IBC Section 718</u> shall be installed.</p> <p>Mass wall designs are assumed to use platform construction (concrete floor line intersects exterior concrete creating a firestop at floor lines). If the floor line is separated from the exterior concrete, fireblocking with mineral wool must be installed to prevent uncontrolled vertical flame spread.</p>
SI: 1 in = 25.4 mm <ol style="list-style-type: none"> 1. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis. 2. Position 1 – Air vapor barrier installed directly on interior side of the base wall system. 3. Position 2 – Air vapor barrier installed over continuous insulation on interior side of the wall assembly. 4. CCW Membrane used in Position 1 or 2, not both. 5. Xci Foil (Class A) (or Xci-286) insulation can be tacked in place with CAV-Grip or Travel-Tack during installation. Follow instructions on product data sheet. 	

**Table 10. NFPA 285 Allowable WRB Materials**

Wall Component	Materials
<p>WRB Over Base Wall Surface Use either 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 or 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, or None.</p> <p>Note: Some WRBs are only allowed with specific systems.</p> <p>Item 24 (Securock® Exoair® 430) or 25 (DensElement w/ FastFlash) replaces the exterior sheathings in Tables 5-8. When either of these items are used, do not use exterior sheathings listed in Tables 5-8 or WRB's on base wall surface in this table.</p>	<ol style="list-style-type: none"> 1. Hunter Xci VP-SA WRB 2. Carlisle® Fire Resist 705 RS, Fire Resist Barrithane VP, Fire Resist 705 VP, Fire Resist 705 FR-A, Fire Resist Barritech NP, Fire Resist Barritech VP (or VP LT). Fire Resist 705 VP may be used with 702 WB, Cav-Grip, or Low VOC Travel-Tack adhesives. Fire Resist 705 FR-A may be used with CCW 702, 702LV, 702 WB, CAV-Grip, and Low VOC Travel-Tack adhesives. 3. CCW-705 (with 702 LV, 702 WB, Cav-Grip, Low VOC Travel-Tack, or 702 adhesives may) be used with Xci Foil (Class A) (or Xci 286), or unfaced noncombustible insulation and cladding options 1-6 (Table 3) 4. GE Momentive SEC 2500 SilShield, Elemax 2600 5. VaproShield Wrapshield SA, RevealShield SA 6. WR Grace Perm-A-Barrier® VPS, Perm-A-Barrier® NPL (AKA, PAB NP20), Perm-A-Barrier® VPL, Perm-A-Barrier® Aluminum Wall Membrane (AWM), Perm-A-Barrier® VPL LT. The following may only be used with claddings 1-6 - Perm-A-Barrier® NPL 10, Perm-A-Barrier® VPL 50. 7. StoGuard Vaporseal 8. 3M 3015 (with Hold Fast 70 adhesive @ 6 mils) 9. Henry Air-Bloc® 17MR, 21S, 31MR, 32MR (only with Xci-Ply [Class A]), 33MR, Blueskin SA (only with Xci Ply [Class A] and claddings 1-6), Air-Bloc® 16MR, Blueskin VP 160. 10. Tyvek CommercialWrap or CommercialWrap D, Fluid Applied WB (only with Xci Ply [Class A] or Xci Foil [Class A]). 11. PolyGuard Spray-N-Roll (STPE), Air Lok Sheet UV400NP, Air Lok Flex VP, FlexGuard, Air Lok Flex, Air Lok Sheet 400 NP (Only with Cladding 1-6) (Table 3) 12. Prosoco R-Guard Cat 5, R-Guard Cat 5 Rainscreen, R-Guard VB or R-Guard Spray Wrap MVP 13. Dryvit Backstop NT 14. WR Meadows Air Shield LMP (Gray), Air Shield LMP (Black), Air Shield TMP, Air Shield LSR 15. Dörken Systems, Inc., Delta-Vent SA, Delta-Vent S, Delta-Fassade S, Delta Maxx, Delta Stratus SA 16. Any WRB that has been tested per ASTM E1354 (at a minimum of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{ign}, Pk. HRR) than those listed above. 17. BASF Enershield HP or Enershield I 18. Soprema Sopraseal Stick VP, Soprasolin HD, LM 204 VP, Stick 1100T with Elastacool 600c Primer (for use with Xci-CG, Xci-CG [Class A]), Xci Foil [Class A], Xci-Ply or Xci-ply [Class A]) 19. Pecora XL Perm Ultra VP 20. Siga Majvest or Majvest 500 SA 21. Sto Gold Coat or Emerald Coat 22. Tremco ExoAir 230 and ExoAir 130 23. Fortifiber Building Systems Group WeatherSmart Housewrap, WeatherSmart Drainable, WeatherSmart Commercial or Super Jumbo Tex 60 24. USG Securock® Exoair® 430 System – see note on left and Air/Vapor System sections in Tables 5-8. 25. 5/8" Georgia Pacific DenElement, flashed with Prosoco R-Guard FastFlash on sheathing joints. 26. Dow Corning Dowsil DefendAir200 (or LT version) or DefendAir 200C (Charcoal) 27. Hohmann & Barnard Enviro Barrier and Enviro Barrier VP 28. STS FW100 or FW100A 29. Karnak 321 K-NRG 30. NaturaSeal AirSeal NS-A-250LP, AirSeal NS-A-250HP 31. Jumpstart HWW-65A, HWW-65B, HWHP-80A, HWMP-90A, HWD2-72A, HWHPT-92A, HWMPC-105A 32. Master Wall Rollershield 33. Parex WeatherSeal Spray & Roll-On
<p>WRB Over Exterior Insulation Use any Item 1-27 or None</p>	<ol style="list-style-type: none"> 1. Hunter Xci VP-SA WRB 2. Carlisle® Fire Resist 705 RS, Fire Resist Barrithane VP, Fire Resist 705 VP (with 702 WB, Cav-Grip, or Low VOC Travel-Tack adhesives), Fire Resist 705 FR-A (with CCW 702, 702LV, 702 WB, CAV-Grip, and Low VOC Travel Adhesives), Fire Resist Barritech NP 3. GE Momentive SEC 2500 SilShield, Elemax 2600 4. VaproShield Wrapshield SA, RevealShield SA



Wall Component	Materials
<p>Note: Some WRB's are only allowed with specific systems</p>	<ol style="list-style-type: none"> 5. Grace Perm-A-Barrier® NPL (AKA, PAB NP20), Perm-A-Barrier® VPL, Perm-A-Barrier® Aluminum Wall Membrane (AWM), Perm-A-Barrier®VPL LT, Perm-A-Barrier®VPS. 6. Henry Air-Bloc® 17MR, 21S, 31MR, Blueskin® VP160 (only with Xci Ply [Class A]), Air-Bloc® 33MR and 16MR. 7. Tyvek CommercialWrap or StuccoWrap 8. Polyguard Air Lok Sheet UV400 NP, Air Lok Flex (only with claddings 1-6), Air Lok Flex VP (over Xci Ply with any cladding listed or over the other Xci foams listed with claddings 1-6) (Table 3) 9. Prosoco R-Guard Cat 5, R-Guard Cat 5 Rainscreen, R-Guard VB or R-Guard Spray Wrap MVP 10. Sto Gold coat or Emerald Coat (only with Xci-Ply) 11. Dryvit Backstop NT 12. Any WRB that has been tested per ASTM E1354 (at a minimum of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{ign}, Pk. HRR) than those listed above 13. 3" Aluma-GRIP™ 701 or 4" FG-1402 joint tape may be interchanged. (Hardcast AFT is a rebrand of Aluma-GRIP™ 701). 14. WR Meadows Air Shield LMP (Gray), Air Shield LMP (Black), Air Shield TMP, Air Shield LSR 15. Dörken Systems, Inc., Delta-Vent SA, Delta-Vent S, Delta-Fassade S, Delta Maxx. 16. Soprema Sopraseal Stick VP (with Claddings 1-6, not with Xci Foil), Soprasolin HD 17. Pecora XL Perm Ultra VP 18. Siga Majvest (for all claddings) or Majvest 500 SA (only with Claddings 1-6) 19. Fortifiber Building Systems Group WeatherSmart Housewrap, WeatherSmart Drainable or WeatherSmart Commercial 20. Dow Chemical DefendAir 200 (or LT version) or DefendAir 200C (Charcoal) 21. Hohmann & Barnard Enviro Barrier VP 22. STS FW100A 23. Karnak 321 K-NRG 24. Jumpstart HWW-65A, HWW-65B, HWHP-80A, HWMP-90A, HWD2-72A, HWHPT-92A, HWMPC-105A 25. Master Wall Rollershield 26. Parex WeatherSeal Spray & Roll-On 27. 3M 3015 VP

St: 1 in. = 25.4 mm

1. The following adhesives may be used for attachment of the polyisocyanurate (polyiso) insulation:
 - a. Adhesive applied discontinuously at a rate of "1" x 3" dabs, 16" o.c.: LM 800 XL or BariBond or BariBond XL
 - b. Aerosol adhesive at the application rate as per mfg. instructions: CAV-Grip™ or Low VOC Travel-Tack
2. The following may be used as gap filler between insulation panels: FOMO HandFoam FireBlock and TVM FireBlock.
3. These CCW detailing materials may be used over the base wall assembly. The detailing materials can be used alone or with any approved WRB for the construction.
 - a. Board Joint Treatments:
 - i. 2" x 40 mil ribbon of BariBond or BariBond XL
 - ii. 4" DCH Reinforcing Fabric embedded in Fire-Resist Barritec VP/NP/NP LT or embedded in Fire Resist Barrithane VP
 - iii. 4" Foil-GRIP™ 1402 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet)
 - iv. 4" AlumaGRIP 701 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715; Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet)
 - b. Termination Mastic for Flashing/Membrane: 1" x 40 mil ribbon or tooled "1" bead of SURE-SEAL Lap Sealant, CCW-704, LM 800 XL, BariBond, or BariBond XL
 - c. Detail Flashing, 3" on each side, at Openings, Terminations, Penetrations, Transitions, and Angle Changes.
 - i. CCW-705/XLT, CCW-705 TWF/XLT, or Fire Resist 705 FR-A/XLT (all with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet)
 - ii. SURE-SEAL P/S Elastoflex or SURE-SEAL P/S Cover Strip (both with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet)
 - iii. LiquiFiber or DCH Reinforcing Fabric embedded in Barritec VP/NP/NP LT
 - iv. 40 mil application of BariBond, BariBond XL, or Barrithane VP
4. These CCW detailing materials may be used over the polyiso insulation and can be use alone or with any approved WRB for the assembly.
 - a. Board Joint Treatments:
 - i. 2" x 40 mil ribbon of BariBond or BariBond XL
 - ii. 4" DCH Reinforcing Fabric embedded in Fire-Resist Barritec VP/NP/NP LT or embedded in Fire Resist Barrithane VP



Wall Component	Materials
iii.	4" Foil-GRIP™ 1402 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet)
iv.	4" AlumaGRIP 701 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet)
b.	Termination Mastic for Flashing Membrane: 1" x 40 mil ribbon or tooled 1/4" bead of SURE-SEAL Lap Sealant, LM 800 XL, BariBond, or BariBond XL.
c.	Detail Flashing, 3" on each side, at Openings, Terminations, Penetrations, Transitions, and Angle Changes.
i.	Fire Resist 705 FR-A/XLT (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet)
ii.	SURE-SEAL P/S Elastoform or SURE-SEAL P/S Cover Strip (both with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet)
iii.	LiquiFiber or DCH Reinforcing Fabric embedded in BariTech VP/NP/NT LT
iv.	40 mil application of BariBond, BariBond XL, or Barithane VP
5.	In the NFPA 285 test, flashing for fenestration, including through-wall flashing (TWF), are not considered part of the WRB (ref. 2015 IBC Section 1405.4). TWF is permitted for use in wall assemblies clad with masonry or stone at the base of wall, head of wall, relieving angle, window head, windowsill, and at other interruptions in the exterior cavity. TWF shall be applied a maximum of 8" onto the back-up wall and terminate at daylight or onto a drip edge. The following TWF products may be used:
a.	CCW TWF/XLT (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet)
b.	Pre-Kleened EPDM TWF loose-laid or adhered with SURE-SEAL 90-B-30A bonding Adhesive or SURE-SEAL Low VOC Bonding Adhesive
c.	Metal TWF by others
6.	BRT-801 tape may be used over Fire-Resist 705 RS at membrane splices, terminations, and penetrations. Fire-Resist 705 RS and the substrate may be treated with CCW-702, CCW-702 LV, CCW-702 WB, or Low VOC Travel-Tack to promote adhesion of BRT-801.
7.	Fire-Resist 705 RS may be used in the following applications:
a.	Over the exterior insulation, while another approved WRB is used over the base wall assembly.
b.	Over a WRB on the base wall assembly while no exterior insulation is used. Use only WRBs listed below:
i.	CC Fire Resist 705 FR-A
ii.	Other WRBs that produce no ignition when tested per ASTM E1354 at a heat flux of 50 kW/m².
8.	Insulating coating applied over noncombustible substrate can be used for mitigating thermal bridging at wall assembly terminations and penetrations. Coating applied in these conditions cover a small percentage of the total wall surface area. The following products are allowed:
a.	Aerolon 945 tape with primer by Tnemec
b.	Aerolon 971 coating with primer by Tnemec

**Table 11:** Table Notes

Note 1: The following adhesives may be used to attach the polyisocyanurate (polyiso) insulation.

- 1) Adhesive applied discontinuously at a rate of $\frac{3}{8}$ " x 3" dabs, 16" OC: LM 800 XL or BarriBond or BarriBond XL
- 2) Aerosol adhesive at the application rate as per mfg. instructions: CAV-GRIP™ or Low VOC Travel-Tack

Note 2: The following may be used as a gap-filler between insulation panels: FOMO HandiFoam Fireblock or TVM Fireblock

Note 3: These CCW detailing materials may be used over the base wall assembly and alone or with any approved WRB for the construction.

- 1) Board Joint Treatments:
 - a. 2" x 40 mil ribbon of BarriBond or BarriBond XL
 - b. 4" DCH Reinforcing Fabric embedded in Fire-Resist Barritech VP/NP/NP LT or embedded in Fire Resist Barrithane VP
 - c. 4" Foil-GRIP 1402*
 - d. 4" AlumaGRIP 701*
- 2) Termination Mastic for Flashing/Membrane: 1" X 40 mil ribbon or tooled $\frac{3}{8}$ " bead of SURE-SEAL Lap Sealant, CCW-704, LM 800 XL, BarriBond, or BarriBond XL
- 3) Detail Flashing, 3" on each side, at Openings, Terminations, Penetrations, Transitions, and Angle Changes.
 - a. CCW-705/XLT*, CCW-705 TWF/XLT* or Fire Resist 705 FR-A/XLT*
 - b. SURE-SEAL P/S Elastoform* or SURE-SEAL P/S Cover Strip*
 - c. LiquiFiber or DCH Reinforcing Fabric embedded in Barritech VP/NP/NP LT
 - d. 40 mil application of BarriBond, BarriBond XL, or Barrithane VP
- * Prepare the surface as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-GRIP, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet.

Note 4: These CCW detailing materials may be used over the polyiso insulation and alone or with any approved WRB for the assembly.

- 1) Board Joint Treatments:
 - a. 2" x 40 mil ribbon of BarriBond or BarriBond XL
 - b. 4" DCH Reinforcing Fabric embedded in Fire-Resist Barritech VP/NP/NP LT or embedded in Fire Resist Barrithane VP
 - c. 4" Foil-GRIP 1402*
 - d. 4" AlumaGRIP 701*
- 2) Termination Mastic for Flashing/Membrane: 1" X 40 mil ribbon or tooled $\frac{3}{8}$ " bead of SURE-SEAL Lap Sealant, LM 800 XL, BarriBond, or BarriBond XL
- 3) Detail Flashing, 3" on each side at Openings, Terminations, Penetrations, Transitions, and Angle Changes.
 - a. Fire Resist 705 FR-A/XLT*
 - b. SURE-SEAL P/S Elastoform* or SURE-SEAL P/S Cover Strip*
 - c. LiquiFiber or DCH Reinforcing Fabric embedded in Barritech VP/NP/NP LT
 - d. 40 mil application of BarriBond, BarriBond XL, or Barrithane VP
- * Prepare the surface as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-GRIP, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet.



Note 5: In the NFPA 285 test, flashings for fenestration, including through-wall flashing "TWF", are not considered part of the WRB (Ref: 2015 IBC Sec. 1403.5). Therefore, suitable combustible or noncombustible flashings are permitted in wall assemblies as required in Building Code (Ref: 2015 IBC Sec. 1405.4). Through-Wall Flashing "TWF" is allowed for use in wall assemblies clad with masonry or stone at the base of wall, head of wall, relieving angle, window head, windowsill, and at other interruptions in the exterior cavity. TWF shall be applied a maximum of 8" onto the back-up wall and terminate at daylight or onto a drip edge. The following "TWF" products may be used:

- 1) CCW-705 TWF/XLT*
- 2) Pre-Kleened EPDM TWF loose-laid or adhered with SURE-SEAL 90-8-30A bonding Adhesive or SURE-SEAL Low VOC Bonding Adhesive
- 3) Metal TWF by others

Note 6: BRT-801 tape may be used over Fire-Resist 705 RS at membrane splices, terminations, and penetrations. Fire-Resist 705 RS and the substrate may be treated with CCW-702, CCW-702 LV, CCW-702 WB, or Low VOC Travel-Tack to promote adhesion of BRT-801.

Note 7: Fire-Resist 705 RS may be used in the following applications:

- 1) Over the exterior insulation, while another approved WRB is used over the base wall assembly.
- 2) Over a WRB on the base wall assembly while no exterior insulation is used. Use only WRBs listed below.
 - a. CC Fire Resist 705 FR-A
 - b. Other WRBs that produce no ignition when tested per ASTM E1354 at a heat flux of 50 kW/m².

Note 8: Insulating coating over a noncombustible substrate can mitigate thermal bridging at wall assembly terminations and penetrations. Coating in these conditions covers a small percentage of the total wall surface area. The following products are allowed:

- 1) Aerolon 945 tape with primer by Tnemec
- 2) Aerolon 971 coating with primer by Tnemec

EXHIBIT E



June 11, 2024

Re: Hunter Panels LLC: Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 Air Barrier, Water-Resistive Barrier, and Fire Performance in Exterior & Interior Walls of Buildings of Type I-V Construction - Listing and TER 1402-01^{1, 2, 3, 4}

To whom it may concern:

The attached Listing and Technical Evaluation Report[™] has been created by DrJ Engineering on behalf of Hunter Panels LLC.

DrJ's code compliance work has been performed in concert with ICC's Product Approval Checklist for Code Officials. DrJ has undertaken its engineering evaluation under the auspices of our ANSI National Accreditation Board (ANAB) ISO/IEC 17065 (17065) product evaluation process, which is the identical ANSI accredited certification approval process listed in the checklist. ANAB accreditation is often promoted by others stating they are "ICC Approved" As an example, Los Angeles has updated their Los Angeles Research Report (LARR) process to adopt the ANAB 17065 process.

DrJ's procedures are fully compliant with 17065 certification procedures and DrJ's scope of expertise.

If there are any questions or concerns, we will gladly provide a professional engineering⁵ and ANAB 17065 accredited approved agency⁶ response. Pursuant to Section 1707.1 and 104.11, we would sincerely appreciate knowing the specific building regulations and/or professional engineering law that this 17065 Research Report does not comply with, so that we can cure any non-conformance⁷. From specifics, we can then delineate a path forward that will serve everyone's free and fair market⁸ competition's best interests.

Our goal with this 17065 evaluation and certification is to provide both the accepted engineering analysis and regulatory compliance substance that supports efficient approval. Please contact us if we can help further in any way. If your request is time-sensitive, please contact Jill Zimmerman at (920) 988-7165. Thank you very much.

Respectfully yours,

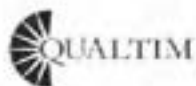
Larry Wainright
Vice President Product Certification
608-310-6742

Ryan Dexter, P.E.
Illinois P.E. No. 62063066
Vice President
608-310-6744



This TER is reviewed and sealed by Ryan Dexter, P.E. of DrJ Engineering, LLC, as a specialty or delegated engineer. The scope of engineering work with respect to this TER is for the engineering analysis provided herein, supported by proprietary intellectual property and other substantiating data. No representation extending beyond this analysis is expressed or implied. Information or data that becomes available at a later date may justify modifications to this TER.

Confidential Intellectual Property is protected by Defend Trade Secrets Act 2016. ©DrJ Engineering, LLC.



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Where building innovation thrives.

¹ All ideas, engineering analysis and test data are proprietary intellectual property (IP) and trade secrets (TS) and should not be provided to anyone. In particular, public regulatory officials are subject to freedom of information act requests – federal and state public records acts. This means that IP and TS will be in the public domain when any information is provided. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2016 (DTSA), where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than 10 years and/or a \$5,000,000 fine or 3 times the value of the IP and TS. To follow DTSA and to comply with state public records and trade secret legislation requires approval through ANAB ISO/IEC 17065 accredited certification bodies or approved sources. For more information, please visit the following websites: <https://www.drengineering.org/AppendixC> and <https://www.dr/certification.org/cornell-2016-protection-trade-secrets>.

² The scope of work contained herein is limited to the specific engineering and/or code compliance analysis undertaken in this duly authenticated report, which is also known as a technical evaluation, evaluation report, research report, accepted evaluation to a reasonable degree of engineering certainty and so forth. This work has been prepared by an Approved Source, who is a Registered Design Professional (RDP). No representation or warranty is expressed or implied by this duly authenticated report beyond the scope of work performed. Information, data, and/or analysis that becomes available in the future may justify modifications to this professional evaluation report.

³ Approval of an RDP takes place when the RDP is properly licensed in the pertinent jurisdiction. Commercial and professional engineering laws affirm that the RDP has the ability to undertake commerce applying engineering principles in their area of expertise without restraint or discrimination. Ohio has set legal precedent.

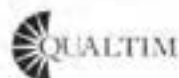
⁴ Capitalized terms and responsibilities are defined pursuant to the applicable building code, applicable reference standards, the latest edition of TPI1, the NDS, AISI S202, US professional engineering law, Canadian building code, Canada professional engineering law and Appendix A: Definitions/Commentary. Otherwise, terms not defined shall have ordinarily accepted meanings as the context implies.

⁵ Approved source. An independent person, firm or corporation, approved by the building official, who is competent and experienced in the application of engineering principles to materials, methods or systems analyses, which is a professional engineer. To find licensed professional engineers please see this website: https://www.nspe.org/resources/licensure/licensing_boards. An approved source is “approved” when a professional engineer (i.e., Registered Design Professional (RDP)) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations. Commercial and professional engineering laws affirm that the RDP has the ability to undertake commerce applying engineering principles in their area of expertise without restraint or discrimination. Ohio has set legal precedent.

⁶ An approved agency shall be objective, competent and independent. Language is found in Section 1703.11.

⁷ Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved; Language is found in Section 104.11.

⁸ Competition provides businesses the opportunity to compete on price, quality, innovation, and wages, in an open market and on a level playing field, unhampered by anticompetitive restraints. <https://www.justice.gov/atr/mission>. State statutes by topic can be found here: <https://www.law.cornell.edu/wex/unfair-competition>. Finally, given that government employees have monopoly approval power they are held to a high standards as it relates to bias in commerce (i.e. discrimination) as found here: <https://www.justice.gov/crt/deprivation-rights-under-color-law>





Technical Evaluation Report™

TER 1402-01

Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 Air Barrier, Water-Resistive Barrier, and Fire Performance in Exterior & Interior Walls of Buildings of Type I-V Construction

Hunter Panels LLC

Product:

Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286

Issue Date:

July 21, 2014

Revision Date:

September 8, 2023

Subject to Renewal:

October 1, 2024



Use the QR code to access the most recent version or a sealed copy of this Technical Evaluation Report (TER) at drjcertification.org.



COMPANY
INFORMATION:

ADDITIONAL
LISTEES:

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TF: 888-746-1114
TF: 877-775-1769

www.hunterpanels.com

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION SECTION: 07 27 23 - Board Product Air Barriers
SECTION: 07 21 00 - Thermal Insulation SECTION: 07 48 00 - Exterior Wall Assemblies

1 Innovative Products Evaluated^{1,2}

- 1.1 Xci CG (Class A)
- 1.2 Xci Ply (Class A)
- 1.3 Xci Foil (Class A)
- 1.4 Xci Foil (Class A) PLUS
- 1.5 Xci 286

2 Applicable Codes and Standards^{3,4}

- 2.1 Codes
 - 2.1.1 IBC—15, 18, 21: International Building Code®
 - 2.1.2 IRC—15, 18, 21: International Residential Code®
 - 2.1.3 IECC—15, 18, 21: International Energy Conservation Code®

¹ For more information, visit drjcertification.org or call us at 808-310-8748.

² **Federal Regulation Definition.** 24 CFR 3280.2 "Listed or certified" means included in a list published by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner. **International Building Code (IBC) Definition of Listed.** Equipment, materials, products or services included in a list published by an organization acceptable to the building official and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose Listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. **IBC Definition of Labeled.** Equipment, materials or products to which has been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, approved agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

³ This Listing is a code defined research report, which is also known as a duly authenticated report, provided by an approved agency (see IBC Section 1703.1) and/or an approved source (see IBC Section 1703.4.7). An approved agency is "approved" when it is ANAB accredited. Dr.J Engineering, LLC (Dr.J) is listed in the ANAB directory. A professional engineer is "approved" as an approved source when that professional engineer is properly licensed to transact engineering commerce. Where sealed by a professional engineer, it is also a duly authenticated report certified by an approved source. (i.e., Registered Design Professional). Dr.J is an ANAB accredited product certification body.

⁴ Unless otherwise noted, all references in this Listing are from the 2021 version of the codes and the standards referenced therein. This material, product, design, service and/or method of construction also complies with the 2000-2021 versions of the referenced codes and the standards referenced therein.



2.2 Standards and Referenced Documents

- 2.2.1 ASTM C1289: Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
- 2.2.2 ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials
- 2.2.3 ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials
- 2.2.4 ASTM E119: Standard Test Methods for Fire Tests of Building Construction and Materials
- 2.2.5 ASTM E136: Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C
- 2.2.6 ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- 2.2.7 ASTM E1354: Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter
- 2.2.8 ASTM E2178: Standard Test Method for Air Permeance of Building Materials
- 2.2.9 ASTM E2357: Standard Test Method for Determining Air Leakage Rate of Air Barrier Assemblies
- 2.2.10 NFPA 259: Standard Test Method for Potential Heat of Building Materials
- 2.2.11 NFPA 285-12: Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components⁵
- 2.2.12 NFPA 286: Standard Methods of Fire Test for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth
- 2.2.13 UL 1715: Fire Test of Interior Finish Material
- 2.2.14 UL 263: Standard for Fire Tests of Building Construction and Materials
- 2.2.15 UL 723: Test for Surface Burning Characteristics of Building Materials

3 Performance Evaluation

- 3.1 Tests, test reports, research reports, duly authenticated reports and related engineering evaluations are defined as intellectual property and/or trade secrets and protected by Defend Trade Secrets Act 2016 (DTSA).⁶
- 3.2 Testing and/or inspections conducted for this TER were performed an ISO/IEC 17025 accredited testing laboratory,⁷ an ISO/IEC 17020 accredited inspection body,⁸ which are internationally recognized accreditations through International Accreditation Forum (IAF), and/or a licensed Registered Design Professional (RDP).

⁵ References to NFPA 285-12 in this TER are code compliant through the 2018 version of the IBC.

⁶ <https://www.law.cornell.edu/uscode/text/18/part-4/chapter-90>. Given our professional duty to inform, please be aware that whoever, with intent to convert a trade secret (TS), that is related to a product or service used in or intended for use in interstate or foreign commerce, to the economic benefit of anyone other than the owner thereof, and intending or knowing that the offense will, injure any owner of that trade secret, knowingly without authorization copies, duplicates, sketches, draws, photographs, downloads, uploads, alters, destroys, photocopies, replicates, transmits, delivers, sends, mails, communicates, or conveys such information; shall be fined under this title or imprisoned not more than 10 years, or both. Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of \$5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided. The federal government and each state have a public records act. As the National Society of Professional Engineers states, "Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve." Therefore, to protect intellectual property (IP) and TS, and to achieve compliance with public records and trade secret legislation, requires approval through the use of Listings, certified reports, technical evaluation reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources. For more information, please review this website: Intellectual Property and Trade Secrets.

⁷ Internationally recognized accreditations are performed by members of the International Accreditation Forum (IAF). Accreditation Body and Regional Accreditation Group Members of IAF are admitted to the IAF MLA only after a stringent evaluation of their operations by a peer evaluation team, which is charged to ensure that the applicant complies fully with both international standards and IAF requirements. Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope.

⁸ Ibid.



- 3.3 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 were evaluated to determine:
- 3.3.1 Performance for use in exterior walls of buildings of any height and of Type I-V construction in accordance with IBC Section 2603.5 and IRC Section R316.5.12.
 - 3.3.2 Performance in accordance with UL 723 for flame spread and smoke-development index ratings in accordance with IBC Section 2603.5.4 and IRC Section R316.3.
 - 3.3.3 Performance for use without a thermal barrier in accordance with IBC Section 2603.5.2 and IRC Section R316.4.
 - 3.3.4 Performance with regard to the potential heat generated by the foam plastic insulating sheathing (FPIS) in accordance with IBC Section 2603.5.3 and IRC Section R316.4.
 - 3.3.5 Performance with regard to vertical and lateral fire propagation in accordance with 2018 IBC Section 2603.5.5.
 - 3.3.6 Performance with regard to ignition in accordance with IBC Section 2603.5.7.
 - 3.3.7 Performance for use in exterior walls of buildings as a Water-Resistive Barrier (WRB) in accordance with IBC Section 1403.2⁹ and IRC Section R703.2.
 - 3.3.8 Performance for use in exterior walls of buildings as Continuous Insulation (ci) in accordance with IECC Section C402.1.3.
 - 3.3.9 Performance in exterior walls of buildings as vapor retarding FPIS in accordance with IBC Section 1404.3.¹⁰
 - 3.3.10 Performance for use in exterior walls of buildings as an air barrier in accordance with IECC Section C402.5.1.
- 3.4 Other structural requirements in accordance with IBC Chapter 16 are outside the scope of this TER.
- 3.5 Any building code and/or accepted engineering evaluations (i.e. research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ Engineering, LLC (DrJ), an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDPs / approved sources. DrJ is qualified¹¹ to practice product and code compliance services within its scope of accreditation and engineering expertise, respectively.
- 3.6 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope, which are also its areas of professional engineering competence.
- 3.7 Any regulation specific issues not addressed in this section are outside the scope of this TER.

⁹ 2015 IBC Section 1404.2

¹⁰ 2015 IBC Section 1405.3

¹¹ Qualification is performed by a legislatively defined Accreditation Body. ANSI National Accreditation Board (ANAB) is the largest independent accreditation body in North America and provides services in more than 75 countries. DrJ is an ANAB accredited product certification body.



4 Product Description and Materials

- 4.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are proprietary FPIS products.
- 4.1.1 Xci CG (Class A) is a polyisocyanurate insulation board adhered to coated glass facers.
- 4.1.2 Xci Ply (Class A) is a polyisocyanurate insulation board bonded to APA-TECO Exposure 1, fire treated plywood.
- 4.1.3 Xci Foil (Class A) and Xci 286 are composite boards consisting of a 25 psi closed cell polyisocyanurate insulation foam core, coated on both sides with a glass-backed aluminum foil facer (ASTM C1289 Type I, Class 1).
- 4.1.4 Xci Foil (Class A) PLUS is a composite board consisting of a 25 psi closed cell polyisocyanurate insulation foam core with increased fire retardant, with tri-laminate foil facers on both sides.
- 4.2 *Material Availability*
- 4.2.1 *Thickness:*
- 4.2.1.1 Xci Ply (Class A): either a $\frac{5}{8}$ " or $\frac{3}{4}$ " fire treated plywood with 1" (25.4 mm) through 3.5" (88.9 mm) coated glass polyiso
- 4.2.1.2 Xci CG (Class A), Xci Foil (Class A), and Xci 286: 1" (25.4 mm) through 4" (102 mm). Xci Foil (Class A) PLUS is available in thicknesses from 1" (25.4 mm) through 3" (76 mm)
- 4.2.2 *Standard Product Width:*
- 4.2.2.1 48" (1219 mm)
- 4.2.3 *Standard Length:*
- 4.2.3.1 Xci Ply (Class A): 96" (2438 mm)
- 4.2.3.2 Xci CG (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286: 96" (2438 mm), 120" (3048 mm), and 144" (3657 mm)
- 4.2.4 Custom widths, lengths, and thicknesses are available upon request.

5 Applications

- 5.1 *General*
- 5.1.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are FPIS products complying with IBC Section 2603 and IRC Section R316.
- 5.1.2 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are used in exterior walls of buildings of any height and of Type I-V construction in accordance with IBC Section 2603.5 and IRC Section R316.5.12.
- 5.1.3 Environmental Product Declarations (EPD) for Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are available at polyiso.org.
- 5.1.4 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.



5.2 Vapor-Retarding Insulated Sheathing

- 5.2.1 Xci Foil (Class A), Xci Foil (Class A) PLUS and Xci 286 have a permeance rating of <1. Per [IBC Section 1404.3.2](#),¹² only Class III vapor retarders shall be used on the interior side of walls framed with insulated sheathing with <1 perm installed on the exterior side of the framed wall. Water vapor permeance of Xci Foil (Class A) and Xci 286 is indicated in Table 1.

Table 1. Xci Foil (Class A) Xci Foil (Class A) PLUS, and Xci 286 Water Vapor Permeance

Test Method	Water Vapor Permeance (grains/h·ft ² ·in Hg) ¹
ASTM E96 A (Desiccant Method)	0.000
ASTM E96 B (Water Method)	0.009

1. Results for 1" thickness board

5.3 Air Barrier

- 5.3.1 Xci 286 is an air barrier material and meets the requirements of [IECC Section C402.5.1.3](#)¹³ for use as part of an air barrier material and an air barrier assembly when installed in accordance with the manufacturer installation instructions, this TER and with all seams (including the top and bottom edges) taped.
- 5.3.2 Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci CG (Class A) meet the requirements of [IECC Section C402.5.1.4](#)¹⁴ for use as part of an air barrier assembly when installed in accordance with the manufacturer installation instructions, this TER and with all seams (including the top and bottom edges) taped. See Table 2.
- 5.3.2.1 As an alternative to the tape specified in Section 5.3.2, Xci Foil (286) sheathing joints and penetrations are permitted to be sealed with Hunter Panels Xci BarriBond Liquid Flashing and Detail Sealant.

Table 2. Xci Foil (Class A), Xci Foil (Class A) PLUS, Xci CG (Class A), and Xci 286 Air Barrier Properties

Test Method	Air Barrier Performance
ASTM E2178	≤0.00012 L/s.m ² @ 75 Pa [0.000024 CFM/R ² @ 1.57 PSF]
ASTM E2357	≤ 0.020 L/s.m ² @ 75 Pa [0.0004 CFM/R ² @ 1.57 PSF] ^{1,2}

SI: 1 psf = 0.0479 kN/m², 1 psi = 0.00689 MPa

1. All seams and joints between boards shall be covered by 4" wide Carlisle® Coatings & Waterproofing Foil-Grip™ 1402 pressure sensitive foil-faced flashing tape.

2. All fenestrations and penetrations shall be sealed with 9" wide Carlisle® Coatings & Waterproofing Alum-Grip™ 701 foil-faced self-adhering flashing tape with the top of the flashing sealed with a butyl-based sealant.

¹² 2015 IBC Section 1405.3.2

¹³ 2018 IECC Section C402.5.1.2.1

¹⁴ 2018 IECC Section C402.5.1.2.2



5.4 Water-Resistive Barrier

- 5.4.1 Xci Foil (Class A) and Xci Foil (Class A) PLUS are approved for use as a WRB as prescribed in IBC Section 1403.2¹⁵ and IRC Section R703.2¹⁶ when installed on exterior walls as described in this section.
- 5.4.2 Xci Foil (Class A) shall be installed horizontally or vertically with board joints placed directly over exterior framing spaced a maximum of 24" (610 mm) o.c. The fasteners used to attach the board shall be installed in accordance with Section 6.
- 5.4.3 All seams and joints between boards shall be covered by 4" wide Carlisle® Coatings & Waterproofing Foil Grip™ 1402 pressure sensitive foil-faced flashing tape.
- 5.4.4 A separate WRB may also be provided. If a separate WRB method is used, taping of the sheathing joints is not required.
- 5.4.5 Flashing of penetrations is required and shall comply with the applicable code.

5.5 Fire Safety Performance

5.5.1 Surface Burn Characteristics:

- 5.5.1.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 were evaluated to assess performance with regard to flame spread and smoke-developed index in accordance with ASTM E84 as shown in Table 3.

Table 3. Surface Burn Characteristics¹

Product Name	Flame Spread Index	Smoke-Developed Index
Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286	≤ 25	< 450
1. Foam core tested in accordance with UL 723 (ASTM E84). Flame spread and smoke-developed indexes are shown for comparison purposes only and are not intended to represent the performance under actual fire conditions.		

5.5.2 Ignition

- 5.5.2.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), and Xci 286 were evaluated to assess performance with regard to ignition in accordance with IBC Section 2603.5.7. Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 comply with this section when the exterior side of the sheathing is protected with one of the following materials:
- 5.5.2.1.1 A thermal barrier complying with IBC Section 2603.4.
- 5.5.2.1.2 A minimum 1" (25.4 mm) thickness of concrete or masonry.
- 5.5.2.1.3 Glass fiber reinforced concrete panels with a minimum thickness of $\frac{3}{8}$ " (9.5 mm).
- 5.5.2.1.4 Metal faced panels having a minimum 0.019" (0.48 mm) thick aluminum or 0.016" (0.41 mm) thick corrosion resistant steel outer facings.
- 5.5.2.1.5 A minimum $\frac{7}{8}$ " (22.2 mm) thickness of stucco complying with IBC Section 2510.
- 5.5.2.1.6 A minimum $\frac{1}{4}$ " (6.4 mm) thickness of fiber cement siding complying with IBC Section 1404.16.1¹⁷ and IBC Section 1404.16.1¹⁸ or IBC Section 1404.16.2¹⁹.

¹⁵ 2015 IBC Section 1404.2

¹⁶ WRB is not required for detached accessory buildings.

¹⁷ 2015 IBC Section 1405.16

¹⁸ 2015 IBC Section 1405.16.1

¹⁹ 2015 IBC Section 1405.16.2



5.5.3 Potential Heat:

- 5.5.3.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), and Xci 286 were tested in accordance with NFPA 259 to assess the potential heat generated by the FPIS in accordance with IBC Section 2603.5.3 and IRC Section R316.5.7, as shown in Table 4.

Table 4. Potential Heat

Product	Potential Heat (Btu/lb) ¹
Xci CG (Class A)	11,503
Xci Ply (Class A)	11,503
Xci Foil (Class A)	11,587
Xci Foil (Class A) PLUS	11,587
Xci 286	11,587

St: 1 lb. = 4.45 N
 1. Tested in accordance with NFPA 259.

5.5.4 Vertical and Lateral Fire Propagation:

- 5.5.4.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 were tested to assess their performance with regard to vertical and lateral fire propagation in accordance with NFPA 285 and 2018 IBC Section 2603.5.5.
- 5.5.4.2 Engineering analysis has also been conducted to assess substitution of other products within the approved wall assemblies.
- 5.5.4.3 The wall assemblies listed in Appendix B are approved for use in buildings of Type I-IV construction.

5.5.5 Special Approval:

- 5.5.5.1 Xci Foil (Class A), , and Xci 286 up to 3 1/2" (88.9 mm) thick has been tested for use as a thermal barrier on walls only or ceilings only to NFPA 286 in accordance with IBC Section 2603.9 and IRC Section 316.6 and met the criteria of IBC Section 803.1.1.²⁰ Therefore, Xci Foil (Class A) and Xci 286 require no thermal barrier or ignition barrier protection.
- 5.5.5.2 Xci Foil (Class A), , and Xci 286 up to 3 1/2" (88.9 mm) thick has been tested for use as an ignition barrier on walls and/or ceilings in attics and crawl spaces to NFPA 286 in accordance with IBC Section 2603.9 and IRC Section 316.6 and has met the criteria of IBC Section 803.1.1.²¹ Therefore, Xci Foil (Class A) and Xci 286 require no ignition barrier protection in attics and crawl spaces.
- 5.5.5.3 Xci Foil (Class A), , and Xci 286 up to 8" (203 mm) thick has been tested to UL 1715 in accordance with IBC Section 2603.9 and IRC Section R316.6 and met the requirements of the standard. Therefore, Xci Foil (Class A) and 286 up to 8" thick is approved for use on ceilings and floors without a thermal barrier.
- 5.5.5.4 Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are not recommended for applications requiring an aesthetic or wear resistant surface.

- 5.6 Where the application falls outside of the performance evaluation, conditions of use and/or installation requirements set forth herein, alternative techniques shall be permitted in accordance with accepted engineering practice and experience. This includes but is not limited to the following areas of engineering: mechanics or materials, structural, building science, and fire science.

²⁰ 2015 IBC Section 803.1.2

²¹ 2015 IBC Section 803.1.2



6 Installation

- 6.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this TER and the applicable building code.
- 6.2 In the event of a conflict between the manufacturer installation instructions and this TER, the more restrictive shall govern.
- 6.3 *Installation Procedure*
- 6.3.1 Protect surrounding areas and surfaces from damage.
- 6.3.2 If wall assembly design calls for WRB installed over the base wall, ensure that the WRB is one of those identified in Table 10 (Appendix B) and the WRB is installed correctly and in good condition before covering with FPIS.
- 6.3.3 For installation of FPIS on interior, over air/water resistive barrier on base wall: ensure that the WRB is one of those identified in Table 10 (Appendix B) and the WRB is installed correctly and in good condition before covering with FPIS.
- 6.3.4 FPIS shall not be applied over walls while they are vulnerable to water intrusion from above or behind.
- 6.3.5 Do not block flashing, weeps, or other drainage paths with FPIS.
- 6.3.6 Do not span expansion joints with FPIS.
- 6.3.7 During installation, take precautions to minimize moisture intrusion behind insulation.
- 6.3.8 Beginning at the base of the wall, apply horizontally using maximum board lengths to minimize number of joints.
- 6.3.9 Offset FPIS board joints in neighboring rows a minimum of 6". Do not form four-corner intersections.
- 6.3.10 Form a "corner lock" pattern by staggering vertical joints at inside and outside corners.
- 6.3.11 FPIS may be applied vertically, as required.
- 6.3.12 Pre-cut FPIS to fit openings and penetrations.
- 6.3.13 Cut with a knife, using a square to guide the cut, or use a table saw.
- 6.3.14 Abut all joints tightly and ensure an overall flush, level surface.
- 6.3.15 Mechanically fasten using the fastening pattern as indicated.
- 6.3.15.1 Space fasteners 12" o.c. (305 mm) at the perimeter and 16" o.c. (406 mm) in the field.
- 6.3.15.2 Set back perimeter fasteners $\frac{3}{16}$ " (9.5 mm) from board edges.
- 6.3.15.3 **Note for Exterior Application:** Where Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are installed by the same trade as the cladding, or in close cooperation with that trade, cladding attachment hardware can supplement or replace the insulation fasteners and insulation adhesive. Cladding fasteners fulfilling the Xci Foil (Class A) and Xci 286 attachment function shall be designed for this function. If the cladding attachment is 16" o.c. (406 mm) or closer and it tightly secures the insulation, no additional fastening or adhesive is required.
- 6.3.15.4 **Note for Interior Application:** Where Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are installed by the same trade as the interior drywall, or in close cooperation with that trade, drywall attachment hardware can supplement or replace the insulation fasteners and insulation adhesive. Drywall fasteners fulfilling the Xci Foil (Class A) and Xci 286 attachment function shall be designed for this function. If the drywall attachment is 16" o.c. (406 mm) or closer and it tightly secures the insulation, no additional fastening or adhesive is required.



- 6.3.16 When an approved adhesive is used, periodically verify adhesion. Properly installed adhesively applied Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 will cohesively break the adhesive while still wet and destroy the substrate when dry.
- 6.3.16.1 Consult the detailed manufacturer installation instructions for the proper adhesive pattern to maintain the drainage plane.
- 6.3.16.2 When used in a NFPA 285 approved assembly, adhesives must be one of those listed in the tables found in Appendix B.
- 6.3.17 Fill gaps greater than $\frac{1}{8}$ " (3 mm) between FPIS boards with expanding spray foam or butter edge of board with approved sealant and strike flush. Expanding spray foam may also be applied onto the FPIS board edges during installation.
- 6.3.18 Verify all materials are installed in accordance with current Hunter Panels published literature and local code requirements.
- 6.3.19 Additional information on the installation and detailing of Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 can be found at hunterpanels.com.
- 6.4 *Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 as an Air and Water-Resistive Barrier*
- 6.4.1 When used in a NFPA 285 approved assembly as an air/water resistive barrier, see also Section 5.3 and Table 10 in Appendix B.
- 6.4.2 When used in a NFPA 285 approved assembly as a WRB, see also Section 5.4 and Table 10 (Appendix B) with all notes.
- 6.4.3 Use minimum 1" (25.4 mm) thickness Xci Foil (Class A) and Xci 286.
- 6.4.4 Install directly over wood or steel studs or over exterior sheathing fastened to wood or steel studs.
- 6.4.5 Fasten Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 boards with corrosion-resistant screws or HeckMann Pos-I-Tie®, either fitted with Thermal-Grip CI plastic washers by Rodenhouse or equivalent. Space fasteners 16" o.c. (406 mm) in the field and 12" o.c. (305 mm) at the perimeter.
- 6.4.5.1 Other fastening used shall be installed 16" o.c. (406 mm) in the field and 12" o.c. (305 mm) at the perimeter. Other fastening shall be verified as air and water tight through ASTM E2357 and ASTM E331 testing, or it shall be sealed with caulk or flashing tape.
- 6.4.6 Tape over board joints with 4" (102 mm) width Aluma-GRIP™ 1402 tape by Carlisle Coatings & Waterproofing (CCW).
- 6.4.7 Cover inside/outside corners with Aluma-GRIP™ 701 by CCW. Aluma-GRIP™ 701 shall bear 3" (76 mm) minimum onto each side of angle.
- 6.4.8 Wrap window openings with Aluma-GRIP™ 701. Aluma-GRIP™ 701 shall wrap at least 3" (76 mm) onto wall and shall return far enough into the window opening to provide a continuous air/water seal to window frame.
- 6.4.9 Flash pipe and duct penetrations through Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 with Aluma-GRIP™ 701.
- 6.4.10 Consult Hunter Panels details and instructions for complete information about installation of Xci Foil (Class A) and Xci 286 as an air and water-resistive barrier.



- 6.5 *Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci CG (Class A)*
- 6.5.1 Refer to the manufacturer installation instructions in addition to this TER, for complete details and requirements.
- 6.5.2 Cut with a knife using a square to guide the cut or use a table saw.
- 6.5.3 Abut all joints tightly and ensure an overall flush, level surface.
- 6.5.4 Mechanically fasten using the fastening pattern as indicated.
- 6.5.4.1 Space fasteners 12" o.c. (305 mm) at the perimeter and 16" o.c. (406 mm) in the field.
- 6.5.4.2 Set back perimeter fasteners $\frac{3}{8}$ " (9.5 mm) from board edges.
- 6.5.4.3 **Note:** where Xci Foil (Class A), Xci Foil (Class A) PLUS, or Xci CG (Class A) are installed by the same trade as the cladding, or in close cooperation with that trade, cladding attachment hardware can supplement or replace the insulation fasteners and insulation adhesive. Cladding fasteners fulfilling the Xci Foil (Class A), Xci Foil (Class A) PLUS, or Xci CG (Class A) attachment function shall be designed for this function. If the cladding attachment is 16" o.c. (406 mm) or closer and it tightly secures the insulation, no additional fastening or adhesive is required.
- 6.5.5 When adhesive is used, periodically verify adhesion. Properly installed adhesively applied Xci Foil (Class A), Xci Foil (Class A) PLUS, or Xci CG (Class A) will cohesively break the adhesive while still wet and destroy the substrate when dry.
- 6.5.6 Consult the detailed manufacturer installation instructions for the proper adhesive pattern to maintain the drainage plane.
- 6.6 *Xci Ply (Class A)*
- 6.6.1 Refer to the manufacturer installation instructions, in addition to this TER, for complete details and requirements.
- 6.6.2 Provide separation of the edge of Xci Ply (Class A) from concrete at grade with pressure-treated lumber sill plate, sill gasket, or non-permeable flashing material.
- 6.6.3 Begin at base of wall from firm, permanent support.
- 6.6.4 Fasten Xci Ply (Class A) with proper fasteners and spacing to accommodate design. Fasten Xci Ply (Class A) to the structure using SIPs fasteners or similar hardware driven into steel studs, wood studs, concrete, or CMU substrate. Fastening shall be approved by a structural engineer as the fastening must be sufficient to support both the weight of the Xci Ply (Class A) and the weight of the cladding for the project conditions.
- 6.6.5 Allow a minimum $\frac{1}{8}$ " (3.2 mm) and a maximum $\frac{1}{4}$ " (6.4 mm) gap between Xci Ply (Class A) boards to accommodate hydric movement of wood. Fasten boards tightly to provide a flush, level surface.
- 6.6.6 Apply WRB over plywood side of Xci Ply (Class A) according to WRB manufacturer instructions.

7 Substantiating Data

- 7.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:
- 7.1.1 Flame spread and smoke developed rating testing in accordance with UL 723
- 7.1.2 Fire performance criteria testing in accordance with NFPA 285
- 7.1.3 Fire performance criteria testing in accordance with NFPA 286
- 7.1.4 Fire performance criteria testing in accordance with UL 1715
- 7.1.5 Potential heat testing in accordance with NFPA 259
- 7.1.6 Air barrier material testing in accordance with ASTM E2178
- 7.1.7 Air barrier assembly testing in accordance with ASTM E2357



- 7.1.8 Vapor impermeability testing in accordance with ASTM E96 Method A and Method B
- 7.1.9 Water-resistive barrier testing in accordance with ASTM E331
- 7.2 Engineering analysis comparing the fire resistance properties of Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 by Priest and Associates
- 7.3 Engineering analysis assessing the substitution of products within the approved NFPA 285 tested wall assemblies by Priest and Associates
- 7.4 Engineering analysis comparing the fire resistance properties of Xci Foil, Xci Foil Plus, Xci CG, and Xci Ply by Priest and Associates
- 7.5 Engineering analysis assessing the substitution of products within the approved NFPA 285 tested wall assemblies by Priest and Associates
- 7.6 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies (i.e., ANAB accredited agencies), approved sources (i.e., RDPs), and/or professional engineering regulations. Accuracy of external test data and resulting analysis is relied upon.
- 7.7 Where pertinent, testing and/or engineering analysis is based upon provisions that have been codified into law through state or local adoption of codes and standards. The developers of these codes and standards are responsible for the reliability of published content. DrJ's engineering practice may use a code-adopted provision as the control sample. A control sample versus a test sample establishes a product as being equivalent to the code-adopted provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.
- 7.8 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, Listings, certified reports, duly authenticated reports from approved agencies, and research reports prepared by approved agencies and/or approved sources provided by the suppliers of products, materials, designs, assemblies and/or methods of construction. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this TER, may be dependent upon published design properties by others.
- 7.9 Testing and engineering analysis: The strength, rigidity and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.²²
- 7.10 Where additional condition of use and/or code compliance information is required, please search for Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 on the DrJ Certification website.

8 Findings

- 8.1 As delineated in Section 3, Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 have performance characteristics that were tested and/or meet pertinent standards and is suitable for use pursuant to its specified purpose.
- 8.2 When used and installed in accordance with this TER and the manufacturer installation instructions, Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 shall be approved for the following applications:
 - 8.2.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are approved for use in exterior walls of buildings of any height of Type I-V construction in accordance with IBC Section 2603.5 and IRC Section R316.5.12.
 - 8.2.2 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are approved for use in wall assemblies meeting the requirements of NFPA 285 testing when constructed in accordance with the tables in Appendix B.

²² See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.



- 8.2.3 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 described in this TER comply with or are a suitable alternative to, the applicable sections of the codes listed in Section 2.
- 8.2.4 Xci 286, and Xci Foil (Class A) up to 3 1/2" (88.9 mm) thick are approved as a thermal barrier on walls only or ceilings only to NFPA 286, in accordance with IBC Section 2603.9 and IRC Section R316.6 and meet the criteria of IBC Section 803.1.1.²³ Therefore, Xci 286, Xci Foil (Class A) PLUS, and Xci Foil (Class A) may be left exposed and requires no thermal barrier or ignition barrier protection.
- 8.2.5 Xci Foil (Class A), and Xci 286 up to 3 1/2" (88.9 mm) thick are approved for use as an ignition barrier on walls and/or ceilings in attics and crawl spaces to NFPA 286 in accordance with IBC Section 2603.9 and IRC Section R316.6 and meets the criteria of IBC Section 803.1.1.²⁴ Therefore, Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 require no ignition barrier protection in attics and crawl spaces.
- 8.2.6 Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are approved for use in exterior walls of buildings as a WRB in accordance with IBC Section 1403.2²⁵ and IRC Section R703.2 when constructed in accordance with Table 10 (Appendix B).
- 8.2.7 Xci CG (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are approved for use in exterior walls of buildings as an air barrier in accordance with IECC Section C402.5.1 when constructed in accordance with the tables in Appendix B.
- 8.3 Unless exempt by state statute, when the Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are to be used as a structural and/or building envelope component in the design of a specific building, the design shall be performed by an RDP.
- 8.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Hunter Panels LLC.
- 8.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10)²⁶ are similar) in pertinent part states:
- 104.11 Alternative materials, design and methods of construction and equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.
- 8.6 **Approved.**²⁷ Building codes require that the building official shall accept duly authenticated reports²⁸ or research reports²⁹ from approved agencies and/or approved sources (i.e., licensed RDP) with respect to the quality and manner of use of new products, materials, designs, services, assemblies, or methods of construction.
- 8.6.1 Acceptance of an approved agency, by a building official, is performed by verifying that the agency is accredited by a recognized accreditation body of the International Accreditation Forum (IAF).
- 8.6.2 Acceptance of a licensed RDP, by a building official, is performed by verifying that the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.

²³ 2015 IBC Section 803.1.2

²⁴ 2015 IBC Section 803.1.2

²⁵ 2015 IBC Section 1404.2

²⁶ 2018 IFC Section 104.9

²⁷ Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC Section 201.4 where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

²⁸ <https://up.codes/viewer/wyoming/ibc-2021/chapter17/special-inspections-and-tests#1707.1>

²⁹ <https://up.codes/viewer/wyoming/ibc-2021/chapter17/special-inspections-and-tests#1703.4.2>



- 8.6.3 Federal law, Title 18 US Code Section 242, requires that where the alternative product, material, service, design, assembly, and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved, as denial without written reason deprives a protected right to free and fair competition in the marketplace.
- 8.7 DrJ is an engineering company, employs RDPs and is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131.
- 8.8 Through ANAB accreditation and the IAF Multilateral Agreements, this TER can be used to obtain product approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – “*certified once, accepted everywhere.*” IAF specifically says, “*Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope.*”³⁰

9 Conditions of Use

- 9.1 Material properties shall not fall outside the boundaries defined in Section 3.
- 9.2 As defined in Section 3, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.
- 9.3 As listed herein, Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 shall not be used:
- 9.3.1 To resist lateral loads. Walls shall be braced by other materials in accordance with the applicable code, and the exterior wall covering shall be capable of resisting the full design wind pressure.
- 9.4 This TER and the installation instructions, when required by a code official, shall be submitted at the time of permit application.
- 9.5 When the insulation boards are used in assemblies requiring compliance with NFPA 285 and are installed on the exterior side of exterior walls, construction must be as described in Appendix B.
- 9.6 When the insulation boards are used in assemblies requiring compliance with NFPA 285 and are installed on the interior side of exterior walls, construction must be as described in Table 9 (Appendix B).
- 9.7 Xci Ply (Class A) may be used as a nail base provided cladding attachments are designed in accordance with IRC Section R703.3.3 or an approved design. Xci CG (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 shall not be used as a nail base.
- 9.8 When installed in areas where the probability of termite infestation is “very heavy”, the installation must meet the requirements of IBC Section 2603.8 and IRC Section R316.7.
- 9.9 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are available in Montgomery, New York; Tooele, Utah; Terrell, Texas; Smithfield, Pennsylvania; Franklin Park, Illinois; Puyallup, Washington and Lake City, Florida, and are manufactured in Smithfield, Pennsylvania; Franklin Park, Illinois and Puyallup, Washington under a quality control program with quality control inspections in accordance with IBC Section 110.3.10³¹ and IBC Section 110.3.11,³² and IRC Section R109.1.5.
- 9.10 The wall assemblies listed in Appendix B are based on compliance to the fire provisions of the codes listed in Section 2. Consideration of wall assembly performance with regard to other attributes, such as water vapor control, condensation, and energy code requirements are outside the scope of this TER.

³⁰ <https://iaf.nu/en/about-iaf-mla#~:text=required%20to%20recognise>

³¹ 2018 IBC Section 110.3.8, 2015 IBC Section 110.3.8

³² 2018 IBC Section 110.3.10, 2015 IBC Section 110.3.9



- 9.11 When required by adopted legislation and enforced by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed:
- 9.11.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice, and, when prepared by an approved source, shall be approved when signed and sealed.
 - 9.11.2 This TER and the installation instructions shall be submitted at the time of permit application.
 - 9.11.3 These innovative products have an internal quality control program and a third-party quality assurance program.
 - 9.11.4 At a minimum, these innovative products shall be installed per Section 6 of this TER.
 - 9.11.5 The review of this TER, by the AHJ, shall be in compliance with IBC Section 104 and IBC Section 105.4.
 - 9.11.6 These innovative products have an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4 and IRC Section R109.2.
 - 9.11.7 The application of these innovative products in the context of this TER are dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2 and any other regulatory requirements that may apply.
- 9.12 The approval of this TER by the AHJ shall comply with IBC Section 1707.1, where legislation states in pertinent part, *"the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in Section 104.11"*, all of IBC Section 104, and IBC Section 105.4.
- 9.13 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).
- 9.14 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the owner or the owner's authorized agent.

10 Identification

- 10.1 The innovative products listed in Section 1.1 are identified by a label on the board or packaging material bearing the manufacturer name, product name, TER number, and other information to confirm code compliance.
- 10.2 Additional technical information can be found at www.hunterpanels.com.

11 Review Schedule

- 11.1 This TER is subject to periodic review and revision. For the most recent version, visit drjcertification.org.
- 11.2 For information on the status of this TER, contact DrJ Certification.

12 Approved for Use Pursuant to US and International Legislation Defined in Appendix A

- 12.1 Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 are included in this TER published by an approved agency that is concerned with evaluation of products or services, maintains periodic inspection of the production of listed materials or periodic evaluation of services, and whose TER Listing states either that the material, product, or service meets identified standards or has been tested and found suitable for a specified purpose. This TER meets the legislative intent and definition of being acceptable to the AHJ.



Appendix A

1 Legislation that Authorizes AHJ Approval

- 1.1 **Fair Competition:** State legislatures have adopted Federal regulations for the examination and approval of building code referenced and alternative products, materials, designs, services, assemblies and/or methods of construction that:
- 1.1.1 Advance Innovation,
 - 1.1.2 Promote competition so all businesses have the opportunity to compete on price and quality in an open market on a level playing field unhampered by anticompetitive constraints, and
 - 1.1.3 Benefit consumers through lower prices, better quality, and greater choice.
- 1.2 **Adopted Legislation:** The following local, state, and federal regulations affirmatively authorize Xci CG (Class A), Xci Ply (Class A), Xci Foil (Class A), Xci Foil (Class A) PLUS, and Xci 286 to be approved by AHJs, delegates of building departments, and/or delegates of an agency of the federal government:
- 1.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies and/or methods of construction. The goal is to "protect economic freedom and opportunity by promoting free and fair competition in the marketplace."
 - 1.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation, and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.
 - 1.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2016 (DTSA),³³ where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than 10 years³⁴ and/or a \$5,000,000 fine or 3 times the value of³⁵ the Intellectual Property (IP) and Trade Secrets (TS).
 - 1.2.3.1 Compliance with public records and trade secret legislation requires approval through the use of listings, certified reports, Technical Evaluation Reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources.
 - 1.2.4 For new materials³⁶ that are not specifically provided for in any building code, the design strengths and permissible stresses shall be established by tests, where suitable load tests simulate the actual loads and conditions of application that occur.
 - 1.2.5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design using accepted engineering practice.³⁷
 - 1.2.6 The commerce of approved sources (i.e., registered PEs) is regulated by professional engineering legislation. Professional engineering commerce shall always be approved by AHJs, except where there is evidence, provided in writing, that specific legislation has been violated by an individual registered PE.
 - 1.2.7 The AHJ shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in IBC Section 104.11.³⁸

³³ <http://www.drjengineering.org/AppendixC> and <https://www.drjcertification.org/cornell-2016-protection-trade-secrets>.

³⁴ <https://www.law.cornell.edu/uscode/text/18/1832#~:text=imprisoned%20not%20more%20than%2010%20years>

³⁵ <https://www.law.cornell.edu/uscode/text/18/1832#~:text=Any%20organization%20that,has%20thereby%20avoided>

³⁶ <https://up.codes/viewer/wyoming/lbc-2021/chapter17/special-inspections-and-tests#1706.2>

³⁷ [IBC 2021, Section 1706.1 Conformance to Standards](#)

³⁸ [IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General](#)



- 1.3 **Approved³⁹ by Los Angeles:** The Los Angeles Municipal Code (LAMC) states in pertinent part that the provisions of LAMC are not intended to prevent the use of any material, device, or method of construction not specifically prescribed by LAMC. The Department shall use Part III, Recognized Standards in addition to Part II, Uniform Building Code Standards of Division 35, Article 1, Chapter IX of the LAMC in evaluation of products for approval where such standard exists for the product or the material and may use other approved standards, which apply. Whenever tests or certificates of any material or fabricated assembly are required by Chapter IX of the LAMC, such tests or certification shall be made by a testing agency approved by the Superintendent of Building to conduct such tests or provide such certifications. The testing agency shall publish the scope and limitation(s) of the listed material or fabricated assembly.⁴⁰ The Superintendent of Building roster of approved testing agencies is provided by the Los Angeles Department of Building and Safety (LADBS). The Center for Building Innovation (CBI) Certificate of Approval License is TA24945. Tests and certifications found in a CBI Listing are LAMC approved. In addition, the Superintendent of Building shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the California Building Code (CBC) Section 1707.1.⁴¹
- 1.4 **Approved by Chicago:** The Municipal Code of Chicago (MCC) states in pertinent part that an Approved Agency is a Nationally Recognized Testing Laboratory (NRTL) acting within its recognized scope and/or a certification body accredited by the American National Standards Institute (ANSI) acting within its accredited scope. Construction materials and test procedures shall conform to the applicable standards listed in the MCC. Sufficient technical data shall be submitted to the building official to substantiate the proposed use of any product, material, service, design, assembly and/or method of construction not specifically provided for in the MCC. This technical data shall consist of research reports from approved sources (i.e., MCC defined Approved Agencies).
- 1.5 **Approved by New York City:** The NYC Building Code 2022 (NYCBC) states in pertinent part that an approved agency shall be deemed⁴² an approved testing agency via ISO/IEC 17025 accreditation, an approved inspection agency via ISO/IEC 17020 accreditation, and an approved product evaluation agency via ISO/IEC 17065 accreditation. Accrediting agencies, other than federal agencies, must be members of an internationally recognized cooperation of laboratory and inspection accreditation bodies subject to a mutual recognition agreement⁴³ (i.e., ANAB, International Accreditation Forum (IAF), etc.).

³⁹ See Section 8 for the distilled building code definition of Approved

⁴⁰ Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

⁴¹ https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1

⁴² New York City, The Rules of the City of New York, § 191-07 Approved Agencies

⁴³ New York City, The Rules of the City of New York, § 191-07 Approved Agencies



- 1.6 **Approved by Florida:** Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation, by 1) A certification mark or listing of an approved certification agency, 2) A test report from an approved testing laboratory, 3) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity, 4) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a professional engineer or architect, licensed in Florida. For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods; 1) A certification mark, listing, or label from a commission-approved certification agency indicating that the product complies with the code; 2) A test report from a commission-approved testing laboratory indicating that the product tested complies with the code; 3) A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code; 4) A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code; 5) A statewide product approval issued by the Florida Building Commission. The Florida Department of Business and Professional Regulation (DBPR) website provides a listing of companies certified as a Product Evaluation Agency (i.e., EVLMiami 13692), a Product Certification Agency (i.e., CER10642), and as a Florida Registered Engineer (i.e., ANE13741).
- 1.7 **Approved by Miami-Dade County (i.e., Notice of Acceptance [NOA]):** A Florida statewide approval is an NOA. An NOA is a Florida local product approval. By Florida law, Miami-Dade County shall accept the statewide and local Florida Product Approval as provided for in Florida legislation 553.842 and 553.8425.
- 1.8 **Approved by New Jersey:** Pursuant to Building Code 2018 of New Jersey in IBC Section 1707.1 General,⁴⁴ it states: "In the absence of approved rules or other approved standards, the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the administrative provisions of the Uniform Construction Code (N.J.A.C. 5:23)."⁴⁵ Furthermore N.J.A.C 5:23-3.7 states: Municipal approvals of alternative materials, equipment, or methods of construction. **(a) Approvals:** Alternative materials, equipment, or methods of construction shall be approved by the appropriate subcode official provided the proposed design is satisfactory and that the materials, equipment, or methods of construction are suitable for the intended use and are at least the equivalent in quality, strength, effectiveness, fire resistance, durability and safety of those conforming with the requirements of the regulations. 1. A field evaluation label and report or letter issued by a nationally recognized testing laboratory verifying that the specific material, equipment, or method of construction meets the identified standards or has been tested and found to be suitable for the intended use, shall be accepted by the appropriate subcode official as meeting the requirements of (a) above. 2. Reports of engineering findings issued by nationally recognized evaluation service programs, such as, but not limited to, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), the Southern Building Code Congress International (SBCCI), the International Code Council (ICC), and the National Evaluation Service, Inc., shall be accepted by the appropriate subcode official as meeting the requirements of (a) above. The New Jersey Department of Community Affairs has confirmed that technical evaluation reports, from any accredited entity listed by ANAB, meets the requirements of item 2 given that the listed entities are no longer in existence and/or do not provide "reports of engineering findings".

⁴⁴ <https://up.codes/viewed/new-jersey/fbc-2018/chapter/17/special-inspections-and-tests#1707.1>

⁴⁵ <https://www.nj.gov/ical/divisions/codes/codereg/ucc.html>



- 1.9 Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards:** Pursuant to Title 24, Subtitle B, Chapter XX, [Part 3282.14](#)⁴⁶ and [Part 3280](#),⁴⁷ the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform with the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow: 1) "All construction methods shall be in conformance with accepted engineering practices"; 2) "The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur."; and 3) "The design stresses of all materials shall conform to accepted engineering practice."
- 1.10 Approval by US, Local, and State Jurisdictions in General:** In all other local and state jurisdictions, the adopted building code legislation states in pertinent part that:
- 1.10.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.⁴⁸
- 1.10.2 For innovative alternative products, materials, designs, services and/or methods of construction, in the absence of approved rules or other approved standards...the building official shall accept duly authenticated reports (i.e., listing and/or research report) from approved agencies with respect to the quality and manner of use of new materials or assemblies.⁴⁹ A building official approved agency is deemed to be approved via certification from an accreditation body that is listed by the International Accreditation Forum⁵⁰ or equivalent.
- 1.10.3 The design strengths and permissible stresses of any structural material...shall conform to the specifications and methods of design of accepted engineering practice performed by an approved source.⁵¹ An approved source is defined as a PE subject to professional engineering laws, where a research and/or a technical evaluation report certified by a PE, shall be approved.
- 1.11 Approval by International Jurisdictions:** The USMCA and GATT agreements provide for approval of innovative materials, products, designs, services, assemblies and/or methods of construction through the Technical Barriers to Trade agreements and the International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA), where these agreements:
- 1.11.1 Permit participation of conformity assessment bodies located in the territories of other Members (defined as GATT Countries) under conditions no less favourable than those accorded to bodies located within their territory or the territory of any other country,
- 1.11.2 State that conformity assessment procedures (i.e., ISO/IEC 17020, 17025, 17065, etc.) are prepared, adopted, and applied so as to grant access for suppliers of like products originating in the territories of other Members under conditions no less favourable than those accorded to suppliers of like products of national origin or originating in any other country, in a comparable situation.
- 1.11.3 State that conformity assessment procedures are not prepared, adopted, or applied with a view to or with the effect of creating unnecessary obstacles to international trade. This means that conformity assessment procedures shall not be more strict or be applied more strictly than is necessary to give the importing Member adequate confidence that products conform to the applicable technical regulations or standards.

⁴⁶ <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>

⁴⁷ <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>

⁴⁸ IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials, Adopted law pursuant to IBC model code language 1706.2.

⁴⁹ IBC 2021, Section 1707 Alternative Test Procedures, 1707.1 General, Adopted law pursuant to IBC model code language 1707.1.

⁵⁰ Please see the [ANAB directory](#) for building official approved agencies.

⁵¹ IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards, Adopted law pursuant to IBC model code language 1706.1.



- 1.11.4 **Approved:** The purpose of the IAF MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories to the MLA, and subsequently acceptance of accredited certification and validation/verification statements in many markets based on one accreditation for the timely approval of innovative materials, products, designs, services, assemblies and/or methods of construction. Accreditations granted by IAF MLA signatories are recognised worldwide based on their equivalent accreditation programs, therefore reducing costs and adding value to businesses and consumers.



Appendix B

Table 5. NFPA 285 Approved Wall Assemblies with Xci Foil (Class A) or Xci 286 Exterior Insulation 1,4

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	<ol style="list-style-type: none"> 1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge min. 3⁵/₈" (min.) steel studs spaced 24" o.c. (max.) <ol style="list-style-type: none"> a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW (fire-retardant-treated wood) studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) <ol style="list-style-type: none"> a. 5/8" Type X gypsum wallboard interior b. Bracing as required by code
Fire-Stopping at Floor Lines	<ol style="list-style-type: none"> 1. Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. 2. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any Item 1-15 Items 8, 9, 10, 11, 12, 13, 14, or 15 may be used with Exterior Sheathing 2 or the sheathing thickness specified	<ol style="list-style-type: none"> 1. None 2. 1 1/2" (min.) of Carlisle® SPI SealTite PRO (up to full cavity thickness), SealTite PRO Closed Cell, or SealTite PRO One Zero (up to full cavity thickness for each) 3. 1 1/2" (min.) of BASF Walltite SPF (up to full cavity thickness) 4. Any noncombustible insulation per ASTM E136 5. Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) 6. Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) 7. Any foam plastic insulation (SPF or board type) that has been tested per ASTM E1354 (at a min. of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{gr}, PK, HRR) than Covestro EcoBay CC or BASF Walltite 8. NCFI InsulBloc SPF (up to full cavity thickness) 9. Icynene MD-C-200v3 (Proseal) up to 5 1/2" (only with 1/2" [min.] exterior gypsum sheathing) 10. SWD Urethane Quik-Shield 112 up to 6" (max.) stud cavities with an air gap not exceeding 2 1/2" 11. 1 1/2" (min.) Thermoseal 2000 (up to full cavity thickness) 12. Carlisle SealTite PRO High Yield, SealTite PRO Open Cell, SealTite PRO No Mix, SealTite PRO No Trim 21, or SealTite PRO OCX – up to full cavity thickness with 1/2" (min.) exterior gypsum sheathing 13. Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 – 3 1/2" (max.) for use with 5/8" Exterior Gypsum Sheathing 14. JM Corbond III or Corbond IV – Full stud cavity depth or less for use with 5/8" exterior gypsum sheathing 15. Huntsman ProSeal HFO (8 in. max. thickness with no air gap, 6 inch max. thickness with air gap) for use with 1/2" or thicker exterior gypsum sheathing
Exterior Sheathing Use either 1, 2 or 3	<ol style="list-style-type: none"> 1. None (only with cavity insulation 1, 2, 3, 4, 5 or 6) 2. 1/2" or thicker exterior gypsum sheathing 3. 1/2" (min.) FRTW structural panels in Type III construction
Multi-Function Sheathing and WRB Products Use 1 or 2	<ol style="list-style-type: none"> 1. USG Securock® Exoair®430 System – See note and Table 10 2. 5/8" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints <p>Note: Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRB's on base wall surface in Table 10</p>
WRB Over Base Wall Surface	See Table 10



Wall Component	Materials
<p>Exterior Insulation Use either 1 or 2 depending on cladding.</p> <p>Note: A construction which utilizes no exterior sheathing may not use spray foam cavity insulation</p>	<ol style="list-style-type: none"> 3 1/2" thick (max.) Xci Foil (Class A) or Xci-286 for all claddings 4" thick Xci Foil (Class A) or Xci-286 for claddings 1-6
<p>WRB Over Exterior Insulation</p>	<p>See Table 10 The exterior insulation may be used with or without CavClear® Masonry Mat over the insulation with a maximum 1" air gap between the CavClear® and the cladding. When CavClear® is used, this may only be used with Cladding 1, 2, 3, 4, 5, or 6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" min.</p>
<p>Exterior Cladding Use any item 1-17</p> <p>Item 7 may use any tested/approved installation technique.</p> <p>Items 8, 9, or 12 may use any standard installation technique.</p> <p>If Claddings 2, 3, 4, 5, 13, 14, 15, or 16 are on stucco base with lath, a secondary WRB (WRB items above allowed over foam) can be installed between the insulation and lath and must not be full coverage asphalt or self-adhering membranes, but may be slip sheet (stapled) with no adhesive.</p>	<ol style="list-style-type: none"> Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (max.) Stucco – Minimum 3/4" thick, exterior cement plaster and lath. For systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/external insulation and the lath. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. Any MCM that has passed NFPA 285. Uninsulated sheet metal building panels including steel, copper, aluminum or zinc. 1/4" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. Stone, porcelain, ceramic/aluminum honeycomb composite building panels that have successfully passed NFPA 285 criteria. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 criteria. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria or is approved for use in Type I-IV construction or has been tested per NFPA 285 or stays in place when tested per ASTM E119 (stucco exposed to fire) for at least 30 minutes. Thin brick/cultured stone set in thin set adhesive and metal lath that has been tested to ASTM E119 (brick exposed to furnace) and remains in place for a minimum of 30 minutes, or has passed a NFPA 285 test. Minimum 3/4". For these systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/AVP and the lath. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. FunderMax M.Look – minimum 1/4" thick using any standard installation technique
<p>St. 1 in = 25.4 mm</p> <ol style="list-style-type: none"> The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis. Acceptance criteria for ASTM E 1354 testing have not been well established in the referenced building codes and foam sheathing related sections. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis. T_{ig} is the time to ignition from the start of the test until the sheathing ignites. Pk. HRR is the peak heat release rate during the test. 	

**Table 6.** NFPA 285 Approved Wall Assemblies with Xci CG (Class A) Exterior Insulation^{1,4}

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	<ol style="list-style-type: none"> Cast concrete walls CMU concrete walls 25-gauge min. 3⁵/₁₆" (min.) steel studs spaced 24" o.c. (max.) <ol style="list-style-type: none"> ⁵/₈" Type X gypsum wallboard interior Lateral bracing every 4' FRTW (fire-retardant-treated wood) studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) <ol style="list-style-type: none"> ⁵/₈" Type X gypsum wallboard interior Bracing as required by building code
Fire-Stopping at Floor Lines Use Item 1 or 2	<ol style="list-style-type: none"> Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any Item 1-15 Items 8-15 may only be used with exterior sheathing 2 or the specified thickness	<ol style="list-style-type: none"> None 1¹/₂" (min.) of Carlisle® SPI SealTite PRO (up to full cavity thickness), SealTite PRO Closed Cell, or SealTite PRO One Zero (up to full cavity thickness for each) 1¹/₂" (min.) of BASF Walltite SPF (up to full cavity thickness) Any noncombustible insulation per ASTM E136 Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) Any foam plastic insulation (SPF or board type) that has been tested per ASTM E1354 (at a min. of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{ign}, PK, HRR) than Covestro EcoBay CC or BASF Walltite NCFI InsulBloc SPF (up to full cavity thickness) Icynene MD-C-200v3 (Proseal) up to 5¹/₂" (only with ¹/₂" [min.] exterior gypsum sheathing) SWD Urethane Quik-Shield 112 up to 6" in 6" (max.) stud cavities with an air gap not exceeding 2¹/₂" 1¹/₂" (min.) Thermoseal 2000 (up to full cavity thickness) Carlisle SealTite PRO High Yield, SealTite PRO Open Cell, SealTite PRO No Mix, SealTite PRO No Trim 21, or SealTite PRO OCX – up to full cavity thickness with ¹/₂" (min.) exterior gypsum sheathing Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 – 3¹/₂" (max.) for use with ⁵/₈" Exterior Gypsum Sheathing JM Corbond III or Corbond IV – Full stud cavity depth or less for use with ⁵/₈" exterior gypsum sheathing Huntsman ProSeal HFO (8 in. max. thickness with no air gap, 6 inch max. thickness with air gap) for use with ¹/₂" or thicker exterior gypsum sheathing
Exterior Sheathing Use either 1, 2 or 3	<ol style="list-style-type: none"> None (only with claddings 1-6, and cavity insulation 1, 2, 3, 4, 5, 6, or 11). ¹/₂" or thicker exterior gypsum sheathing ¹/₂" (min.) FRTW structural panels in Type III construction
Multi-Function Sheathing & WRB Products Use 1 or 2	<ol style="list-style-type: none"> USG Securock® Exoair® 430 System – See note and Table 10 ⁵/₈" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints. <p>Note: Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRB's on base wall surface in Table 10.</p>
WRB Over Base Wall Surface	See Table 10
Exterior Insulation Use either 1 or 2 depending on cladding.	<ol style="list-style-type: none"> 3¹/₂" thick (max.) Xci CG or Xci CG (Class A) for all claddings. 4" thick (max.) Xci CG or Xci CG (Class A) for claddings 1-6.
WRB Over Exterior Insulation	See Table 10



	<p>The exterior insulation may be used with or without CavClear® Masonry Mat over the insulation with a maximum 1" air gap between the CavClear® and the cladding. When CavClear® is used, this may only be used with Cladding 1, 2, 3, 4, 5, or 6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" min.</p>
<p>Exterior Cladding Use any Item 1-17</p> <p>Item 7 may use any tested/approved installation technique.</p> <p>Items 8, 9, or 12 may use any standard installation technique.</p> <p>If Claddings 2, 3, 4, 5, 13, 14, 15, or 16 are on stucco base with lath, a secondary WRB (WRB items above allowed over foam) can be installed between the insulation and lath and must not be full coverage asphalt or self-adhering membranes, but may be slip sheet (stapled) with no adhesive.</p>	<ol style="list-style-type: none"> 1. Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (max.) 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath. For systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/external insulation and the lath. 3. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. 4. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. 5. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. 6. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Any MCM that has passed NFPA 285. 8. Uninsulated sheet metal building panels including steel, copper, aluminum (or zinc only with Xci CG [Class A]) 9. 1/2" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 10. Stone, porcelain, ceramic/aluminum honeycomb composite building panels that have successfully passed NFPA 285 criteria. 11. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 criteria. 12. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 13. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria or is approved for use in Type I-IV construction or has been tested per NFPA 285 or stays in place when tested per ASTM E119 (stucco exposed to fire) for at least 30 minutes. 14. Thin brick/cultured stone set in thin set adhesive and metal lath that has been tested to ASTM E119 (brick exposed to furnace) and remains in place for a minimum of 30 minutes, or has passed a NFPA 285 test. Minimum 3/4". For these systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/AVP and the lath. 15. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. 16. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. 17. FunderMax M.Look – minimum 1/4" thick using any standard installation technique
<p>St: 1 in = 25.4 mm</p> <ol style="list-style-type: none"> 3. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis. 4. Acceptance criteria for ASTM E 1354 testing have not been well established in the referenced building codes and foam sheathing related sections. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis. 5. T_{ig} is the time to ignition from the start of the test until the sheathing ignites. Pk HRR is the peak heat release rate during the test. 	

**Table 7.** NFPA 285 Approved Wall Assemblies with Xci Ply (Class A) Exterior Insulation^{1,4}

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	<ol style="list-style-type: none"> Cast concrete walls CMU concrete walls 25-gauge min. 3⁵/₁₆" (min.) steel studs spaced 24" o.c. (max.) <ol style="list-style-type: none"> ⁵/₈" Type X gypsum wallboard interior Lateral bracing every 4' FRTW (fire-retardant-treated wood) studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) <ol style="list-style-type: none"> ⁵/₈" Type X gypsum wallboard interior Bracing as required by code
Fire-Stopping at Floor Lines	<ol style="list-style-type: none"> Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any Item 1-15 Items 3, 8, 9, 10, 11, 12, 13, 14 or 15 may only be used with exterior sheathing 2 or the specified thickness	<ol style="list-style-type: none"> None 1¹/₂" (min.) of Carlisle® SPI SealTite PRO (up to full cavity thickness), SealTite PRO Closed Cell, or SealTite PRO One Zero (up to full cavity thickness for each) 1¹/₂" (min.) of BASF Wulfitite SPF (up to full cavity thickness) Any noncombustible insulation per ASTM E136 Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) Any foam plastic insulation (SPF or board type) that has been tested per ASTM E1354 (at a min. of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{up}, PK, HRR) than Covestro EcoBay CC or BASF Wulfitite NCFI InsulBloc SPF (up to full cavity thickness) Icynene MD-C-200v3 (Proseal) up to 5¹/₂" (only with ¹/₂" [min.] exterior gypsum sheathing) SWD Urethane Quik-Shield 112 up to 6" in 6" (max.) stud cavities with an air gap not exceeding 2¹/₂" 1¹/₂" (min.) Thermoseal 2000 (up to full cavity thickness) Carlisle SealTite PRO High Yield, SealTite PRO Open Cell, SealTite PRO No Mix, SealTite PRO No Trim 21, or SealTite PRO OCX – up to full cavity thickness with ¹/₂" (min.) exterior gypsum sheathing Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 – 3¹/₂" (max.) for use with ⁵/₈" Exterior Gypsum Sheathing JM Corbond III or Corbond IV – Full stud cavity depth or less for use with ⁵/₈" exterior gypsum sheathing Huntsman ProSeal HFO (8 in. max. thickness with no air gap, 6 inch max. thickness with air gap) for use with ¹/₂" or thicker exterior gypsum sheathing
Exterior Sheathing Use either 1, 2 or 3	<ol style="list-style-type: none"> None (only with cavity insulation 1, 2, 4, 5 or 6). Also see note for Cavity Insulation ¹/₂" or thicker exterior gypsum sheathing ¹/₂" (min.) FRTW structural panels in Type III construction.
Multi-Function Sheathing and WRB Products Use 1 or 2	<ol style="list-style-type: none"> USG Securock®Exoair®430 System – See note and Table 10. ⁵/₈" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints. <p>Note: Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRB's on base wall surface Table 10.</p>
WRB Over Base Wall Surface	See Table 10
Exterior Insulation Use either 1 or 2 depending on cladding.	<ol style="list-style-type: none"> 4¹/₄" thick (max.) Xci Ply (Class A) (3¹/₂" foam max., ³/₄" FR Plywood max.) with all claddings. 4¹/₄" thick (max.) Xci Ply (Class A) (4" foam max., ³/₄" FR Plywood max.) may be used with claddings 1-6.



Wall Component	Materials
WRB Over Exterior Insulation	See Table 10 The exterior insulation may be used with or without CavClear® Masonry Mat over the insulation with a maximum 1" air gap between the CavClear® and the cladding. When CavClear® is used, this may only be used with Cladding 1-6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" min.
Exterior Cladding Use any Item 1-17 Item 9 may use any tested/approved installation technique. Items 10, 11 and 14 may use any standard installation technique. If Claddings 2, 3, 4, 5, 13, 14, 15, or 16 are on stucco base with lath, a secondary WRB (WRB items above allowed over foam) can be installed between the insulation and lath and must not be full coverage asphalt or self-adhering membranes, but may be slip sheet (stapled) with no adhesive.	<ol style="list-style-type: none"> 1. Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (max.) 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath. For systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/external insulation and the lath. 3. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. 4. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. 5. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. 6. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Thin brick/cultured stone set in thin set adhesive and metal lath that has been tested to ASTM E119 (brick exposed to furnace) and remains in place for a minimum of 30 minutes, or has passed a NFPA 285 test. Minimum 3/4". For these systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/AVP and the lath. 8. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. 9. Any MCM that has passed NFPA 285. 10. Uninsulated sheet metal building panels including steel, copper, aluminum (or zinc only with Xci Ply [Class A]) 11. 1/4" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 12. Stone, porcelain, ceramic/aluminum honeycomb composite building panels that have successfully passed NFPA 285 criteria. 13. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 criteria. 14. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 15. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria or is approved for use in Type I-IV construction or has been tested per NFPA 285 or stays in place when tested per ASTM E119 (stucco exposed to fire) for at least 30 minutes. 16. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. 17. FunderMax M.Look – minimum 1/4" thick using any standard installation technique
<p>St: 1 in = 25.4 mm</p> <ol style="list-style-type: none"> 1. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis. 2. Acceptance criteria for ASTM E 1354 testing have not been well established in the referenced building codes and foam sheathing related sections. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis. 3. T_{ig} is the time to ignition from the start of the test until the sheathing ignites. Pk. HRR is the peak heat release rate during the test. 	

**Table 8. NFPA 285 Approved Wall Assemblies with Xci Foil (Class A) PLUS Exterior Insulation^{1,4}**

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	<ol style="list-style-type: none"> Cast concrete walls CMU concrete walls 25-gauge min. 3¹/₂" (min.) steel studs spaced 24" o.c. (max.) <ol style="list-style-type: none"> ⁵/₈" Type X gypsum wallboard interior Lateral bracing every 4' FRTW (fire-retardant-treated wood) studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) <ol style="list-style-type: none"> ⁵/₈" Type X gypsum wallboard interior Bracing as required by code
Fire-Stopping at Floor Lines	<ol style="list-style-type: none"> Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any item 1-15 Items 8, 9, 10, 11, 12, 13, 14, or 15 may be used with Exterior Sheathing 2 or the sheathing thickness specified	<ol style="list-style-type: none"> None 1¹/₂" (min.) of Carlisle® SPI SealTite PRO (up to full cavity thickness), SealTite PRO Closed Cell, or Seal Tite PRO One Zero (up to full cavity thickness for each) 1¹/₂" (min.) of BASF Walltite SPF (up to full cavity thickness) Any noncombustible insulation per ASTM E136 Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) Any foam plastic insulation (SPF or board type) that has been tested per ASTM E1354 (at a min. of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{on}, PK, HRR) than Covestro EcoBay CC or BASF Walltite NCFI InsulBloc SPF (up to full cavity thickness) Icynene MD-C-200v3 (Proseal) up to 5¹/₂" (only with ¹/₂" [min.] exterior gypsum sheathing) SWD Urethane Quik-Shield 112 up to 6" (max.) stud cavities with an air gap not exceeding 2¹/₂" 1¹/₂" (min.) Thermoseal 2000 (up to full cavity thickness) Carlisle SealTite PRO High Yield, SealTite PRO Open Cell, SealTite PRO No Mix, SealTite PRO No Trim 21, or SealTite PRO OCX – up to full cavity thickness with ¹/₂" (min.) exterior gypsum sheathing Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 – 3¹/₂" (max.) for use with ⁵/₈" Exterior Gypsum Sheathing JM Corbond III or Corbond IV – Full stud cavity depth or less for use with ⁵/₈" exterior gypsum sheathing Huntsman ProSeal HFO (8 in. max. thickness with no air gap, 6 inch max. thickness with air gap) for use with ¹/₂" or thicker exterior gypsum sheathing
Exterior Sheathing Use either 1, 2 or 3	<ol style="list-style-type: none"> None (only with cavity insulation 1, 2, 3, 4, 5 or 6) ¹/₂" or thicker exterior gypsum sheathing ¹/₂" (min.) FRTW structural panels in Type III construction
Multi-Function Sheathing and WRB Products Use 1 or 2	<ol style="list-style-type: none"> USG Securock®Exoair®430 System – See note and Table 10 ⁵/₈" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints <p>Note: Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRB's on base wall surface in Table 10</p>
WRB Over Base Wall Surface	See Table 10
Exterior Insulation	<ol style="list-style-type: none"> 4" thick (max.) Xci Foil (Class A) PLUS for all claddings listed



Wall Component	Materials
WRB Over Exterior Insulation	See Table 10 The exterior insulation may be used with or without CavClear® Masonry Mat over the insulation with a maximum 1" air gap between the CavClear® and the cladding. When CavClear® is used, this may only be used with Cladding 1, 2, 3, 4, 5, or 6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" min.
Exterior Cladding Use any item 1-17 Item 7 may use any tested/approved installation technique. Items 8, 9, or 12 may use any standard installation technique. If Claddings 2, 3, 4, 5, 13, 14, 15, or 16 are on stucco base with lath, a secondary WRB (WRB items above allowed over foam) can be installed between the insulation and lath and must not be full coverage asphalt or self-adhering membranes, but may be slip sheet (stapled) with no adhesive.	<ol style="list-style-type: none"> 1. Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (max.). 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath. For systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/external insulation and the lath. 3. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. 4. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. 5. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. 6. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Any MCM that has passed NFPA 285. 8. Uninsulated sheet metal building panels including steel, copper, aluminum or zinc. 9. 1/4" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 10. Stone, porcelain, ceramic/aluminum honeycomb composite building panels that have successfully passed NFPA 285 criteria. 11. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 criteria. 12. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 13. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria or is approved for use in Type I-IV construction or has been tested per NFPA 285 or stays in place when tested per ASTM E119 (stucco exposed to fire) for at least 30 minutes. 14. Thin brick/cultured stone set in thin set adhesive and metal lath that has been tested to ASTM E119 (brick exposed to furnace) and remains in place for a minimum of 30 minutes, or has passed a NFPA 285 test. Minimum 3/4". For these systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 10) can be used as a slip sheet between the WRB/AVP and the lath. 15. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. 16. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. 17. FunderMax M.Look – minimum 1/4" thick using any standard installation technique
St. 1 in = 25.4 mm <ol style="list-style-type: none"> 1. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis. 2. Acceptance criteria for ASTM E1354 testing have not been well established in the referenced building codes and foam sheathing related sections. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis. 3. T_{ig} is the time to ignition from the start of the test until the sheathing ignites. Pk HRR is the peak heat release rate during the test. 	

**Table 9.** NFPA 285 Approved Mass Wall Assemblies with Xci as Interior Insulation¹

Wall Component	Materials
Base Wall System Use either 1, or 2	<ol style="list-style-type: none"> 1. Cast concrete walls (min. 2" thick) 2. CMU concrete walls (min. 4" thick)
Exterior Coating Use either 1, 2, 3 or 4	<ol style="list-style-type: none"> 1. Portland cement or lime stucco 2. Any ASTM E84 Class A Paint or Elastomeric Coating 3. Any ASTM E84 Class A Clear Sealer 4. None
Air/Vapor Barrier Membrane Position 1 Over Base Wall Interior Note: Some WRBs are only allowed with specific systems.	See Table 10 - WRB over Base Wall Surface.
Continuous Insulation Use 1, 2 or 3	<ol style="list-style-type: none"> 1. Xci Foil (Class A) (or Xci-286), 3 1/2" thick (max.) 2. Xci CG (Class A) or Xci CG, 3 1/2" thick (max.) 3. Xci Foil, 3 1/2" thick (max.)
Air/Vapor Barrier Membrane Position 2 Over Insulation Note: Some WRB's are only allowed with specific systems	See Table 10 - WRB over Base Wall Surface. Note: Insulation Joints may be taped with Foil-Grip™ 1402, 4" width (max.)
Interior Cladding	<p>5/8" type X interior gypsum sheathing installed directly over the insulation or installed to 3/8" (max. depth) studs or Metal Hat or Z Furring directly (no gap between stud/hat/Z and insulation). If an air gap between the stud/hat/Z and insulation is created, fire blocking with mineral wool per <u>IBC Section 718</u> shall be installed.</p> <p>Mass wall designs are assumed to use platform construction (concrete floor line intersects exterior concrete creating a firestop at floor lines). If the floor line is separated from the exterior concrete, fireblocking with mineral wool must be installed to prevent uncontrolled vertical flame spread.</p>
SI: 1 in = 25.4 mm <ol style="list-style-type: none"> 1. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis. 2. Position 1 – Air vapor barrier installed directly on interior side of the base wall system. 3. Position 2 – Air vapor barrier installed over continuous insulation on interior side of the wall assembly. 4. CCW Membrane used in Position 1 or 2, not both. 5. Xci Foil (Class A) (or Xci-286) insulation can be tacked in place with CAV-Grip or Travel-Tack during installation. Follow instructions on product data sheet. 	

**Table 10. NFPA 285 Allowable WRB Materials**

Wall Component	Materials
<p>WRB Over Base Wall Surface Use either 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 or 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, or None.</p> <p>Note: Some WRBs are only allowed with specific systems.</p> <p>Item 24 (Securock® Exoair® 430) or 25 (DensElement w/ FastFlash) replaces the exterior sheathings in Tables 5-8. When either of these items are used, do not use exterior sheathings listed in Tables 5-8 or WRB's on base wall surface in this table.</p>	<ol style="list-style-type: none"> 1. Hunter Xci VP-SA WRB 2. Carlisle® Fire Resist 705 RS, Fire Resist Barrithane VP, Fire Resist 705 VP, Fire Resist 705 FR-A, Fire Resist Barritech NP, Fire Resist Barritech VP (or VP LT). Fire Resist 705 VP may be used with 702 WB, Cav-Grip, or Low VOC Travel-Tack adhesives. Fire Resist 705 FR-A may be used with CCW 702, 702LV, 702 WB, CAV-Grip, and Low VOC Travel-Tack adhesives. 3. CCW-705 (with 702 LV, 702 WB, Cav-Grip, Low VOC Travel-Tack, or 702 adhesives may) be used with Xci Foil (Class A) (or Xci 286), or unfaced noncombustible insulation and cladding options 1-6 (Table 3) 4. GE Momentive SEC 2500 SilShield, Elemax 2600 5. VaproShield Wrapshield SA, RevealShield SA 6. WR Grace Perm-A-Barrier® VPS, Perm-A-Barrier® NPL (AKA, PAB NP20), Perm-A-Barrier® VPL, Perm-A-Barrier® Aluminum Wall Membrane (AWM), Perm-A-Barrier® VPL LT. The following may only be used with claddings 1-6 - Perm-A-Barrier® NPL 10, Perm-A-Barrier® VPL 50. 7. StoGuard Vaporseal 8. 3M 3015 (with Hold Fast 70 adhesive @ 6 mils) 9. Henry Air-Bloc® 17MR, 21S, 31MR, 32MR (only with Xci-Ply [Class A]), 33MR, Blueskin SA (only with Xci Ply [Class A] and claddings 1-6), Air-Bloc® 16MR, Blueskin VP 160. 10. Tyvek CommercialWrap or CommercialWrap D, Fluid Applied WB (only with Xci Ply [Class A] or Xci Foil [Class A]). 11. PolyGuard Spray-N-Roll (STPE), Air Lok Sheet UV400NP, Air Lok Flex VP, FlexGuard, Air Lok Flex, Air Lok Sheet 400 NP (Only with Cladding 1-6) (Table 3) 12. Prosoco R-Guard Cat 5, R-Guard Cat 5 Rainscreen, R-Guard VB or R-Guard Spray Wrap MVP 13. Dryvit Backstop NT 14. WR Meadows Air Shield LMP (Gray), Air Shield LMP (Black), Air Shield TMP, Air Shield LSR 15. Dörken Systems, Inc., Delta-Vent SA, Delta-Vent S, Delta-Fassade S, Delta Maxx, Delta Stratus SA 16. Any WRB that has been tested per ASTM E1354 (at a minimum of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{ign}, Pk. HRR) than those listed above. 17. BASF Enershield HP or Enershield I 18. Soprema Sopraseal Stick VP, Soprasolin HD, LM 204 VP, Stick 1100T with Elastacool 600c Primer (for use with Xci-CG, Xci-CG [Class A]), Xci Foil [Class A], Xci-Ply or Xci-ply [Class A]) 19. Pecora XL Perm Ultra VP 20. Siga Majvest or Majvest 500 SA 21. Sto Gold Coat or Emerald Coat 22. Tremco ExoAir 230 and ExoAir 130 23. Fortifiber Building Systems Group WeatherSmart Housewrap, WeatherSmart Drainable, WeatherSmart Commercial or Super Jumbo Tex 60 24. USG Securock® Exoair® 430 System – see note on left and Air/Vapor System sections in Tables 5-8. 25. 5/8" Georgia Pacific DenElement, flashed with Prosoco R-Guard FastFlash on sheathing joints. 26. Dow Corning Dowsil DefendAir200 (or LT version) or DefendAir 200C (Charcoal) 27. Hohmann & Barnard Enviro Barrier and Enviro Barrier VP 28. STS FW100 or FW100A 29. Kamak 321 K-NRG 30. NaturaSeal AirSeal NS-A-250LP, AirSeal NS-A-250HP 31. Jumpstart HWW-65A, HWW-65B, HWHP-80A, HWMP-90A, HWD2-72A, HWHPT-92A, HWMPC-105A 32. Master Wall Rollershield 33. Parex WeatherSeal Spray & Roll-On
<p>WRB Over Exterior Insulation Use any Item 1-27 or None</p>	<ol style="list-style-type: none"> 1. Hunter Xci VP-SA WRB 2. Carlisle® Fire Resist 705 RS, Fire Resist Barrithane VP, Fire Resist 705 VP (with 702 WB, Cav-Grip, or Low VOC Travel-Tack adhesives), Fire Resist 705 FR-A (with CCW 702, 702LV, 702 WB, CAV-Grip, and Low VOC Travel Adhesives), Fire Resist Barritech NP 3. GE Momentive SEC 2500 SilShield, Elemax 2600 4. VaproShield Wrapshield SA, RevealShield SA



Wall Component	Materials
<p>Note: Some WRB's are only allowed with specific systems</p>	<ol style="list-style-type: none"> 5. Grace Perm-A-Barrier® NPL (AKA, PAB NP20), Perm-A-Barrier® VPL, Perm-A-Barrier® Aluminum Wall Membrane (AWM), Perm-A-Barrier®VPL LT, Perm-A-Barrier®VPS. 6. Henry Air-Bloc® 17MR, 21S, 31MR, Blueskin® VP160 (only with Xci Ply [Class A]), Air-Bloc® 33MR and 16MR. 7. Tyvek CommercialWrap or StuccoWrap 8. Polyguard Air Lok Sheet UV400 NP, Air Lok Flex (only with claddings 1-6), Air Lok Flex VP (over Xci Ply with any cladding listed or over the other Xci foams listed with claddings 1-6) (Table 3) 9. Prosoco R-Guard Cat 5, R-Guard Cat 5 Rainscreen, R-Guard VB or R-Guard Spray Wrap MVP 10. Sto Gold coat or Emerald Coat (only with Xci-Ply) 11. Dryvit Backstop NT 12. Any WRB that has been tested per ASTM E1354 (at a minimum of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{ign}, Pk. HRR) than those listed above 13. 3" Aluma-GRIP™ 701 or 4" FG-1402 joint tape may be interchanged. (Hardcast AFT is a rebrand of Aluma-GRIP™ 701). 14. WR Meadows Air Shield LMP (Gray), Air Shield LMP (Black), Air Shield TMP, Air Shield LSR 15. Dörken Systems, Inc., Delta-Vent SA, Delta-Vent S, Delta-Fassade S, Delta Maxx. 16. Soprema Sopraseal Stick VP (with Claddings 1-6, not with Xci Foil), Soprasolin HD 17. Pecora XL Perm Ultra VP 18. Siga Majvest (for all claddings) or Majvest 500 SA (only with Claddings 1-6) 19. Fortifiber Building Systems Group WeatherSmart Housewrap, WeatherSmart Drainable or WeatherSmart Commercial 20. Dow Chemical DefendAir 200 (or LT version) or DefendAir 200C (Charcoal) 21. Hohmann & Barnard Enviro Barrier VP 22. STS FW100A 23. Karnak 321 K-NRG 24. Jumpstart HWW-65A, HWW-65B, HWHP-80A, HWMP-90A, HWD2-72A, HWHPT-92A, HWMPC-105A 25. Master Wall Rollershield 26. Parex WeatherSeal Spray & Roll-On 27. 3M 3015 VP
<p>St: 1 in. = 25.4 mm</p> <ol style="list-style-type: none"> 1. The following adhesives may be used for attachment of the polyisocyanurate (polyiso) insulation: <ol style="list-style-type: none"> a. Adhesive applied discontinuously at a rate of "1" x 3" dabs, 16" o.c.: LM 800 XL or BariBond or BariBond XL b. Aerosol adhesive at the application rate as per mfg. instructions: CAV-Grip™ or Low VOC Travel-Tack 2. The following may be used as gap filler between insulation panels: FOMO HandFoam FireBlock and TVM FireBlock. 3. These CCW detailing materials may be used over the base wall assembly. The detailing materials can be used alone or with any approved WRB for the construction. <ol style="list-style-type: none"> a. Board Joint Treatments: <ol style="list-style-type: none"> i. 2" x 40 mil ribbon of BariBond or BariBond XL ii. 4" DCH Reinforcing Fabric embedded in Fire-Resist Barritec VP/NP/NP LT or embedded in Fire Resist Barrithane VP iii. 4" Foil-GRIP™ 1402 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet) iv. 4" AlumaGRIP 701 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715; Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet) b. Termination Mastic for Flashing/Membrane: 1" x 40 mil ribbon or tooled "1" bead of SURE-SEAL Lap Sealant, CCW-704, LM 800 XL, BariBond, or BariBond XL c. Detail Flashing, 3" on each side, at Openings, Terminations, Penetrations, Transitions, and Angle Changes. <ol style="list-style-type: none"> i. CCW-705/XLT, CCW-705 TWF/XLT, or Fire Resist 705 FR-A/XLT (all with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet) ii. SURE-SEAL P/S Elastoflex or SURE-SEAL P/S Cover Strip (both with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet) iii. LiquiFiber or DCH Reinforcing Fabric embedded in Barritec VP/NP/NP LT iv. 40 mil application of BariBond, BariBond XL, or Barrithane VP 4. These CCW detailing materials may be used over the polyiso insulation and can be use alone or with any approved WRB for the assembly. <ol style="list-style-type: none"> a. Board Joint Treatments: <ol style="list-style-type: none"> i. 2" x 40 mil ribbon of BariBond or BariBond XL ii. 4" DCH Reinforcing Fabric embedded in Fire-Resist Barritec VP/NP/NP LT or embedded in Fire Resist Barrithane VP 	



Wall Component	Materials
iii.	4" Foil-GRIP™ 1402 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet)
iv.	4" AlumaGRIP 701 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet)
b.	Termination Mastic for Flashing Membrane: 1" x 40 mil ribbon or tooled 1/4" bead of SURE-SEAL Lap Sealant, LM 800 XL, BariBond, or BariBond XL
c.	Detail Flashing, 3" on each side, at Openings, Terminations, Penetrations, Transitions, and Angle Changes
i.	Fire Resist 705 FR-A/XLT (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet)
ii.	SURE-SEAL P/S Elastoform or SURE-SEAL P/S Cover Strip (both with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet)
iii.	LiquiFiber or DCH Reinforcing Fabric embedded in Baritech VP/NP/PP LT
iv.	40 mil application of BariBond, BariBond XL, or Barithane VP
5.	In the NFPA 285 test, flashing for fenestration, including through-wall flashing (TWF), are not considered part of the WRB (ref. 2015 IBC Section 1405.4). TWF is permitted for use in wall assemblies clad with masonry or stone at the base of wall, head of wall, relieving angle, window head, windowsill, and at other interruptions in the exterior cavity. TWF shall be applied a maximum of 8" onto the back-up wall and terminate at daylight or onto a drip edge. The following TWF products may be used:
a.	CCW TWF/XLT (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet)
b.	Pre-Kleened EPDM TWF loose-laid or adhered with SURE-SEAL 90-B-30A bonding Adhesive or SURE-SEAL Low VOC Bonding Adhesive
c.	Metal TWF by others
6.	BRT-801 tape may be used over Fire-Resist 705 RS at membrane splices, terminations, and penetrations. Fire-Resist 705 RS and the substrate may be treated with CCW-702, CCW-702 LV, CCW-702 WB, or Low VOC Travel-Tack to promote adhesion of BRT-801.
7.	Fire-Resist 705 RS may be used in the following applications:
a.	Over the exterior insulation, while another approved WRB is used over the base wall assembly.
b.	Over a WRB on the base wall assembly while no exterior insulation is used. Use only WRBs listed below:
i.	CC Fire Resist 705 FR-A
ii.	Other WRBs that produce no ignition when tested per ASTM E1354 at a heat flux of 50 kW/m ² .
8.	Insulating coating applied over noncombustible substrate can be used for mitigating thermal bridging at wall assembly terminations and penetrations. Coating applied in these conditions cover a small percentage of the total wall surface area. The following products are allowed:
a.	Aerolon 945 tape with primer by Tnemec
b.	Aerolon 971 coating with primer by Tnemec

**Table 11:** Table Notes

Note 1: The following adhesives may be used to attach the polyisocyanurate (polyiso) insulation.

- 1) Adhesive applied discontinuously at a rate of $\frac{3}{8}$ " x 3" dabs, 16" OC: LM 800 XL or BarriBond or BarriBond XL
- 2) Aerosol adhesive at the application rate as per mfg. instructions: CAV-GRIP™ or Low VOC Travel-Tack

Note 2: The following may be used as a gap-filler between insulation panels: FOMO HandiFoam Fireblock or TVM Fireblock

Note 3: These CCW detailing materials may be used over the base wall assembly and alone or with any approved WRB for the construction.

- 1) Board Joint Treatments:
 - a. 2" x 40 mil ribbon of BarriBond or BarriBond XL
 - b. 4" DCH Reinforcing Fabric embedded in Fire-Resist Barritech VP/NP/NP LT or embedded in Fire Resist Barrithane VP
 - c. 4" Foil-GRIP 1402*
 - d. 4" AlumaGRIP 701*
- 2) Termination Mastic for Flashing/Membrane: 1" X 40 mil ribbon or tooled $\frac{3}{8}$ " bead of SURE-SEAL Lap Sealant, CCW-704, LM 800 XL, BarriBond, or BarriBond XL
- 3) Detail Flashing, 3" on each side, at Openings, Terminations, Penetrations, Transitions, and Angle Changes.
 - a. CCW-705/XLT*, CCW-705 TWF/XLT* or Fire Resist 705 FR-A/XLT*
 - b. SURE-SEAL P/S Elastoform* or SURE-SEAL P/S Cover Strip*
 - c. LiquiFiber or DCH Reinforcing Fabric embedded in Barritech VP/NP/NP LT
 - d. 40 mil application of BarriBond, BarriBond XL, or Barrithane VP
- * Prepare the surface as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-GRIP, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet.

Note 4: These CCW detailing materials may be used over the polyiso insulation and alone or with any approved WRB for the assembly.

- 1) Board Joint Treatments:
 - a. 2" x 40 mil ribbon of BarriBond or BarriBond XL
 - b. 4" DCH Reinforcing Fabric embedded in Fire-Resist Barritech VP/NP/NP LT or embedded in Fire Resist Barrithane VP
 - c. 4" Foil-GRIP 1402*
 - d. 4" AlumaGRIP 701*
- 2) Termination Mastic for Flashing/Membrane: 1" X 40 mil ribbon or tooled $\frac{3}{8}$ " bead of SURE-SEAL Lap Sealant, LM 800 XL, BarriBond, or BarriBond XL
- 3) Detail Flashing, 3" on each side at Openings, Terminations, Penetrations, Transitions, and Angle Changes.
 - a. Fire Resist 705 FR-A/XLT*
 - b. SURE-SEAL P/S Elastoform* or SURE-SEAL P/S Cover Strip*
 - c. LiquiFiber or DCH Reinforcing Fabric embedded in Barritech VP/NP/NP LT
 - d. 40 mil application of BarriBond, BarriBond XL, or Barrithane VP
- * Prepare the surface as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-GRIP, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet.



Note 5: In the NFPA 285 test, flashings for fenestration, including through-wall flashing "TWF", are not considered part of the WRB (Ref: 2015 IBC Sec. 1403.5). Therefore, suitable combustible or noncombustible flashings are permitted in wall assemblies as required in Building Code (Ref: 2015 IBC Sec. 1405.4). Through-Wall Flashing "TWF" is allowed for use in wall assemblies clad with masonry or stone at the base of wall, head of wall, relieving angle, window head, windowsill, and at other interruptions in the exterior cavity. TWF shall be applied a maximum of 8" onto the back-up wall and terminate at daylight or onto a drip edge. The following "TWF" products may be used:

- 1) CCW-705 TWF/XLT*
- 2) Pre-Kleened EPDM TWF loose-laid or adhered with SURE-SEAL 90-8-30A bonding Adhesive or SURE-SEAL Low VOC Bonding Adhesive
- 3) Metal TWF by others

Note 6: BRT-801 tape may be used over Fire-Resist 705 RS at membrane splices, terminations, and penetrations. Fire-Resist 705 RS and the substrate may be treated with CCW-702, CCW-702 LV, CCW-702 WB, or Low VOC Travel-Tack to promote adhesion of BRT-801.

Note 7: Fire-Resist 705 RS may be used in the following applications:

- 1) Over the exterior insulation, while another approved WRB is used over the base wall assembly.
- 2) Over a WRB on the base wall assembly while no exterior insulation is used. Use only WRBs listed below.
 - a. CC Fire Resist 705 FR-A
 - b. Other WRBs that produce no ignition when tested per ASTM E1354 at a heat flux of 50 kW/m².

Note 8: Insulating coating over a noncombustible substrate can mitigate thermal bridging at wall assembly terminations and penetrations. Coating in these conditions covers a small percentage of the total wall surface area. The following products are allowed:

- 1) Aerolon 945 tape with primer by Tnemec
- 2) Aerolon 971 coating with primer by Tnemec

EXHIBIT F



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We simplify the code compliance process so you can be confident your product or service meets the requirements to go to market.

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EVALUATION REPORTS

Learn more about the process for developing a new Technical Evaluation Report (TER), the annual review of TERs, revisions of TERs, creating private label TERs, or Termination of TERs.

REPORT DIRECTORY

View and search a list of all publicly available DrJ Listings and Technical Evaluation Reports (TERs) for DrJ Certification clients. Use the search form or filters to search for reports by keyword, company name, product, or Construction Specification Index (CSI) section.

ANAB ACCREDITATION

DrJ Engineering, LLC focuses on areas of professional engineering expertise, including building construction in accordance with the IBC, IRC, IECC, IFC, and local codes. DrJ's ISO/IEC 17065 accreditation covers a broad range of engineering and construction categories.



The diagram features a central 'QUALTIM' logo with a sunburst icon and a lightbulb icon below it. Surrounding this central logo are four other logos: 'DrJ' (top left), 'CBI' (top right), 'ABTG' (bottom left), and 'PUSHING7' (bottom right). All logos are enclosed in rounded rectangular frames, and they are connected by a dotted circular line.

Learn more about the Qualtim Family of Services and how our expertise can help bring your innovation to market.

[GET STARTED](#)



THE QUALTIM FAMILY OF SERVICES
Where building innovation thrives.

EXHIBIT G



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ANAB Accredited Certification Body

Simplifying the “ICC-Approval” Process

ICC’s approval procedure is called the [ICC Product Approval Checklist for Code Officials](#).

“ICC Approved” can also be termed ICC Accepted, ICC Report, ICC Evaluation, HUD Approved, OSHA Approved, NY Approved, Title 24 Approved, CA Approved, FL Approved, Los Angeles Approved, NYC Approved, DCA Approved, Chicago Approved, San Francisco Approved, Miami Dade Approved, as well as other terms specific to given markets.

These market-specific terms all refer to the acceptance of [accredited agencies](#). Therefore, in market terms, **DrJ is “ICC-Approved.”**

DrJ simplifies the code compliance process for innovators and is the only [ANAB Accredited Third Party Certification Body](#) to stand behind certifications with a PE seal.

Verification Process

[Acceptability](#) of an [approved agency](#), by a building official, is performed by verifying that the agency is accredited by a recognized accreditation body of the [International Accreditation Forum](#) (IAF). Examples include **DrJ**, ICC-ES, IAPMO, Intertek, and UL. Each accredited certification body, as a code-defined approved agency, **is qualified to practice** within their specified “accredited scopes.”

The [IAF website states](#): “Once an **accreditation body is a signatory** of the IAF MLA, **it is required to recognise** certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope.”

Code Acceptance for New Products

Building codes require that the **building official shall accept [duly authenticated reports or research reports from approved agencies and/or approved sources](#)**, including licensed [Registered Design Professionals](#) (RDPs), with respect to the quality and manner of use of new products, materials, designs, services, assemblies, or methods of construction.

Please review our [Accredited Scope Comparison](#) to see a list of DrJ's areas of expertise.

Federal law, [Title 18 US Code Section 242](#), supports that where the alternative product, material, service, design, assembly, and/or method of construction is not approved, any authority having jurisdiction shall respond in writing, [stating the reasons why the alternative was not approved](#), as denial without written reason deprives a [protected right to free and fair competition in the marketplace](#) and may be viewed as [discrimination](#).

Get Started



View Accreditation

// ENGINEERING

// CERTIFICATION

6/7/24, 6:20 AM

ANAB Accredited Certification Body | DrJ Certification



The image shows a 'DrJ Certification Approved Scope Declaration' form. It is a structured document with multiple columns and rows, likely used for detailing the scope of certification services. The form includes the DrJ Certification logo at the top left and the ANAB logo at the top right.

DrJ's Scope Comparison

Certified Once, Approved Everywhere

International Accreditation Forum



IAF's primary function is to develop a single worldwide program of conformity assessment that reduces risk for businesses and their customers by assuring them that accredited certificates and validation and verification statements may be relied upon.



Recognized Accreditation Body

// ENGINEERING

// CERTIFICATION

The graphic is a vertical banner with a green background. At the top, it features the ANAB logo, which consists of a torch with a flame above the word "ANAB" in a bold, black, sans-serif font. Below this, the text "ANSI National Accreditation Board" is written in a smaller, italicized font, followed by "ACCREDITED" in a large, spaced-out, black, sans-serif font. A white arrow points to the right, indicating a transition to the next section. The second section features the text "ANAB Accredited Third Party Certification Body" in a white, sans-serif font. Below this is the DrJ logo, which consists of the letters "Dr" in white on a black background, followed by a large "J" in white on a grey background. At the bottom of this section, there is a paragraph of text in white, sans-serif font.

ANAB
ANSI National Accreditation Board
ACCREDITED

ANAB is recognized as an Accreditation Body (AB) by the International Accreditation Forum.

>

ANAB Accredited Third Party Certification Body

DrJ

DrJ is an accredited certification body, qualified to practice product and code compliance services within our specific ISO/IEC 17065 accreditation scope. In market terms, DrJ is "ICC-Approved."

ANSI Accreditation Onion - What is the Difference between Accreditation and Certific



Related Links

- [Accredited Certification Body Scope Comparison](#)
- [ANSI/ANAB Product Certification Body Letter](#)
- [DrJ Certificate of Accreditation](#)
- [Resources](#)





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// ENGINEERING

// CERTIFICATION

EXHIBIT H



PRODUCT APPROVAL CHECKLIST FOR CODE OFFICIALS

Product:

Manufacturer:

Date:

This "Product Approval Checklist" provides suggested items for building officials to consider when they utilize an evaluation report or listing in deciding whether to approve a product for use in the field. The items on the checklist are suggestions only. It is the responsibility and authority of the appropriate reviewing officials to determine (a) what matters to consider, (b) the reliability, relevance, and effect of any evaluation report or listing, (c) the applicability of any codes and standards, and (d) whether the product in question should be approved for use.

Basic Approval Criteria

- The report or listing relates to the specific product and manufacturer at hand.
- The report or listing has not expired.
- The report or listing references a code, standard or criteria covering the entire product, material or method.

Other Important Items to Consider

- The product has been evaluated to a code and/or standard and/or criteria.
- The code edition referenced in the report or listing is the code currently used in the jurisdiction.
- The standard or criteria referenced in the report or listing is the latest version.

Accreditation Verification

- The product has proof of compliance for the specific installation, in the form of a report or listing an accredited Certification Body.

Some entities that provide accreditation to Certification Bodies include:

IAS <https://www.iasonline.org/>

A2LA <https://portal.a2la.org/search>

ANSI <https://anabpd.ansi.org/Accreditation/product-certification/DirectoryListingAccredited?menuID=1&prgID=1>

ema https://www.ema.org.mx/portal_v3

SCC <https://www.scc.ca/en/accreditation>

- The scope of the Certification Body's accreditation covers the code, standard or criteria referenced in the report A Certification Body's scope of accreditation information may be available on the accrediting entity's website or may otherwise be obtained by contacting the accrediting entity.

Notes:

EXHIBIT I



PRODUCT APPROVAL CHECKLIST FOR CODE OFFICIALS

Product:

Manufacturer:

Date:

This "Product Approval Checklist" provides suggested items for building officials to consider when they utilize an evaluation report or listing in deciding whether to approve a product for use in the field. The items on the checklist are suggestions only. It is the responsibility and authority of the appropriate reviewing officials to determine (a) what matters to consider, (b) the reliability, relevance, and effect of any evaluation report or listing, (c) the applicability of any codes and standards, and (d) whether the product in question should be approved for use.

Basic Approval Criteria

- The report or listing relates to the specific product and manufacturer at hand.
- The report or listing has not expired.
- The report or listing references a code, standard or criteria covering the entire product, material or method.

Other Important Items to Consider

- The product has been evaluated to a code and/or standard and/or criteria.
- The code edition referenced in the report or listing is the code currently used in the jurisdiction.
- The standard or criteria referenced in the report or listing is the latest version.

Accreditation Verification

- The product has proof of compliance for the specific installation, in the form of a report or listing an accredited Certification Body.

Some entities that provide accreditation to Certification Bodies include:

- IAS** <https://www.iasonline.org/>
- A2LA** <https://portal.a2la.org/search>
- ANSI** <https://anab.ansi.org/>
- ema** https://www.ema.org.mx/portal_v3
- SCC** <https://www.scc.ca/en/accreditation>

- The scope of the Certification Body's accreditation covers the code, standard or criteria referenced in the report A Certification Body's scope of accreditation information may be available on the accrediting entity's website or may otherwise be obtained by contacting the accrediting entity.

Notes:

anab.ansi.org



EXHIBIT J

The screenshot shows a web browser window displaying a document viewer. A 'Document properties' dialog box is open in the foreground, showing the following information:

Description	
File name:	ICC_product_approval_checklist_for_cod...
File size:	262 KB
Title:	Not available
Author:	Kirk Grundahl
Subject:	Not available
Keywords:	Not available
Created on:	5/25/2021, 12:18:48 PM
Modified on:	12/26/2022, 10:55:02 AM
Creator:	Microsoft® Word 2016

Advanced	
PDF producer:	Microsoft® Word 2016
PDF version:	1.6
Location:	https://www.djcertification.org/sites/de...
Page count:	1
Page size:	15.58 x 11.01 in (landscape)
Fast web view:	No

A blue 'Close' button is located at the bottom right of the dialog box.

The background document is titled 'INTERNATIONAL CODE COUNCIL PRODUCT APPROVAL CHECKLIST'. It includes fields for 'Product:', 'Manufacturer:', and 'Date:'. Below these fields, there is a paragraph of text explaining the purpose of the checklist. The document also contains sections for 'Basic Approval Criteria', 'Other Important Items to Consider', and 'Accreditation Verification', each with a list of checkboxes. At the bottom, there are links to various accreditation organizations: IAS, AZLA, ANSI, and ANA.

EXHIBIT K

Document properties

Description

File name:	ICC_Product_Approval_Checklist_for_Co...
File size:	406 KB
Title:	ICC product_approval_checklist_for_cod...
Author:	flutz
Subject:	Not available
Keywords:	Not available
Created on:	10/4/2023, 1:42:30 PM
Modified on:	10/4/2023, 2:07:54 PM
Creator:	Not available

Advanced

PDF producer:	Microsoft: Print To PDF
PDF version:	1.7
Location:	https://www.icc-certification.org/sites/def...
Page count:	1
Page size:	14.67 x 11.33 in (landscape)
Fast web view:	No

Close

INTERNATIONAL CODE COUNCIL

PRODUCT APPROVAL CHECKLIST

Product:

Manufacturer:

Date:

This "Product Approval Checklist" provides suggested items for field checklists. These suggestions are only. It is the responsibility and authority of the user to determine the applicability of any codes and standards, and of the user to approve a product for use in the field. The items on the checklist are suggestions only. It is the responsibility and authority of the user to determine the reliability, relevance, and effect of any evaluation report or

Basic Approval Criteria

- The report or listing relates to the specific product and manufacturer.
- The report or listing has not expired.
- The report or listing references a code, standard or criteria used in the report or listing.

Other Important Items to Consider

- The product has been evaluated to a code and/or standard.
- The code edition referenced in the report or listing is the code edition used in the report or listing.
- The standard or criteria referenced in the report or listing is the standard or criteria used in the report or listing.

Accreditation Verification

- The product has proof of compliance for the specific installer.

Some entities that provide accreditation to ICC:

- IAS: <https://www.iasonline.org/>
- AZLA: <https://www.azla.org/azla/>
- ANSI: <https://www.ansi.org/>
- CSA: <https://www.csa.org/majordetail.cfm>
- SCC: <https://www.scc.com/accr/accr.html>

The scope of the Certification Body's accreditation covers the product and the installer. For more information, visit the Certification Body's website or may otherwise be obtained by contacting the accrediting entity.

EXHIBIT L




Frequently Asked Questions

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About ANAB

[What is the ANSI National Accreditation Board?](#)
[Why should I use the services of ANAB?](#)
[Under what authority does ANAB operate?](#)
 [Who oversees ANAB's work?](#)
[How is ANAB financially supported?](#)
[What are the benefits of accreditation?](#)

How are ANAB and ANSI related, and what's the history behind the company name?

Can I get standards from ANAB?

How can I get the current ANAB logo or accreditation symbol?

What is ANSI certification and what is the cost of ANSI certification?

What is the ANSI National Accreditation Board?

The ANSI National Accreditation Board is a non-governmental organization that provides accreditation services to public- and private-sector organizations. ANAB is a wholly owned subsidiary of the [American National Standards Institute](#) (ANSI).

Why should I use the services of ANAB?

ANAB is committed to customer service and technical competence and maintains international recognition. We provide quality and value to our customers. Our staff and assessors are technically competent, personable, and effective communicators. This ensures a more beneficial and pleasant experience for our customers.

Under what authority does ANAB operate?

ANAB is a Wisconsin limited liability company. ANAB operations are in keeping with U.S. government support for use of standards and conformity assessment solutions developed or adopted by private, voluntary consensus standards bodies in lieu of developing government-unique standards or regulations (per the National Technology Transfer and Advancement Act of 1995, Public Law 104-113). ANAB operations are also consistent with the government's endorsement of close interaction and cooperation between the public and private sectors as critical to developing and using standards that serve national needs and support innovation and competitiveness (per the Office of Management and Budget A-119: Federal Participation in the Development and Use of Voluntary Consensus Standards in Conformity Assessment Activities).

ANSI, the owner of ANAB, is the U.S. body to the International Organization for Standardization (ISO). ANAB's Accreditation Councils are composed of representatives of stakeholders of ANAB programs, including government.

Who oversees ANAB's work?

ANAB complies with international standards and requirements for accreditation bodies and is a member of the International Accreditation Forum (IAF), International Laboratory Accreditation Cooperation (ILAC), InterAmerican Accreditation Cooperation (IAAC), and Asia Pacific Accreditation Cooperation (APAC). ANAB is [signatory of relevant IAF, ILAC, IAAC, and APAC multilateral cooperative arrangements \(MLAs\) and multilateral recognition arrangements \(MRAs\)](#). Members of these organizations are admitted to the MLAs/MRAs after a stringent assessment of their operations by a peer evaluation team charged to ensure full compliance with international standards and IAF, ILAC, IAAC, and APAC requirements. MLA/MRA signatories are required to recognize the certificates and reports issued by bodies accredited by all other signatories of the MLAs/MRAs.

Through the IAF, ILAC, IAAC, and APAC MRAs/MLAs, ANAB cooperates with other accreditation bodies around the world to provide value to its accredited customers and their customers, ensuring that accredited certificates are recognized nationally and internationally. The global conformity assessment system ensures confidence and reduces risk for customers engaging in trade worldwide.

How is ANAB financially supported?


ANAB is supported by fees charged for the services it provides.

What are the benefits of accreditation?

Accreditation provides formal recognition to competent organizations. It provides a conduit for regulators and industry to find reliable products and services to meet their specific needs. Accreditation is a means to reduce costs and redundancy and eliminate trade barriers. Most important, accreditation assures industry and government decision-makers that accredited organizations are competent and their results can be relied on.

For more information on the benefits of accreditation for public sector organizations, visit the [Public Sector Assurance site](#).

How are ANAB and ANSI related, and what's the history behind the company name?

 ANAB was established in 1989 as the Registrar Accreditation Board (RAB) by the American Society for Quality. ANAB's relationship with [ANSI](#) dates almost to its beginnings as RAB. On

December 13, 1991, RAB and ANSI agreed to operate the American National Accreditation Program for Registrars of Quality Systems, and 12 certification bodies accredited by RAB prior to the agreement were subsequently converted to accreditation under the ANSI-RAB program.

After RAB introduced its second accreditation program in May 1996, a second agreement was negotiated with ANSI. The ANSI-RAB National Accreditation Program covered ISO 9000 quality and ISO 14000 environmental management systems.

Effective January 1, 2005, the ANSI-RAB NAP became a legal entity, jointly owned by ANSI and ASQ, and renamed the ANSI-ASQ National Accreditation Board. ANSI acquired full interests in ANAB in December 2018, strengthening ANSI's and ANAB's abilities to provide the highest quality third-party accreditation services for diverse global markets. ANAB is a wholly owned subsidiary of ANSI, registered as a separate legal entity and renamed the ANSI National Accreditation Board.

As the voice of the U.S. standards and conformity assessment system, ANSI empowers its members and constituents to strengthen the U.S. marketplace position in the global economy while helping to assure the safety and health of consumers and the protection of the environment. ANSI oversees the creation, promulgation, use of thousands of norms and guidelines that have a direct impact on businesses in nearly every sector.

Can I get standards from ANAB?

No. ANAB does not provide standards. You can purchase standards to which ANAB offers accreditation from the [ANSI Webstore](#). Many standards mentioned on ANAB's website are linked to the ANSI Webstore. Some industry-specific standards are available free or for purchase from the scheme owners.

How can I get the current ANAB logo or accreditation symbol?

The ANAB logo (displayed at the top of this website) is for use only by ANAB to identify itself and shall not be used by any other entity. ANAB issues accreditation symbols to accredited conformity assessment bodies (laboratories, certification bodies, forensic service providers, inspection bodies, etc.) to indicate their accredited status. Your ANAB contact can provide the appropriate ANAB accreditation symbol for your accredited organization.

An organizations issued a certification by an ANAB-accredited certification body can use the ANAB accreditation symbol in conjunction with the certification body symbol (as provided directly by the certification body to the certified organization).

What is ANSI certification and what is the cost of ANSI certification?

Inquiries about ANSI certification typically refer to one of the [ANAB credentialing programs](#) (which previously were ANSI programs, as were current ANAB accreditation programs for ISO/IEC 17065 product, process, and service certification bodies and for ISO 14065 validation and verification bodies).

ANAB accredits ISO/IEC 17024 **certification** and ASTM E2659 **certificate** programs, which are two different things. ANAB also accredits organizations providing food-handler training courses and certificates, which are required in some states and localities. ANAB does not set pricing for the certification and certificate programs provided by ANAB-accredited organizations. You should contact directly the certification body or certificate issuer to determine the cost.

Recognition

- [Is ANAB recognized domestically and internationally?](#)
- [How does ANAB demonstrate its capability as an accreditation body?](#)

Is ANAB recognized domestically and internationally?

ANAB is a signatory of the multilateral recognition arrangements (MRAs) of the International Laboratory Accreditation Cooperation (ILAC) and the Asia Pacific Accreditation Cooperation (APAC). ANAB also is a signatory of the International Accreditation Forum (IAF) and Inter-American Accreditation Cooperation (IAAC) multilateral recognition arrangements (MLAs). Domestically, ANAB has been recognized by the Federal Communications Commission, the National Institute of Standards and Technology (NIST) National Voluntary Conformity

Assessment Systems Evaluation Program (NVCASE), the NELAC Institute (TNI), and many other private and government organizations.

[More about ANAB recognition](#)

How does ANAB demonstrate its capability as an accreditation body?

ANAB, like other MRA/MLA-signatory accreditation bodies, is evaluated regularly by its peers in the international accreditation community. This includes evaluation of its compliance with the requirements of ISO/IEC 17011, Conformity assessment – General requirements for accreditation bodies accrediting conformity assessment bodies. The evaluators also accompany ANAB assessors and staff on select assessments to evaluate the diligence and appropriateness of the assessment process to conform with ISO/IEC 17011 and the relevant standard used to assess the conformity assessment body.

General

- [What is conformity assessment?](#)
- [What is accreditation?](#)
- [What's the difference between accreditation and certification?](#)
- [What does accreditation cover?](#)
- [Is accreditation mandatory?](#)
- [What is transparency in coverage?](#)

What is conformity assessment?

ISO/IEC 17000:2019 defines conformity assessment as “demonstration that specified requirements are fulfilled.”

A standard is a technical expression of how to make a product safe, efficient, and compatible with others. But standards are just good ideas unless products, processes, systems, and personnel conform to them. Conformity assessment provides assurance to consumers by increasing consumer confidence when personnel, products, systems, processes, or services are evaluated against the requirements of a voluntary standard.

What is accreditation?

Accreditation denotes both a status and process. As a status it denotes conformity to a specific standard as set forth by an accrediting agency and as a process it shows a commitment to continuous improvement. ISO/IEC 17000:2019 defines accreditation as "third-party attestation to a conformity assessment body conveying formal demonstration of its competence, consistent operation and impartiality in performing specific conformity assessment activities."

What's the difference between accreditation and certification?

Certification of products, personnel, or management systems (such as ISO 9001 or ISO 14001) demonstrates conformity to the requirements of a standard. Accreditation is the procedure by which an authoritative body gives formal recognition that a body or person is competent to carry out specific tasks. Both accreditation and certification use criteria and procedures to implement such activities.

What does accreditation cover?

The scope of the accreditation is determined by the standard to which the conformity assessment body is accredited. In general, the accreditation standard covers aspects of governance, disclosure, fairness to candidates, non-discrimination, and disclosure.

Is accreditation mandatory?

Accreditation is voluntary. Accreditation by ANAB provides an exemplary level of credibility, integrity, and trust.

What is transparency in coverage?

In an effort to improve price and quality transparency in American healthcare, the Departments of Health and Human Services, Labor and the Treasury created a *Transparency in Coverage Rule* that requires health insurers and group health plans to post publicly available machine-readable files that include in-network negotiated payment rates and historical out-of-network charges for covered items and services, including prescriptions drugs. Please use this link to access the files: transparency-in-coverage.uhc.com

Laboratory Accreditation Process

- [How do I start the accreditation process?](#)
- [I need help preparing for accreditation; can ANAB help?](#)
- [What information is available to ANAB customers?](#)
- [How much advance notice is provided in scheduling assessments?](#)
- [How long will it take to be notified of accreditation results after the assessment?](#)
- [How is the scope of lab accreditation established?](#)
- [Are all ANAB fees disclosed in my quote?](#)
- [How can I inform my customers that my company has applied for ANAB accreditation?](#)

How do I start the accreditation process?

Call ANAB at 414-501-5455, to begin a mutually beneficial dialog. We start by gathering information and in a short time can recommend specific guidance documents, provide pricing information, explain the estimated timeline of accreditation for your company, and answer any questions. Then we'll send a quote, application for accreditation, and all necessary documentation. You can also download a request for quote and an application from this [website](#).

I need help preparing for accreditation; can ANAB help?

We offer several types of preparatory evaluations prior to the assessment; however, we cannot engage in consulting. We have tools, resources, and contacts to which we can direct you to help you get started. We also offer [training](#) related to our accreditation programs.

What information is available to ANAB customers?

ANAB has an open system. Customers have access to any documentation that's not restricted based on privacy, accreditation mandate, or other legal issues. This includes checklists used in the accreditation process.

How much advance notice is provided in scheduling assessments for laboratories?

For laboratories, assessment schedules for current customers are maintained approximately 120 days in advance. Customers typically receive assessment schedules 30 to 60 days in advance.

How long will it take to be notified of accreditation results after the assessment for laboratories?

At the end of the accreditation assessment, you'll receive a copy of the assessor checklist and any nonconformities. The assessor will tell you prior to leaving the facility if your company will be recommended for accreditation. After corrective action responses are approved, ANAB will begin the accreditation decision review process. A certificate and scope of accreditation are issued if your company is approved for accreditation.

How is the scope of accreditation established?

The scope of accreditation for a laboratory details the specific tests and/or calibrations for which the laboratory is accredited. Other types of accredited organizations have similarly detailed scopes of accreditation. To ensure consistent uniformity for all scopes of accreditation, the format must be written in accordance with NIST 811, Guidelines for the Expression of SI Units. Also refer to the ANAB Guidance Document on Scopes of Accreditation.

Are all ANAB fees disclosed in my quote?

The only charges not included in our quotes are for actual travel costs, any time for corrective action review, and reimbursement for assessor travel time. If travel is required, we try to keep expenses to a minimum. ANAB monitors assessor travel arrangements to ensure costs are as low as possible. Assessment time (days on site) may vary depending on the complexity of the proposed scope of accreditation.

How can I inform my customers that my company has applied for any ANAB accreditation?

ANAB provides a letter stating that accreditation is in progress so your customers understand you're working to become accredited.

Technical Questions About Laboratory Accreditation

- [What's the difference between CMC and MU?](#)
- [What will my assessor look for when reviewing my CMC budgets?](#)
- [Does ANAB offer accreditation to ANSI-NCSL Z540-1 and Z540.3? How does the assessment differ from the ISO/IEC 17025 assessment?](#)
- [Do test labs have to estimate measurement uncertainty?](#)
- [Do we need to have participated in proficiency testing or inter-laboratory comparisons \(PT/ILC\) before our initial assessment? Do we need to demonstrate participation for every discipline on our proposed scope of accreditation? What about continuing requirements?](#)
- [What is a scope of accreditation?](#)
- [The laboratory I've been using for calibration of my standards says it complies with ISO/IEC 17025 but only has an ISO 9001 certificate on its website. Why?](#)

- [What proof of traceability is required during assessments?](#)
- [Am I required to participate in proficiency testing \(PT\) and/or inter-laboratory comparisons \(ILC\)? How often and what are the costs? What if there no commercial PTs or ILCs are available?](#)
- [What about NIST traceable v. traceability to the SI Unit? Can I be traceable to another country's NMI instead of NIST?](#)

What's the difference between CMC and MU?

CMC stands for calibration and measurement capability, while MU stands for measurement uncertainty. CMC is a calibration laboratory's "best capability." This means calibration was performed using the best standards, with the smallest uncertainty, the smallest error, and under the best environmental conditions, with calibration performed on a very high-end piece of equipment. In other words, the calibration is as near ideal as possible for a given calibration laboratory. These CMC values are reported on your scope of accreditation.

Because a calibration laboratory cannot always work in its best environment and with its best reference standards, it needs to calculate an MU for each particular instrument it calibrates. In this case, the laboratory needs to estimate the uncertainty, taking into account potentially larger uncertainties and errors (compared w those in its CMCs) from its working standards, the contribution of more environmental variance, and possibly use of a lower-end piece of equipment with less resolution.

What will my assessor look for when reviewing my CMC budgets?

First, the assessor will want to see your procedure for calculating the uncertainty budgets. The procedure should include a method for identifying all the potential error contributors for a calibration. It should also refer to any software you intend to use and the coverage factor you'll be reporting (usually $k=2$). You might also want to describe when and why a contributor may be excluded because it won't be significant.

The second area to be reviewed will be the contributors in your uncertainty budgets to see how they were determined. We'll verify the uncertainty from your calibration certificates to make sure they're correct. We'll look at standard error from the calibration certificates, repeatability studies, contributions of environmental variance, deflection, etc.

Last, we'll review uncertainty budgets to make sure you're using the proper distributions in the calculations. It's very important that these are correct because the budgets could be over- or understated dramatically if these are improperly applied.

Does ANAB offer accreditation to ANSI-NCSL Z540-1 and Z540.3? How does the assessment differ from the ISO/IEC 17025 assessment?

We continue to offer assessment of the requirements of both standards for our ISO/IEC 17025 customers. For ANSI-NCSL Z540.3, we assess the requirements of section 5.3, the only section not already covered during the ISO/IEC 17025 assessment. This requires an additional half-day of assessment time during initial assessment and reassessment. The scope and certificate of accreditation will refer to both standards when they've been verified.

Although ANSI-NCSL Z540-1 has been replaced by Z540.3, it's still referred to in some of our customers' contracts and we therefore offer it to customers who request it. The additional requirements are included in the ISO/IEC 17025 checklist and identified as "Z540-1." No additional assessment time is required. The scope and certificate of accreditation will refer to both standards when they've been verified.

For ISO/IEC 17025 customers who request assessment to both of these national standards, the scope and certificate of accreditation will refer to all three standards.

Do test labs have to estimate measurement uncertainty?

Every ISO/IEC 17025 accredited lab needs to be diligent about uncertainties, including all testing labs. In fact, all ISO/IEC 17025 accreditation visits must include verification that the laboratory has demonstrated this diligence. There must be a documented procedure in the system describing how uncertainties are handled. For some testing labs, this may be a simple statement that all tests are qualitative and not quantitative and they do not need to determine any uncertainties. Most testing labs do not need to calculate or demonstrate what we call ISO-GUM uncertainties for all relevant uncertainties for tests on their scope of accreditation. They rarely if ever might report an uncertainty on any test report either. They only need to demonstrate to their ISO/IEC 17025 assessors with a few specific examples how they would calculate those MUs for a customer requesting them.

Do we need to participate in proficiency testing or inter-laboratory comparisons (PT/ILC) before our initial assessment? Do we need to demonstrate participation for every discipline on our proposed scope of accreditation? What about continuing requirements?

ANAB requires that applicant labs demonstrate proof of participation in a test that meets the requirements of ISO/IEC 17043 *prior to* the initial assessment visit, whenever possible. This means that the lab must have participated and provided its input to the provider, but the results may or may not be available yet. The lab is required to forward the results to ANAB when they are available. If no results have been received within six months of accreditation, the accredited laboratory is subject to suspension until ANAB receives them. The minimum required participation prior to the initial assessment visit is one discipline from the proposed scope of participation.

Following the initial accreditation, ANAB requires that accredited labs participate in at least one PT/ILC each calendar year. In addition, the lab must participate in at least one PT/ILC for each major sub-area of its scope of accreditation during any calendar four-year period. Major sub-areas are identified on the scope of accreditation by Roman numerals (I. Dimensional Calibration, II. Thermal Testing, etc.).

What is a scope of accreditation?

The scope of accreditation is a document listing a laboratory's specific test or calibration capability as verified by the accreditation body. For a calibration laboratory, the scope includes the type of test or calibration, range or detection limits, reference standards, and procedures used and the calibration and measurement Capabilities (CMCs). The scope refers to a certificate of accreditation.

The laboratory I've been using for calibration of my standards says it complies with ISO/IEC 17025 but only has an ISO 9001 certificate on their website. Why?

Chances are it is not accredited. Laboratories accredited by an accreditation body that is a signatory of the ILAC mutual recognition arrangement (MRA) have been assessed to all the requirements of ISO/IEC 17025. This means all aspects of the management and calibration processes were evaluated. This evaluation includes traceability, measurement uncertainty (MU), use of acceptable methods, environmental controls, results, reporting, and many other factors. It also includes a complete review of the management system of the laboratory. As a

signatory of the ILAC MRA, ANAB can accept for calibration traceability only laboratories that have been accredited by an MRA signatory accreditation body. We trust that they have done as good a job as we would in assessing a laboratory's capabilities.

What proof of traceability is required during assessment?

During initial assessment and reassessment, assessors review proof of "metrological traceability" for all standards listed on the proposed or existing scope of accreditation. The easiest way to demonstrate traceability is by producing a calibration certificate issued by a national metrology institute, such as the National Institute of Standards and Technology, or by a laboratory accredited for that discipline by an accrediting body, such as ANAB, that is an International Laboratory Accreditation Cooperation (ILAC) signatory. A list of ILAC signatories is available from [ILAC](#). If you can't find an NMI or accredited source for the calibration, [contact ANAB](#) for assistance.

Am I required to participate in proficiency testing (PT) and/or inter-laboratory comparisons (ILC)? How often and what are the costs? What if there are no commercial PTs or ILCs available for me?

Unfortunately, there's a shortage of proficiency testing programs available to accredited laboratories around the world. In many cases, especially for testing labs, there is no reasonable PT program available. Most accreditation bodies, including ANAB, require accredited labs to participate every year in some form of PT or reasonable alternative if none is available. ANAB must approve the alternative. We also have a framework to approve any PT program that is not commercially offered but might satisfy the PT requirement for ANAB-accredited labs. Costs can run from a few hundred dollars to more than \$1,000 for some programs and the frequency of participation. We work with each lab on its PT programs at each visit to make them increasingly value-added to their QA and to building international confidence in their demonstration of competence via PT/ILC.

What about NIST traceable v. traceability to the SI Unit? Can I be traceable to another country's NMI instead of NIST?

NIST traceable calibrations are often called ISO 9001 calibrations. In the ISO/IEC 17025 world, the term we should use is metrological traceability, and the chain of comparisons is to the SI unit, not any particular national metrology institute (NMI). The vast majority of the global

NMI's participate with each other in comparisons to most of the highest precision measurements to measure or "realize" many of the SI units or other indirect unit. The participants recognize each other through these "key comparisons," and thus the traceability chain can channel through any one of them in most cases. This means that a lab in the United States may have a very satisfactory metrological traceability for some of their measurements that have no participation from NIST in their chain of comparisons.

Management Systems Accreditation

- [What is certification?](#)
- [What is a certification body \(CB\)?](#)
- [What are the benefits of management systems certification?](#)
- [How can I obtain a list of ANAB-accredited management systems CBs?](#)
- [How does ANAB determine whether a management systems CB meets ANAB's accreditation criteria?](#)
- [How often are accredited management systems CBs re-examined?](#)
- [What should I do if I believe that an ANAB-accredited management systems CB has not done an adequate job?](#)
- [How can my organization become an ANAB-accredited management systems CB?](#)
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- [Must management systems certification be periodically renewed?](#)
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- [If the CB discovers a regulatory noncompliance during an EMS certification audit, does the organization fail the audit?](#)
- [What is IAAR?](#)

What is certification?

Certification is the act of verifying the conformance to a standard or other requirements. A certification body audits an organization and, if appropriate, a certificate of conformance to a given standard (for example, ISO 9001 for quality management systems) is issued. With regard to management systems, the terms certification and registration are used interchangeably. (Certification also refers to the process of validating and verifying the credentials of individuals, such as auditors.)

What is a certification body (CB)?

A CB (also known as a registrar) is a third-party company contracted to evaluate the conformance of an organization to the requirements of the appropriate standard(s) and issue a certificate of conformance when warranted.

What are the benefits of management systems certification?

Benefits of implementing quality management systems include increased operational efficiency; an opportunity to critically examine how employees do their work and interact between functions; establishing the proper processes for future operations; better documentation of methods and responsibilities; consistency of process; greater employee awareness about quality; cost savings from less scrap and rework, as well as fewer warranty claims; enhanced communication among employees; customer satisfaction; competitive edge; increased credibility; ease of trade; perceived higher quality; reduced customer audits; increased market share; and fulfilling supplier requirements for certification.

Benefits of implementing environmental management systems include potential reduction in process by-products and wastes ; greater employee awareness about the environment and the impact of their jobs on it; potential increased energy efficiency and energy conservation in design, production, and postproduction processes; creation of systematic structure for complying with environmental regulations; customer satisfaction/requirement; competitive advantage; ease of trade, avoiding non-tariff trade barriers; potential for improved market share; and improved image with community and environmental groups.

Implementing other management systems may offer some of the same benefits, as well as benefits unique to the specified type of management system.

How can I obtain a list of ANAB-accredited management systems CBs?

This site contains a [searchable directory](#) of accredited management systems CBs. You can search the directory by CB name, location, scope category (for QMS), and other qualifications.

How does ANAB determine whether a management systems CB meets ANAB's accreditation criteria?

ANAB accreditation assessors evaluate a prospective CB's written policies and procedures, including the credentials of its auditors. If all of these are acceptable, the ANAB assessor team performs a rigorous on-site examination of the CB's internal operations and then witnesses the CB conducting a complete client audit.

How often are accredited management systems CBs reassessed?

Management Systems Accreditation is typically valid for five years. Maintaining accreditation includes at a minimum, an annual office assessment and annual witnessed assessment/s with a complete reassessment required every five years. Depending on the scope of accreditation, oversight may increase to cover additional industry sectors (e.g. Aerospace programs).

What should I do if I believe that an ANAB-accredited management systems CB has not done an adequate job?

Each management systems CB is required to have a system for handling complaints. ANAB evaluates the operation of the complaint system during its surveillance. Every CB also has an appeals system through which clients can appeal adverse decisions. The CB's appeals system is also evaluated by ANAB during surveillance.

If you have a complaint, please go to ANAB's [online complaint center](#).

How can my organization become an ANAB-accredited management systems CB?

There is information about [applications](#) and the [accreditation process](#) on this website. While ANAB accepts applications from CBs based outside of North America, ANAB encourages such CBs to seek accreditation by their local national accreditation body.

What is the certification process for management systems?

Certification is done by a CB through a series of document reviews and facility visits and audits. The CB's auditors examine an organization's procedures, processes, and operations to determine their conformance to the requirements (elements) of the standard.

The CB evaluates a variety of issues. For QMS certification, these include but are not limited to the applicant organization's administrative, design, and production processes; quality system documentation; personnel training records; management reviews; and internal audit processes. For EMS certification, these include but are not limited to the applicant organization's administrative processes; technical capabilities and operations; training and experience of personnel; regulatory compliance; environmental aspects and impacts; and management review and internal audit processes.

The certification process can take anywhere from several weeks to more than a year, depending on the readiness of the organization applying for certification. Other factors that can contribute to the amount of time certification takes are the size of the organization, the scope of the certification, and the number of facilities being certified and their location.

What is a pre-assessment?

Pre-assessment is an option offered by most CBs to help an organization determine its readiness for the certification audit. Other terms for pre-assessment are pre-audit and trial

audit. Pre-assessments offer the opportunity for a “no-risk-of-failure” audit and the experience of a third-party audit.

During a pre-assessment, the audit team evaluates all applicable management systems elements for approach, implementation, and the amount of evidence available. Audit findings are limited to weak implementation or failure to address an element or requirement. These are described in a written pre-assessment report; formal nonconformance reports may not be issued.

Accredited CBs are not permitted to offer advice on how to resolve nonconformances, as this would be considered consulting. Accredited CBs are not allowed to offer certification and consulting together. ANAB limits the number and frequency of pre-assessments to prevent the perception of consulting or advice giving.

Who does a CB interview during the course of the certification process?

The CB’s audit team can interview anyone from the chief executive officer to line workers and operators. This interview process is typically done on a sampling basis and covers a wide range of personnel from diverse divisions and departments.

How helpful may a management systems CB be to the success of an organization’s certification effort?

A management systems CB may not engage in advice-giving or consulting with the organization it is certifying. One of the conditions of accreditation is that certification and consulting may not be marketed together, nor may it be said or implied that certification may be easier as a result of using the services of a particular consultant. Persons engaged in both certification assessment and consulting for the same organization must separate these activities by at least two years of time. ANAB considers private or tailored training to be consulting if it is offered by a CB (or related body) to an organization being certified.

How much does management systems certification cost?

The cost of certification depends on a variety of factors including but not limited to the amount of time that the process takes, which is based in part on the size of the organization, the scope of the certification, and the number of facilities being certified and their location.

Other factors may also come into play. For example, whether an organization seeking ISO 14001 certification already has an ISO 9001 system in place and whether that system is registered may have an impact on the cost.

ANAB provides accreditation, not certification. We suggest you contact an [ANAB-accredited certification body](#), as they will be able to provide more specific information about the cost of certification for your organization.

Must management systems certification be periodically renewed?

Yes. The process includes annual surveillance audits and a periodic re-assessment. The two most common processes for surveillance audits are one surveillance audit annually or two surveillance audits annually at approximately six-month intervals. The total number of audits days annually is usually the same in either case, as this is established by IAF Guidance, and should total about one-third of the days required for the initial audit.

A re-assessment audit is also required. Normally this occurs in the third year of a certification cycle, with an audit duration of about two-thirds the number of days required for the initial audit; this is also established by IAF Guidance.

IAF guidance allows flexibility in the frequency of the audits and audit duration. The CB is responsible for assuring that the surveillance and re-assessment program is sufficient to verify continued conformance of a certified organization. ANAB requires the CB to have documented justification for any variation from the surveillance and re-assessment audit frequency and duration specified in the IAF Guidance.

It's important to note that some CBs issue certificates for three years with an expiration date. Others do not include an expiration date on the certificate and it is considered valid unless withdrawn. Both of these are acceptable options. In all cases with either system, if there is any question about the validity of a current certificate, one should contact the CB directly.

What happens if a CB finds nonconformities at a facility during the management systems certification audit?

There are several degrees of nonconformities, or NCRs. Typically, these are minor and major NCRs, and possibly also observations.

An observation is just that: an observation. Not a violation of the criteria, an observation is typically an identification that there may be a better way to monitor a process or document a procedure. It's not a problem, just a potential for improvement – a way to avoid future problems.

A minor nonconformance by itself doesn't indicate a systemic problem with the management system. It is typically an isolated or random incident. An example would be not having the most current version of a document available at an operator's station; the updated version exists but a copy of it is not available for the operator's use and the operator is using an outdated procedure. Other examples are a form without a document control number on it, a micrometer that is out of calibration, and an internal audit finding with an overdue corrective action request pending.

A major nonconformance occurs when one of the criteria of the standard has not been addressed or has not been addressed adequately. Typically, major NCRs occur when an organization has not addressed all of the requirements of a specific element or criterion. They also occur when an organization has put a process or procedure in place but has not implemented it or cannot yet demonstrate effective implementation.

A major nonconformance can also occur if a significant number of minor NCRs in a given activity or against a given element point to a systemic failure. For example, a minor nonconformance in document control may not in itself constitute a significant problem. But if several problems (the audit team leader judges what constitutes a significant number) are found with document control, then this points to a larger systemic document control problem and would constitute a major nonconformance.

If the CB discovers a regulatory noncompliance during an EMS certification audit, does the organization fail the audit?

A regulatory noncompliance won't necessarily result in failing the certification audit. CBs recognize that all facilities will be out of regulatory compliance at one time or another. The CB's audit team will look at how an organization handled the situation. Did the system identify how to address the noncompliance? Was it reported quickly and properly? Was a root-cause analysis done to prevent future violations? How the environmental management system responded to the noncompliance will determine whether an organization passes the certification audit.

What is IAAR?

The [Independent Association of Accredited Registrars \(IAAR\)](#) is an association of accredited management systems CBs operating in North America. IAAR actively promotes the establishment and maintenance of effective management systems in companies through the use of accredited certification. ANAB representatives play an active role in IAAR activities.

Greenhouse Gas Validation/Verification Bodies

- [What is the purpose of becoming a greenhouse gas validation/verification body \(V/VB\)?](#)
- [How do I learn more about how to become a V/VB?](#)
- [What's the cost to become an ANAB accredited GHG V/VB?](#)
- [What steps does the accreditation process follow and how long does it take to achieve accreditation?](#)
- [Is a witness assessment required for accreditation and is a V/VB applying for ANAB Accreditation required to complete a witness assessment for each scope that it has applied for?](#)

What is the purpose of becoming a greenhouse gas validation/verification body (V/VB)?

The purpose of becoming an ANSAB accredited V/VB is to demonstrate conformance with ISO 14065:2007, Greenhouse gases – Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition.

The purpose of GHG validation or verification accreditation is to give confidence to parties that rely on a GHG assertion or claim (for example, regulators or investors) that the V/VBs

providing the declarations are competent to do so, and have systems in place to manage impartiality and to provide the required level of assurance on a consistent basis.

ISO 14065 provides requirements for bodies that undertake GHG validation or verification using ISO 14064 or other relevant standards or specifications. The objectives of the ISO 14064 and ISO 14065 standards are to:

- Develop flexible, regime-neutral tools for use in voluntary or regulatory GHG schemes.
- Promote and harmonize best practice.
- Support the environmental integrity of GHG assertions.
- Assist organizations to manage GHG-related opportunities and risks.
- Support the development of GHG programs and markets.

ANAB provides accreditation to V/VBs that seek to provide verification for reporters and projects for the following GHG programs:

- [Alberta Technology Innovation and Emissions Reduction Regulation](#)
- [American Carbon Registry](#)
- [Architecture for REDD+ Transactions, The REDD+ Environmental Excellence Standard](#)
- [British Columbia Greenhouse Gas Emission Reporting Regulation](#)
- [British Columbia Greenhouse Gas Emission Control Regulation](#)
- [Carbon Offsetting and Reduction Scheme for International Aviation \(CORSA\)](#)
- [Climate Action Reserve](#)
- [Colorado Air Quality Control Commission Recovered Methane Regulation](#)
- [Environment and Climate Change Canada Output-Based Pricing System](#)
- [Environment and Climate Change Canada Clean Fuel Regulations](#)
- [Gold Standard Foundation](#)

- [Newfoundland and Labrador Regulation 14/17](#)
- [Ontario Regulation O. Reg. 390/18](#)
- [Oregon Department of Environmental Quality Greenhouse Gas Reporting Program](#)
- [Province of Nova Scotia, Greenhouse Gas Emission Regulations](#)
- [Province of Saskatchewan Reporting Regulations](#)
- [Quebec Regulation Q-2, r.15 Reporting Regulation](#)
- [Quebec Regulation Q-2, r.46.1 Cap & Trade Regulation](#)
- [Regional Greenhouse Gas Initiative*](#)
- [The Climate Registry](#)
- [Verra's Verified Carbon Standard](#)
- [World Bank Forest Carbon Partnership Facility](#)

*Offsets only and subject to state requirements for verifier recognition

How do I learn more about how to become a V/VB?

Organizations interested in developing validation/verification programs can find more information through the following sources in addition to the GHG program links provided above (this is not intended to provide a complete list of references nor does it imply ANSI endorsement of the services provided by the organizations listed below):

- [GHG Management Institute](#)
- [Canadian Standards Association](#)
- [Trinity Consultants](#)
- [The WRI/WBCSD Greenhouse Gas Protocol](#)
- [Relevant ISO standards including ISO 14064 and ISO 14065](#)

What's the cost to become an ANAB accredited GHG V/VB?

Please [contact us for a quote](#).

What steps does the accreditation process follow and how long does it take to achieve accreditation?

The detailed steps of accreditation are listed [here](#).

The amount of time that it takes for a V/VB to complete the accreditation process depends on a number of factors, such as:

- Scope of validation/verification services for which the applicant body seeks accreditation.
- The V/VB's understanding and implementation of the requirements of ISO 14065:2007, ISO 14064-3:2006, and the requirements of the relevant GHG protocols or registries for which the applicant seeks accreditation.

On average, the process takes approximately one year to complete. However, many organizations achieve accreditation in less than six months.

Is a witness assessment required for accreditation and is a V/VB applying for ANAB Accreditation required to complete a witness assessment for each scope that it has applied for?

A witness assessment (ANSI observation of V/VB carrying out third-party validation/verification of GHG assertion) is required as a component of the accreditation process. The purpose of the witness assessment is to determine that the V/VB understands and is implementing its verification procedures as defined by ISO 14065:2007, ISO 14064-3:2006, the relevant GHG program or registry requirements, as well as the applicant's own internal procedures and processes for conducting GHG validation/verification.

A witness assessment for project verification will not serve as satisfactory completion of a witness assessment for the purposes of attaining verification as a inventory verifier and vice

versa. In addition, for project validation and verification, multiple witness assessments may be required depending on the scope of the application. Witnesses for project validation will count toward accreditation for project verification.

For more information, please see [GHG-PR-706: ANSI GHG Validation and Verification Body Accreditation Scoping Policy](#).

Questions can be addressed to:

Ann Howard

Senior Director, Validation and Verification

202-331-3620

Personnel Credentialing

- [What's the difference between certification and certificate?](#)
- [Can a certification body offer training or educational programs ?](#)
- [Can a new certification program apply for ANAB accreditation?](#)
- [What's the time frame to close a nonconformity?](#)
- [What happens if a CB has applied for accreditation for five certification programs \(schemes\) and two of them have nonconformities?](#)
- [How do I find information about food handler certificates?](#)
- [Whom do I contact for more information?](#)

What's the difference between certification and certificate?

Certification and certificate are distinct terms, yet they are often used synonymously. Certification is a more comprehensive and necessarily includes an assessment of an

individual's knowledge, skills, and abilities based on a body of knowledge pertaining to a profession or occupation. In comparison, certificate programs emphasize learning events and coursework completion. Certification is valid for a specific time period and involves recertification at the expiry of the stated period. Certificates are generally issued for life!

Can a certification body offer training or educational programs?

A certification body can offer training/educational programs, however, it needs to demonstrate that there are clear firewalls between training and certification.

Can a new certification program apply for ANAB accreditation?

There is no ANAB policy that prevents a new certification program from applying for ANAB accreditation. However, to demonstrate that the examinations are fair, valid, and reliable, the certification body needs to have adequate data collected from test takers to conduct statistical analyses.

What's the time frame to close a nonconformity?

All accredited CBs must post a corrective action plan within 30 days and close the nonconformity within 90 days.

What happens if a CB has applied for accreditation for five certification programs (schemes) and two of them have nonconformities?

The certification body shall be accredited only when all the non-conformities relating are closed. In the above case, if two certification schemes have non-conformities, then the certification body will not be accredited. One way to address this issue is through scope reduction/expansion.

How do I find information about food handler certificates?

In the food-handling arena, ANAB accredits two types of credentialing bodies: (1) the [ANAB-CFP program for food protection managers](#) based on the Conference for Food Protection (CFP) standard and (2) organizations providing [food-handler training courses and certificates](#).

Whom do I contact for more information?

Vijay Krishna, Vice President, Credentialing Programs
202-331-3614

Product Certification

- [What is product certification?](#)
- [How is ANAB involved in assessing the conformity of products to standards?](#)
- [What are the advantages for product certification programs that are accredited by ANAB?](#)
- [Who recognizes ANAB's accreditation program?](#)
- [How does my organization apply for accreditation?](#)
- [How does my organization apply for accreditation?](#)
- [Whom do I contact for more information?](#)

What is product certification?

Certification attests that a product meets specified standards, especially for quality or safety and health issues.

A certification mark provides unique credibility when granted by an independent third party that is accredited under a globally-recognized process. A certification mark is designed to resemble the ANSI logo, but carries a distinct message that a product or personnel certification program has been accredited by ANSI.

How is ANAB involved in assessing the conformity of products to standards?

ANAB does not conduct tests or technical evaluations of products, systems or services; rather, ANAB provides accreditation services.

ANAB accreditation recognizes the competence of bodies to carry out product or personnel certification in accordance with requirements defined in international standards. ANAB administers more than [30 distinct product accreditation program scopes](#) – ranging from appliances and bottled water to plumbing products and fresh produce.

What are the advantages for product certification programs that are accredited by ANAB?

Ultimately, the marketplace and customers of this service measure the beneficial value of accreditation.

However, ANAB provides accreditation for product certification programs in accordance with international standards (ISO/IEC 17065). ANAB is also involved in several international and regional arrangements for mutual recognition of equivalency across boundaries. As a result, many of the ANAB-accredited certification programs are recognized as equivalent to commensurate programs around the world.

Businesses whose products earn a certification mark from a product certification program that has been accredited by ANAB will discover that they have more freedom to compete in many markets around the world, often without the requirement for a duplicative test or mark. Doors open to new markets, products compete on a level playing field, and regulatory costs can be minimized.

Who recognizes ANAB's accreditation program?

Domestically, ANAB is recognized by the National Institute of Standards and Technology (NIST) as an accreditor of Telecommunication Certification Bodies by the National Voluntary Conformity Assessment System Education Program (NVCASE) in compliance with requirements of the Federal Communications Commission (FCC).

Internationally, in accordance with phase II of the Asia-Pacific Economic Cooperation (APEC) Mutual Recognition Arrangement on Telecommunication Equipment, ANSI has been recognized by Industry Canada as the accreditor of U.S. "certification bodies" for approving

telecommunications equipment for compliance with Canadian requirements. In addition, the United State has implemented the first phase of the agreement, which allows test results from approved U.S. labs to be considered as evidence of compliance, with three other APEC economies: Australia, Singapore and Chinese Taipei (Taiwan).

[More information about ANAB recognition](#)

ANAB is also recognized as an accreditor of bodies certifying fresh fruits and vegetables by the Euro-Retailer Produce Good Agricultural Practices.

How does my organization apply for accreditation?

The first step in the ANAB application procedure is submission of a letter of application by the certification body. The purpose is to enable ANAB to judge the eligibility of the certification program for accreditation. A comprehensive description of the application process can be found in the [How to Apply](#) section of this website.

Whom do I contact for more information?

To submit the letter of application or for more information, please contact:

Reinaldo Figueiredo

Vice President, Conformity Assessment Strategy
202-331-3611

Nikki Jackson

Senior Director, Product Certification Accreditation
202-331-3623

OF FURTHER INTEREST

 MARCH 1, 2024

Communication preferences

FULL STORY

FEBRUARY 9, 2024

Private Training

FULL STORY

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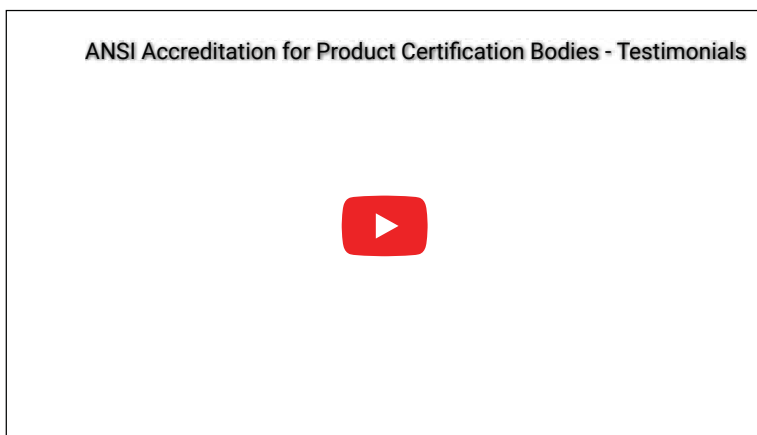


EXHIBIT M

Product Certification Accreditation Program

Product Certification Programs

The American National Standards Institute (ANSI) provides accreditation in accordance with ISO/IEC 17065 for product certification programs to ensure that the marketplace can gain confidence for their activities. The program is overseen by the ANSI Product Certification Accreditation Committee (ACC), established by the ANSI Board of Directors. The responsibilities of the committee include approving the key policy documents, reviewing the process of evaluation, accreditation decisions, and monitoring/auditing programs.



★ In addition, ANSI and the ANSI National Accreditation Board (ANAB) offer a [joint accreditation program for laboratory and inspection bodies](#) under ISO/IEC 17065, ISO/IEC 17025, and ISO/IEC 17020. ANSI allows voluntary agreements for the Mutual Acceptance of [Test Data](#).

ANSI's accreditation program for product certification programs includes [sector programs for specific certifiers](#) and covers a multitude of areas as defined by the [ICS Codes](#), including:

- Appliances
- Automotive lifting devices
- Bottled water and packaged ice
- Building Products
- Building and institutional furniture
- Class II biohazard cabinetry
- Drinking water additives
- Drinking water treatment units
- Electric appliances and accessories
- Electrical products
- Fenestration Products
- Food service equipment
- Gas appliances and accessories
- Gas and Oil products
- Waste Water Treatment
- Manufactured products and recreational vehicle plumbing products
- Marine Products
- Personal protective and safety equipment
- Plastic piping systems and components

- Plumbing products
- Recreational and Occupational Health and Safety/Personal protective clothing
- Sanitation products
- Sealed insulating glass
- Solar energy
- Sustainable Forestry Initiative Chain of Custody (SFI CoC and PEFC CoC)
- Swimming pools, spas and components
- Treated wood
- Wastewater treatment units
- Windows and doors
- Wood Products

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	ANAB Terms and Conditions for Accreditation		

EXHIBIT N



ICS edition 7

A photograph of a worker in a white shirt and dark pants standing on a blue metal ladder in a warehouse. The worker is reaching up to a high shelf filled with cardboard boxes. The shelves are arranged in a long aisle, and the boxes are stacked neatly. The lighting is bright, and the overall scene is a typical industrial storage environment.

International Classification
for Standards

International Classification **for Standards**

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Introduction

1 - Purpose of the ICS

1.1 The ICS (International Classification for Standards) is intended to serve as a structure for catalogues of international, regional and national standards and other normative documents, and as a basis for standing-order systems for international, regional and national standards. It may also be used for classifying standards and normative documents in databases, libraries, etc.

1.2 The ICS should facilitate the harmonization of information and ordering tools such as catalogues, selective lists, bibliographies, and databases on magnetic and optical media, thus promoting the world-wide dissemination of international, regional and national standards and other normative documents.

2 - Description of the ICS

2.1 For the purposes of this document, the general term “standard” is applied to all international, regional and national normative documents, such as standards, technical reports, standardized profiles, technical specifications, technical regulations, guides, codes of practice, technology trends assessments, etc. and the drafts of such documents.

2.2 The ICS is a hierarchical classification which consists of three levels.

2.3 Level 1 covers 40 fields of activity in standardization, e.g. road vehicle engineering, agriculture, metallurgy. Each field has a two-digit notation, e.g.

43 ROAD VEHICLE ENGINEERING

2.4 The fields are subdivided into 392 groups (level 2). The notation of a group consists of the field notation and a three-digit group number, separated by a point, e.g.

43.040 Road vehicle systems

2.5 144 of the 392 groups are further divided into 909 sub-groups (level 3). The notation of a sub-group consists of the group notation and a two-digit number, separated by a point, e.g.

43.040.20 *Lighting, signalling and warning devices*

2.6 A number of group and sub-group titles are followed by scope notes and/or reference notes, indicated by asterisks and printed in italics in the ICS. A scope note, as a rule, lists subjects covered by a given group/sub-group or defines the subject of a given group/sub-group. A reference note refers to a subject, related to a given group/sub-group, which is covered by another group/sub-group.

2.7 All groups divided into sub-groups contain, with a few exceptions, a sub-group which covers the complete subject of the respective group. Such general subject sub-groups have notations terminating with “.01”. For example, the group

07.100 *Microbiology*

contains as a first sub-group

07.100.01 *Microbiology in general*

which shall include standards covering the subject of microbiology in general, e.g. the standard

ISO 21528-1:2004, Microbiology of food and animal feeding stuffs – Horizontal methods for the detection and enumeration of Enterobacteriaceae – Part 1: Detection and enumeration by MPN technique with pre-enrichment

while standards covering medical microbiology, microbiology of water, food microbiology or cosmetics microbiology shall be included respectively in other specific sub-groups: 07.100.10, 07.100.20, 07.100.30 or 07.100.40.

2.8 Most of the groups divided into sub-groups contain a sub-group having the notation terminating with “.99”. Such sub-groups include standards on subjects which do not correspond either to the subjects of the general sub-groups or to the subjects of the specific sub-groups of the respective groups. For example, the subject of the standard

ISO 10945:1994, Hydraulic fluid power – Gas-loaded accumulators – Dimensions of gas ports

does not correspond either to the subject of the sub-group

23.100.01 *Fluid power systems in general*

or to the specific subjects of the sub-groups

23.100.10 *Pumps and motors*

23.100.20 *Cylinders*

23.100.40 *Piping and couplings*

23.100.50 *Control components*

23.100.60 *Filters, seals and contamination of fluids*

In this case, it shall be included in the sub-group

23.100.99 *Other fluid power system components*

The above rule does not apply in the ICS if all standards related to a group can be included either in the general sub-group or in the specific sub-groups.

For example, the group

21.100 *Bearings*

contains the general subject sub-group

21.100.01 *Bearings in general*

and specific sub-groups

21.100.10 *Plain bearings*

21.100.20 *Rolling bearings*

The group does not contain a sub-group

21.100.99 *Other bearings*

since all bearings belong only to two types of bearings : plain bearings and rolling bearings.

3 - Rules for the use of the ICS

3.1 The latest edition of the ICS with the subsequent issues of the ICS Update should be used for indexing standards and other normative documents and their drafts. Before indexing standards for the first time, the indexer should first carefully study the present rules and the ICS structure.

3.2 Standards should be classified according to their subjects. The indexer should first identify the appropriate field for a given subject, then allocate the appropriate group notation, and, further, the sub-group's notation if the group is subdivided. For example, the standard *ISO 3412:1992, Road vehicles – Screened and waterproof spark-plugs and their connections – Types 1A and 1B*

belongs to the field

43 ROAD VEHICLE ENGINEERING

The appropriate group within the field is

43.060 Internal combustion engines for road vehicles

and the appropriate sub-group within the group is

43.060.50 *Electrical equipment. Control systems*

If the field of application of a standard is not clear from its content, indexers may take into account the scopes of the relevant technical committee, subcommittee and working group responsible for the development of the standard.

3.3 The alphabetical index of the ICS may be used as a supplementary tool for identifying the appropriate field, group, sub-group, but the notations found in the index shall be carefully verified against the systematic table. The reason is that only the systematic table contains the full information relating to a group notation, such as its title, the field to which it belongs, the subdivision into sub-groups, sometimes the scope note, and the reference note(s) showing its relationship with other group(s) or sub-group(s). Otherwise errors in indexing may occur.

3.4 It is recommended to use all levels available for classifying a given standard. For example, the standards

ISO 5358:1992, Anaesthetic machines for use with humans

ISO 7864:1993, Sterile hypodermic needles for single use

ISO 7740:1985, Instruments for surgery – Scalpels with detachable blades – Fitting dimensions

should be classified respectively in sub-groups 11.040.10, 11.040.25 and 11.040.30 (level 3); it is not recommended to allocate notation 11.040 (level 2) to the above standards since it may create difficulties in the exchange of ICS data between databases and will impede application of the ICS in multinational information systems.

3.5 Standards classified according to this classification may be included in more than one group or sub-group; e.g. the standard

ISO 7686:2005, Plastics pipes and fittings – Determination of opacity

shall be included in the two sub-groups

23.040.20 *Plastics pipes*

23.040.45 *Plastics fittings*

while the standard

ISO 8159:1987, Textiles – Morphology of fibres and yarns – Vocabulary

shall be included in the three sub-groups

01.040.59 *Textile and leather technology (Vocabularies)*

59.060.01 *Textile fibres in general*

59.080.20 *Yarns*

However, it is recommended to avoid the allocation of more than four notations to one document.

3.6 Standards included in the groups

01.040 **Vocabularies**

01.060 **Quantities and units**

01.070 **Colour coding**

01.075 **Character symbols**

and the sub-groups

01.080.20 *Graphical symbols for use on specific equipment*

01.080.30 *Graphical symbols for use on mechanical engineering and construction drawings, diagrams, plans, maps and in other technical product documentation*

01.080.40 *Graphical symbols for use on electrical and electronics engineering drawings, diagrams, charts and in relevant technical product documentation*

01.080.50 *Graphical symbols for use on information technology and telecommunications technical drawings and in relevant technical product documentation*

17.140.20 *Noise emitted by machines and equipment*

17.140.30 *Noise emitted by means of transport*

shall also be included in other groups and/or sub-groups according to their subjects; e.g. the standard

ISO 1942:2009, Dentistry – Vocabulary

shall be included in the two sub-groups

01.040.11 *Health care technology (Vocabularies)*

11.060.01 *Dentistry in general*

while the standard

ISO 6405-1:2004, Earth-moving machinery – Symbols for operator controls and other displays – Part 1: Common symbols

shall be included both in the sub-group

01.080.20 *Graphical symbols for use on specific equipment*

and in the group

53.100 Earth-moving machinery

3.7 A standard containing definitions which apply only for the purpose of that standard shall not be classified into the group

01.040 Vocabularies

3.8 Amendments, addenda and technical corrigenda to a standard shall have the same notations as the standard itself.

3.9 Standards for systems, components, spare parts and materials used for specific equipment, machines and installations should be classified in the respective groups and sub-groups containing standards for the equipment, machines and installations if the ICS does not contain groups or sub-groups specially designated for classifying the relevant systems, components, spare parts and materials. For example, standard

ISO 5696:1984, Trailed agricultural vehicles – Brakes and braking devices – Laboratory test method

should be included in the sub-group

65.060.10 *Agricultural tractors and trailed vehicles*

since the ICS does not contain a group/sub-group for braking systems of agricultural machinery, while the standard

ISO 4251-1:2005, Tyres (ply rating marked series) and rims for agricultural tractors and machines – Part 1: Tyre designation and dimensions, and approved rim contours

should be included in the sub-group

83.160.30 *Tyres for agricultural machinery*

3.10 Where a group is further subdivided into sub-groups, only the notations of the sub-groups shall be allocated to standards, e.g. the standard

ISO 4254-1:2013, Agricultural machinery – Safety – Part 1: General requirements

shall be classified under the title of the sub-group

65.060.01 *Agricultural machines and equipment in general*

and not under the title of the group

65.060 Agricultural machines, implements and equipment

3.11 If the subject of a standard covers two or more sub-groups within a group which contains only these sub-groups plus sub-groups with notations terminating with “.01” and/or “.99”, i.e. the subject covers all of the specific sub-groups, that standard shall be classified under the sub-group which has the notation terminating with “.01”, e.g. the standard

ISO 4829-1:1986, Steel and cast iron – Determination of total silicon content – Reduced molybdosilicate spectrophotometric method – Part 1: Silicon contents between 0.05 and 1.0 %

shall be classified under the title of the sub-group

77.080.01 *Ferrous metals in general*

and not under the titles of the sub-groups

77.080.10 *Irons*

77.080.20 *Steels*

since irons and steels completely cover the ferrous metals subject.

Similarly, the standard

ISO 6632:1981, Fruits, vegetables and derived products – Determination of volatile acidity

shall be classified under the title of the sub-group

67.080.01 *Fruits, vegetables and derived products in general*

and not under the title of the sub-groups

67.080.10 *Fruits and derived products*

67.080.20 *Vegetables and derived products*

since

67.080 Fruits. Vegetables

contains only

67.080.01 *Fruits, vegetables and derived products in general*

67.080.10 *Fruits and derived products*

67.080.20 *Vegetables and derived products*

3.12 A sub-group, or a group which does not have sub-groups, may be further subdivided by the user into respectively either several units (level 4) or new sub-groups (level 3). For the purpose of distinguishing subdivisions (units or new sub-groups) from those given in the classification, new notations shall be created using a hyphen as a separator, followed by a two-digit number; e.g. the group

53.100 Earth-moving machinery

may be subdivided into the following new sub-groups

53.100-01 *Earth-moving machinery in general*

53.100-10 *Tractors*

53.100-20 *Excavators*

53.100-30 *Loaders*

53.100-40 *Graders*

53.100-99 *Other earth-moving machinery*

However, such subdivisions should be used very restrictively and avoided wherever possible. The preferred solution should be to address the question to the ISO Central Secretariat which is responsible for the maintenance and development of the ICS.

3.13 A semicolon should be used for separating notations in printed documents. To provide consistency in the presentation of notations, they should be sorted in ascending numerical order, e.g. ICS notations for ISO 8159:1987 should be indicated as follows: ICS 01.040.59; 59.060.01; 59.080.20.

For data exchange, the rules set up in the second edition (1998) of the *ISONET Manual* should be used.

3.14 Fields

21 MECHANICAL SYSTEMS AND COMPONENTS FOR GENERAL USE

23 FLUID SYSTEMS AND COMPONENTS FOR GENERAL USE

and also the fields and the groups for which the scopes contain an indication that this field or group includes standards for general use, e.g.

13.110 Safety of machinery

*This group includes standards only for general use

shall contain only standards for general use which may be applied by different industries. For example, the standard

ISO 10317:2008, Rolling bearings – Tapered roller bearings – Designation system

which may be applied by different industries, shall be included in the sub-group

21.100.20 *Rolling bearings*

while standards

ISO 6045:1987, Shipbuilding and marine structures – Bearings for derrick goosenecks – Assemblies and components

and

ISO 14204:1998, Aerospace – Airframe ball bearings, double-row, rigid, diameter series 0 – Metric series

which are designated for application by specific industries, shall be included respectively in the sub-groups related to those industries, namely

47.020.40 *Lifting and cargo handling equipment*

and

49.035 *Components for aerospace construction*

The standard

ISO 6259-1:1997, Thermoplastics pipes – Determination of tensile properties – Part 1: General test method

which is applied for general purposes and may be used by different industries, shall be included in the sub-group

23.040.20 *Plastic pipes*

while the standard

ISO 6993-1:2006, Buried, high-impact poly(vinyl chloride) (PVC-HI) piping systems for the supply of gaseous fuels – Part 1: Pipes for a maximum operating pressure of 1 bar (100 kPa)

which is designated for specific purposes of natural gas handling, shall be included respectively in the group related to those specific purposes (from the point of view of using the product) and in the sub-group related to the relevant type of product (from the point of view of manufacturing the product), namely

75.200 *Petroleum products and natural gas handling equipment*

and

83.140.30 *Plastic pipes and fittings for non fluid use*

The standard

ISO 12100:2010, Safety of machinery – General principles for design – Risk assessment and risk reduction

shall be included in the group

13.110 Safety of machinery

while the standard

ISO 4254-1:2013, Agricultural machinery– Safety – Part 1: General requirements

shall not be included in the above group since it is designated for use by only one industry, the agricultural machinery engineering sector; the standard shall be included in the sub-group

65.060.01 *Agricultural machines and equipment in general*

3.15 If a group/sub-group has a reference note to another group/sub-group, the standards related to the subject indicated in the relevant reference note shall be classified in the referenced group/sub-group. For example, the sub-group

81.060.20 *Ceramic products*

contains the reference note

*Sanitary ceramic products, see 91.140.70

therefore, standards for sanitary ceramic products shall be classified into the sub-group

91.140.70 *Sanitary installations*

and not into the sub-group

81.060.20 *Ceramic products*

3.16 If an international standard is adopted as a regional and/or national standard, the regional and/or national standard shall have the notation(s) allocated to the international standard. Similarly, if a regional standard is adopted as a national standard, the latter shall have the notation(s) allocated to the regional standard.

3.17 In general, to provide worldwide consistency in indexing, indexers should be guided by the practices of allocation of ICS notations applied for international standards (in the first place) and regional standards.

3.18 Identified errors in indexing due to misallocation of ICS notations, transposing of figures in ICS notations, typographical errors, etc. should be notified to the organization concerned.

4 - Updating of the ICS

4.1 The classification is updated according to needs. Any user may submit proposals for modifications and/or additions to the ICS. Such proposals should be sent to the ISO Central Secretariat at the following address:

International Organization for Standardization

ISO Central Secretariat
BIBC II
Chemin de Blandonnet 8
CP 401
1214 Vernier, Geneva
Switzerland
E-mail: central@iso.org
Tel.: +41 22 749 01 11

4.2 All proposals received will be considered and their authors will be informed on any follow-up action.

5 - How to use the ICS index

5.1 The ICS index is presented in a KWIC (key-word-in-context) form. The titles of all fields/groups/sub-groups, scope notes and reference notes (when they do not repeat the titles of corresponding fields/groups/sub-groups) appear under all words (keywords) which they contain with the exception of stop-words. These are words which are not significant for search purposes. They include prepositions and such words as “and”, “some”, “other”, “any”, “device”, “standard”, “designation”, “sampling” and so on.

5.2 The keywords (printed in bold characters) are arranged in alphabetical order in a single column down the page.

5.3 Keywords are separated from their titles by a bullet symbol (•)

5.4 Notations of fields/groups/sub-groups are given at the left hand column. According to their numbers, corresponding fields/groups/sub-groups are easily identified in the systematic table of fields, groups and sub-groups.

6 - List of the ICS fields

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Systematic table of fields, groups and sub-groups

01

GENERALITIES. TERMINOLOGY. STANDARDIZATION. DOCUMENTATION

01.020 Terminology (principles and coordination)

*Including terminography

01.040 Vocabularies

*Standards included in this group shall also be included in other groups and/or sub-groups according to their subject

01.040.01 *Generalities. Terminology. Standardization. Documentation (Vocabularies)*

01.040.03 *Services. Company organization, management and quality. Administration. Transport. Sociology. (Vocabularies)*

01.040.07 *Natural and applied sciences (Vocabularies)*

01.040.11 *Health care technology (Vocabularies)*

01.040.13 *Environment. Health protection. Safety (Vocabularies)*

01.040.17 *Metrology and measurement. Physical phenomena (Vocabularies)*

01.040.19 *Testing (Vocabularies)*

01.040.21 *Mechanical systems and components for general use (Vocabularies)*

01.040.23 *Fluid systems and components for general use (Vocabularies)*

01.040.25 *Manufacturing engineering (Vocabularies)*

01.040.27 *Energy and heat transfer engineering (Vocabularies)*

01.040.29 *Electrical engineering (Vocabularies)*

01.040.31 *Electronics (Vocabularies)*

01.040.33 *Telecommunications. Audio and video engineering (Vocabularies)*

01.040.35 *Information technology (Vocabularies)*

01.040.37 *Image technology (Vocabularies)*

01.040.39 *Precision mechanics. Jewellery (Vocabularies)*

01.040.43 *Road vehicle engineering (Vocabularies)*

01.040.45 *Railway engineering (Vocabularies)*

- 01.040.47** *Shipbuilding and marine structures (Vocabularies)*
- 01.040.49** *Aircraft and space vehicle engineering (Vocabularies)*
- 01.040.53** *Materials handling equipment (Vocabularies)*
- 01.040.55** *Packaging and distribution of goods (Vocabularies)*
- 01.040.59** *Textile and leather technology (Vocabularies)*
- 01.040.61** *Clothing industry (Vocabularies)*
- 01.040.65** *Agriculture (Vocabularies)*
- 01.040.67** *Food technology (Vocabularies)*
- 01.040.71** *Chemical technology (Vocabularies)*
- 01.040.73** *Mining and minerals (Vocabularies)*
- 01.040.75** *Petroleum and related technologies (Vocabularies)*
- 01.040.77** *Metallurgy (Vocabularies)*
- 01.040.79** *Wood technology (Vocabularies)*
- 01.040.81** *Glass and ceramics industries (Vocabularies)*
- 01.040.83** *Rubber and plastics industries (Vocabularies)*
- 01.040.85** *Paper technology (Vocabularies)*
- 01.040.87** *Paint and colour industries (Vocabularies)*
- 01.040.91** *Construction materials and building (Vocabularies)*
- 01.040.93** *Civil engineering (Vocabularies)*
- 01.040.95** *Military Affairs. Military engineering. Weapons (Vocabularies)*
- 01.040.97** *Domestic and commercial equipment. Entertainment. Sports (Vocabularies)*

01.060 Quantities and units

*Standards included in this group shall also be included in other groups and/or sub-groups according to their subject

01.070 Colour coding

*Standards included in this group shall also be included in other groups and/or sub-groups according to their subject

*Safety colours in the context of graphical symbols, see 01.080.10

01.075 Character symbols

*Standards included in this group shall also be included in other groups and/or sub-groups according to their subject

01.080 Graphical symbols

01.080.01 *Graphical symbols in general*

01.080.10 *Public information symbols. Signs. Plates. Labels*

*Including safety signs, safety colours, etc.

01.080.20 *Graphical symbols for use on specific equipment*

*Standards included in this group shall also be included in other groups and/or sub-groups according to their subject

01.080.30 *Graphical symbols for use on mechanical engineering and construction drawings, diagrams, plans, maps and in relevant technical product documentation*

*Standards included in this group shall also be included in other groups and/or sub-groups according to their subject

01.080.40 *Graphical symbols for use on electrical and electronics engineering drawings, diagrams, charts and in relevant technical product documentation*

*Standards included in this group shall also be included in other groups and/or sub-groups according to their subject

01.080.50 *Graphical symbols for use on information technology and telecommunications technical drawings and in relevant technical product documentation*

*Standards included in this group shall also be included in other groups and/or sub-groups according to their subject

01.080.99 *Other graphical symbols*

01.100 Technical drawings

*Graphical symbols for use on technical drawings, see 01.080.30

*Computer-aided design, see 35.240.10

01.100.01 *Technical drawings in general*

01.100.20 *Mechanical engineering drawings*

01.100.25 *Electrical and electronics engineering drawings*

*Including electrical tables, diagrams and charts

01.100.27 *Technical drawings for telecommunications and information technology fields*

01.100.30 *Construction drawings*

*Including civil engineering drawings

01.100.40 *Drawing equipment*

01.100.99 *Other standards related to technical drawings*

01.110 Technical product documentation

*Including rules for preparation of user guides, manuals, product specifications, etc.

01.120 Standardization. General rules

*Including rules for the preparation of standards catalogues and management of technical documents

01.140 Information sciences. Publishing

*Information technology applications in information, documentation and publishing, see 35.240.30

01.140.10 *Writing and transliteration*

*Coded character sets for bibliographic information interchange, see 35.040.10

01.140.20 *Information sciences*

*Including documentation, librarianship and archive systems

01.140.30 *Documents in administration, commerce and industry*

- *Technical product documentation, see 01.110
- *Banking documents, see 03.060
- *Electronic data interchange (EDI), see 35.240.60

01.140.40 *Publishing*

- *Electronic publishing, see 35.240.30

03

SERVICES. COMPANY ORGANIZATION. MANAGEMENT AND QUALITY. ADMINISTRATION. TRANSPORT. SOCIOLOGY

03.020 Sociology. Demography

03.040 Labour. Employment

*Working environment, see 13.040.30 and 13.180

03.060 Finances. Banking. Monetary systems. Insurance

*Including personal financial planning

*Information technology applications in banking, see 35.240.40

03.080 Services

*Transport, see 03.220

*Postal services, see 03.240

03.080.01 *Services in general*

03.080.10 *Maintenance services. Facilities management*

*Including cleaning and pest control

*Sterilization and disinfection in health care, see 11.080

03.080.20 *Services for companies*

*Including publicity, advertising, professional services, recruitment services, management consultancy, outsourcing, etc.

*Outsourcing as part of a company organization, see 03.100.01

*Staff training and staff certification, see 03.100.30

03.080.30 *Services for consumers*

*Including hotels, restaurants, washing, cleaning, removals, funerals, real estate, vehicle repair and servicing, furniture removals, services for elderly, sheltered housing etc.

*Services for dementia care, assisted living, see 11.020.10

*Transport services and costs, see 03.220

*Consumer information, see 97.020

03.080.99 *Other services*

03.100 Company organization and management. Management systems

03.100.01 *Company organization and management in general*

- * Including legal aspects and risk management, societal security, outsourcing
- * Outsourcing as a business to business service, see 03.080.20
- * Management systems, see 03.100.70
- * Security and protection against crime, see 13.310

03.100.02 *Governance and ethics*

- * Including anti-bribery, anti-procurement fraud, corporate social responsibility

03.100.10 *Purchasing. Procurement. Logistics*

- * Including asset management, supply chain, etc.

03.100.20 *Trade. Commercial function. Marketing*

- * E-commerce, see 35.240.60

03.100.30 *Management of human resources*

- * Including staff training, staff responsibilities, staff qualifications and certification
- * Welders' qualifications, see 25.160.01

03.100.40 *Research and development*

- * Including project management, value analysis, etc.

03.100.50 *Production. Production management*

03.100.60 *Accountancy*

03.100.70 *Management systems*

- * Standards included in this sub-group shall also be included in other groups and/or sub-groups according to their subject
- * Including environmental management systems (EMS), road traffic management systems, energy management systems, health care management systems, etc.

03.100.99 *Other standards related to company organization and management*

03.120 Quality

03.120.01 *Quality in general*

- * Including general aspects related to reliability and maintainability

03.120.10 *Quality management and quality assurance*

- * Quality management systems, see 03.100.70

03.120.20 *Product and company certification. Conformity assessment*

- * Including laboratory accreditation and audit programmes and auditing

03.120.30 *Application of statistical methods*

03.120.99 *Other standards related to quality*

03.140 Patents. Intellectual property

03.160 Law. Administration

- * Including flags and associated symbols (emblems) of political and administrative entities, military flags, flags of organizations, etc.

- * This group includes standards for general use

03.180 Education

*E-learning, see 35.240.90

03.200 Leisure. Tourism

*Camping equipment, see 97.200.30

03.200.01 *Leisure and tourism in general*

*Including outdoor events management, tourist information offices, tourism services, hotels, etc.

03.200.10 *Adventure tourism*

03.200.99 *Other standards relating to leisure and tourism*

*Including recreational diving services

03.220 Transport

*Transport of dangerous goods, see 13.300

03.220.01 *Transport in general*

03.220.20 *Road transport*

*Including road transport services

*Road traffic management system, see 03.100.70

*Road traffic control equipment and installations, see 93.080.30

03.220.30 *Transport by rail*

*Including rail transport services

*Rail traffic control equipment and installations, see 93.100

03.220.40 *Transport by water*

*Including water transport services

*Water transport control equipment and installations, see 93.140

03.220.50 *Air transport*

*Including air transport services

*Air transport control equipment and installations, see 93.120

03.220.99 *Other forms of transport*

03.240 Postal services

*Including postal equipment, post-boxes and letter-boxes, etc.

07

NATURAL AND APPLIED SCIENCES

07.020 Mathematics

*Application of statistical methods in quality assurance, see 03.120.30

07.030 Physics. Chemistry

*This group includes standards in the field of physics and chemistry as natural sciences

*Applied physics, see 17

*Chemical technology, see 71

07.040 Astronomy. Geodesy. Geography

07.060 Geology. Meteorology. Hydrology

07.080 Biology. Botany. Zoology

*Including biotechnology

07.100 Microbiology

07.100.01 *Microbiology in general*

07.100.10 *Medical microbiology*

*Laboratory medicine, see 11.100

07.100.20 *Microbiology of water*

*Examination of biological properties of water, see 13.060.70

07.100.30 *Food microbiology*

*Including microbiology of animal feeding stuffs

*Animal feeding stuffs, see 65.120

*General methods of tests and analysis for food products, see 67.050

07.100.40 *Cosmetics microbiology*

07.100.99 *Other standards related to microbiology*

07.120 Nanotechnologies

07.140 Forensic science

11

HEALTH CARE TECHNOLOGY

11.020 Medical sciences and health care facilities in general

*Forensic science, see 07.140

11.020.01 *Quality and environmental management in health care*

*Including quality and environmental management in health care technology

*Health care management systems, see 03.100.70

*IT applications in health care technology, see 35.240.80

11.020.10 *Health care services in general*

*Including care homes, dementia care, assisted living, aesthetic surgery, chiropractic services, etc.

11.020.20 *Medical science*

*Including regenerative medicine, cell therapy, stratified medicine

11.020.99 *Other standards related to health care in general*

11.040 Medical equipment

11.040.01 *Medical equipment in general*

11.040.10 *Anaesthetic, respiratory and reanimation equipment*

*Including medical gas installations

11.040.20 *Transfusion, infusion and injection equipment*

*Including blood packs and containers for transfusion

*Syringes, needles and catheters, see 11.040.25

11.040.25 *Syringes, needles and catheters*

11.040.30 *Surgical instruments and materials*

*Including surgical dressings, sutures, etc.

11.040.40 *Implants for surgery, prosthetics and orthotics*

*Including pacemakers

*Ophthalmic implants, see 11.040.70

11.040.50 *Radiographic equipment*

*Including radiographic diagnostic and therapy equipment

*In vitro diagnostic systems, see 11.100.10

*Dental, medical and industrial radiographic films, see 37.040.25

11.040.55 *Diagnostic equipment*

*Including medical monitoring equipment, medical thermometers and related materials

11.040.60 *Therapy equipment*

11.040.70 *Ophthalmic equipment*

*Including ophthalmic implants, glasses, contact lenses and their cleaning products

11.040.99 *Other medical equipment*

11.060 Dentistry

11.060.01 *Dentistry in general*

11.060.10 *Dental materials*

11.060.15 *Dental implants*

*Including dentures

11.060.20 *Dental equipment*

*Dental radiographic films, see 37.040.25

*Toothbrushes and dental floss, see 97.170

11.060.25 *Dental instruments*

11.080 Sterilization and disinfection

11.080.01 *Sterilization and disinfection in general*

*Including sterilization methods, air quality of surgery rooms, etc.

11.080.10 *Sterilizing equipment*

11.080.20 *Disinfectants and antiseptics*

*Including indicators

*Chemicals for industrial and domestic disinfection purposes, see 71.100.35

11.080.30 *Sterilized packaging*

11.080.99 *Other standards related to sterilization and disinfection*

11.100 Laboratory medicine

11.100.01 *Laboratory medicine in general*

11.100.10 *In vitro diagnostic test systems*

11.100.20 *Biological evaluation of medical devices*

*Medical microbiology, see 07.100.10

11.100.30 *Analysis of blood and urine*

*Including doping control

11.100.99 *Other standards related to laboratory medicine*

11.120 Pharmaceuticals

11.120.01 *Pharmaceuticals in general*

11.120.10 *Medicaments*

*Including medical prescriptions and medicinal herbs

11.120.20 *Wound dressings and compresses*

11.120.99 *Other standards related to pharmaceuticals*

*Including equipment for pharmaceutical industry

11.140 Hospital equipment

*Including hospital beds, surgical tables, medical garments, medical gloves, containers for sharp disposal, etc.

11.160 First aid

*Including kits, equipment, facilities and medical transport for first aid

11.180 Aids for disabled or handicapped persons

*Including aids for elderly people

11.180.01 *Aids for disabled and handicapped persons in general*

11.180.10 *Aids and adaptation for moving*

*Including wheelchairs, walking sticks and lifting platforms

11.180.15 *Aids for deaf and hearing impaired people*

11.180.20 *Aids for incontinence and ostomy*

11.180.30 *Aids for blind or partially sighted people*

*Including Braille

*Glasses, contact lenses and their cleaning products, see 11.040.70

11.180.40 *Aids for drinking and eating*

11.180.99 *Other standards related to aids for disabled and handicapped people*

11.200 Birth control. Mechanical contraceptives

11.220 Veterinary medicine

*Including equipment specific to veterinary medicine

13

ENVIRONMENT. HEALTH PROTECTION. SAFETY

13.020 Environmental protection

*Energy efficiency, see 27.015

13.020.01 *Environment and environmental protection in general*

13.020.10 *Environmental management*

*Including certification and audit

*Environmental management systems (EMS), see 03.100.70

13.020.20 *Environmental economics. Sustainability*

*Standards included in this sub-group may also be included in other groups and/or subgroups according to their subjects

*Including responsible sourcing, procurement, sustainable development, sustainable events management, sustainable communities, smart urban infrastructure, biodiversity

13.020.30 *Environmental impact assessment*

*Including environmental risk management

13.020.40 *Pollution, pollution control and conservation*

*Including ecotoxicology and greenhouse gas emissions

13.020.50 *Ecolabelling*

13.020.55 *Biobased products*

13.020.60 *Product life-cycles*

*Including environmental footprint, carbon neutrality

13.020.70 *Environmental projects*

13.020.99 *Other standards related to environmental protection*

13.030 Wastes

*Standards for industrial and agricultural wastes should be classified under sub-groups according to their type

13.030.01 *Wastes in general*

13.030.10 *Solid wastes*

13.030.20 *Liquid wastes. Sludge*

*Sewage water disposal and treatment, see 13.060.30

13.030.30 *Special wastes*

* Including radioactive wastes, hospital wastes, carcasses, electrical, electronic equipment and other hazardous wastes

13.030.40 *Installations and equipment for waste disposal and treatment*

* Including street cleaning equipment, waste containers, incineration and compaction equipment, equipment for dumping of refuse, landfill sites, etc.

* Waste collection vehicles, see 43.160

* Waste chutes, see 91.140.70

* Food waste disposal units, see 97.040.50

13.030.50 *Recycling*

* Including relevant equipment

* motor vehicle recycling, see 43.020

13.030.99 *Other standards related to wastes*

* Including waste prevention

13.040 Air quality

13.040.01 *Air quality in general*

13.040.20 *Ambient atmospheres*

* Including indoor air

13.040.30 *Workplace atmospheres*

* Air quality of surgery rooms, see 11.080.01

13.040.35 *Cleanrooms and associated controlled environments*

13.040.40 *Stationary source emissions*

13.040.50 *Transport exhaust emissions*

13.040.99 *Other standards related to air quality*

13.060 Water quality

* Including toxicity, biodegradability, protection against pollution, related installations and equipment

* Standards for examination of water should be classified under sub-groups according to their type of water

13.060.01 *Water quality in general*

13.060.10 *Water of natural resources*

13.060.20 *Drinking water*

* Mineral water, see 67.160.20

* Chemicals for purification of water, see 71.100.80

* Drinking water supply systems, see 91.140.60

13.060.25 *Water for industrial use*

* Including water for commercial use: for swimming pools, fish breeding, etc.

13.060.30 *Sewage water*

* Including sewage water disposal and treatment

* Liquid wastes, see 13.030.20

* Drainage systems, see 91.140.80

* Sewage systems, see 93.030

13.060.45 *Examination of water in general*

*Including sampling

13.060.50 *Examination of water for chemical substances*

13.060.60 *Examination of physical properties of water*

13.060.70 *Examination of biological properties of water*

*Microbiology of water, see 07.100.20

13.060.99 *Other standards related to water quality*

13.080 Soil quality. Pedology

*Soil properties related to geotechnics, see 93.020

13.080.01 *Soil quality and pedology in general*

*Including pollution, erosion, degradation, etc.

13.080.05 *Examination of soils in general*

*Including sampling

13.080.10 *Chemical characteristics of soils*

13.080.20 *Physical properties of soils*

13.080.30 *Biological properties of soils*

13.080.40 *Hydrological properties of soils*

13.080.99 *Other standards related to soil quality*

*Including agricultural aspects related to soils and re-use of soil materials

13.100 Occupational safety. Industrial hygiene

*Protective clothing and equipment, see 13.340

*Workplace lighting, see 91.160.10

13.110 Safety of machinery

*This group includes standards for general use

13.120 Domestic safety

*Child safety, see 97.190

*Safety of toys, see 97.200.50

13.140 Noise with respect to human beings

*Including audiometry

*Hearing protectors, see 13.340.20

*Acoustics and acoustic measurements, see 17.140

13.160 Vibration and shock with respect to human beings

*Vibrations, shock and vibration measurements, see 17.160

13.180 Ergonomics

13.200 Accident and disaster control

- * Including emergency evacuations and emergency control systems
- * Seismic and vibration protection of buildings, see 91.120.25

13.220 Protection against fire

13.220.01 *Protection against fire in general*

- * Including fire safety

13.220.10 *Fire-fighting*

- * Including equipment and vehicles
- * Flameproof clothing, see 13.340.10

13.220.20 *Fire protection*

- * Including equipment

13.220.40 *Ignitability and burning behaviour of materials and products*

13.220.50 *Fire-resistance of building materials and elements*

13.220.99 *Other standards related to protection against fire*

13.230 Explosion protection

- * Electrical apparatus for explosive atmospheres, see 29.260.20
- * Explosives and pyrotechnics, see 71.100.30

13.240 Protection against excessive pressure

- * Including safety valves, bursting disc devices, etc.

13.260 Protection against electric shock. Live working

- * Including tools for working with voltages

13.280 Radiation protection

- * Including protection against radio-frequency radiation
- * Radiation measurements, see 17.240

13.300 Protection against dangerous goods

- * Including performance requirements for dangerous goods, their handling, storage, transportation, marking, labelling, etc.
- * Nuclear fissile materials, see 27.120.30
- * Explosives, see 71.100.30

13.310 Protection against crime

- * Including security services, security procedures, burglar alarm devices, burglary resisting materials and equipment, bullet resisting materials and equipment, anti-theft devices for vehicles, safes, strong rooms, etc.

13.320 Alarm and warning systems

- * Burglar alarm and warning systems, see 13.310
- * Warning devices for road vehicles, see 43.040.20

13.340 Protective equipment

- * Occupational safety, see 13.100

13.340.01 *Protective equipment in general*

13.340.10 *Protective clothing*

*Including flameproof clothing

13.340.20 *Head protective equipment*

*Including helmets, eye-protectors, hearing protectors, ear muffs, teeth protectors and hoods.

13.340.30 *Respiratory protective devices*

13.340.40 *Hand and arm protection*

*Including protective gloves, sleeves and mits

*Medical gloves, see 11.140

13.340.50 *Leg and foot protection*

*Including safety boots and shoes

13.340.60 *Protection against falling and slipping*

*Including safety ropes, harnesses and fall arrestors

*Mountaineering equipment, see 97.220.40

13.340.70 *Lifejackets, buoyancy aids and flotation devices*

13.340.99 *Other protective equipment*

17

METROLOGY AND MEASUREMENT. PHYSICAL PHENOMENA

17.020 Metrology and measurement in general

*Including measuring instruments in general, preferred numbers, standard measures, general aspects of reference materials, etc.

*Quantities and units, see 01.060

*Chemical reference materials, see 71.040.30

17.040 Linear and angular measurements

17.040.01 *Linear and angular measurements in general*

17.040.10 *Limits and fits*

17.040.20 *Properties of surfaces*

17.040.30 *Measuring instruments*

17.040.40 *Geometrical Product Specification (GPS)*

17.040.99 *Other standards related to linear and angular measurements*

17.060 Measurement of volume, mass, density, viscosity

*Including measuring instruments

*Volumetric measurements of petroleum products and natural gas, see 75.180.30

17.080 Measurement of time, velocity, acceleration, angular velocity

*Including measuring instruments

*Time-measuring instruments, see 39.040

17.100 Measurement of force, weight and pressure

*Including measuring and weighing instruments

17.120 Measurement of fluid flow

*Including measuring instruments and installations

17.120.01 *Measurement of fluid flow in general*

17.120.10 *Flow in closed conduits*

*Gas meters in buildings, see 91.140.40

*Water meters in buildings, see 91.140.60

17.120.20 *Flow in open channels*

*Including hydrometric determinations

17.140 Acoustics and acoustic measurements

* Including measuring instruments and testing equipment

* Noise with respect to human beings, see 13.140

* Acoustics in building, see 91.120.20

17.140.01 *Acoustic measurements and noise abatement in general*

* Including acoustic insulation

17.140.20 *Noise emitted by machines and equipment*

* Standards included in this group shall also be included in other groups and/or sub-groups according to their subject

17.140.30 *Noise emitted by means of transport*

* Including road noise, railway noise, harbour noise and airport noise

* Standards included in this group shall also be included in other groups and/or sub-groups according to their subject

17.140.50 *Electroacoustics*

* Including sound level meters

17.140.99 *Other standards related to acoustics*

17.160 Vibrations, shock and vibration measurements

* Including measuring instruments and installations

* Vibration and shock with respect to human beings, see 13.160

* Balancing and balancing machines, see 21.120.40

* Vibration protection of buildings, see 91.120.25

17.180 Optics and optical measurements

17.180.01 *Optics and optical measurements in general*

17.180.20 *Colours and measurement of light*

17.180.30 *Optical measuring instruments*

* Including spectrometers, geodetic instruments, etc.

* Ophthalmic optics and instruments, see 11.040.70

* Laser equipment, see 31.260

* Fibre optics, see 33.180

* Optical equipment, materials and components, see 37.020

* Photographic equipment lenses, see 37.040.10

17.180.99 *Other standards related to optics and optical measurements*

17.200 Thermodynamics and temperature measurements

17.200.01 *Thermodynamics in general*

17.200.10 *Heat. Calorimetry*

17.200.20 *Temperature-measuring instruments*

* Including thermostats

* Medical thermometers, see 11.040.55

17.200.99 *Other standards related to thermodynamics*

17.220 Electricity. Magnetism. Electrical and magnetic measurements

17.220.01 *Electricity. Magnetism. General aspects*

*Including electromagnetism

17.220.20 *Measurement of electrical and magnetic quantities*

*Including measuring instruments, instrument transformers

*Electric energy meters in buildings, see 91.140.50

17.220.99 *Other standards related to electricity and magnetism*

17.240 Radiation measurements

*Including dosimetry

*Radiation protection, see 13.280

19

TESTING

*This group includes standards for general use

*Analytical chemistry, see 71.040

19.020 Test conditions and procedures in general

19.040 Environmental testing

*Including testing equipment

19.060 Mechanical testing

*Including testing equipment

*Mechanical testing of metals, see 77.040.10

19.080 Electrical and electronic testing

*Including testing equipment

*Equipment for measuring electrical and magnetic quantities, see 17.220.20

19.100 Non-destructive testing

*Including testing equipment: industrial apparatus for X-ray and gamma radiography, penetrant flaw detectors, etc.

*Non-destructive testing of welded joints, see 25.160.40

*Industrial radiographic films, see 37.040.25

*Non-destructive testing of metals, see 77.040.20

19.120 Particle size analysis. Sieving

*Including test sieves and porosimetry

21

MECHANICAL SYSTEMS AND COMPONENTS FOR GENERAL USE

21.020 Characteristics and design of machines, apparatus, equipment

* Including reliability, dependability, maintainability, durability, etc.

* Safety of machinery, see 13.110

21.040 Screw threads

* Screw threads for aerospace construction, see 49.030.10

21.040.01 *Screw threads in general*

21.040.10 *Metric screw threads*

21.040.20 *Inch screw threads*

* Including Whitworth screw threads

* Pipe threads, see 21.040.30

21.040.30 *Special screw threads*

* Including miniature screw threads, pipe threads, etc.

21.060 Fasteners

* Fasteners related to surgery, prosthetics and orthotics, see 11.040.40

* Fasteners for aerospace construction, see 49.030

21.060.01 *Fasteners in general*

21.060.10 *Bolts, screws, studs*

21.060.20 *Nuts*

21.060.30 *Washers, locking elements*

21.060.40 *Rivets*

21.060.50 *Pins, nails*

21.060.60 *Rings, bushes, sleeves, collars*

21.060.70 *Clamps and staples*

21.060.99 *Other fasteners*

21.080 Hinges, eyelets and other articulated joints

21.100 Bearings

21.100.01 *Bearings in general*

21.100.10 *Plain bearings*

21.100.20 *Rolling bearings*

21.120 Shafts and couplings

21.120.01 *Shafts and couplings in general*

21.120.10 *Shafts*

21.120.20 *Couplings*

21.120.30 *Keys and keyways, splines*

21.120.40 *Balancing and balancing machines*

21.120.99 *Other standards related to shafts and couplings*

21.140 Seals, glands

*Seals for pipe and hose assemblies, see 23.040.80

21.160 Springs

*Steel for springs, see 77.140.25

21.180 Housings, enclosures, other machine parts

21.200 Gears

21.220 Flexible drives and transmissions

21.220.01 *Flexible drives and transmissions in general*

21.220.10 *Belt drives and their components*

21.220.20 *Cable or rope drives and their components*

21.220.30 *Chain drives and their components*

21.220.99 *Other flexible drives and transmissions*

21.240 Rotary-reciprocating mechanisms and their parts

*Including pistons, piston-rings, crankshafts, etc. for general engineering

21.260 Lubrication systems

*Lubricants, see 75.100

23

FLUID SYSTEMS AND COMPONENTS FOR GENERAL USE

* Measurement of fluid flow, see 17.120

23.020 Fluid storage devices

* Small containers for transportation of fluids and bulk materials, see 55.140

* Storage devices for petroleum products and natural gas, see 75.200

23.020.01 *Fluid storage devices in general*

23.020.10 *Stationary containers and tanks*

23.020.20 *Vessels and containers mounted on vehicles*

* Tanker trucks, see 43.080.10

* Tank wagons, see 45.060.20

* Tankers, see 47.020.85

* Small containers for fluids, see 55.140

23.020.30 *Pressure vessels*

* Steam pressure vessels, see 27.060.30

* Steel for pressure purposes, see 77.140.30

23.020.35 *Gas cylinders*

23.020.40 *Cryogenic vessels*

23.020.99 *Other fluid storage devices*

23.040 Pipeline components and pipelines

* Pipeline components and pipelines for petroleum products and natural gas, see 75.200

23.040.01 *Pipeline components and pipelines in general*

23.040.03 *Pipelines and its parts for external water conveyance systems*

23.040.05 *Pipelines and its parts for external sewage systems*

23.040.07 *Pipelines and its parts for district heat*

23.040.10 *Iron and steel pipes*

* Steel pipes and tubes for specific use, see 77.140.75

23.040.15 *Non-ferrous metal pipes*

* Non-ferrous metal pipes and tubes for specific use, see 77.150

23.040.20 *Plastics pipes*

- 23.040.40** *Metal fittings*
- 23.040.45** *Plastics fittings*
- 23.040.50** *Pipes and fittings of other materials*
- 23.040.60** *Flanges, couplings and joints*
- 23.040.70** *Hoses and hose assemblies*
- 23.040.80** *Seals for pipe and hose assemblies*
- 23.040.99** *Other pipeline components*

23.060 Valves

- 23.060.01** *Valves in general*
- 23.060.10** *Globe valves*
- 23.060.20** *Ball and plug valves*
- 23.060.30** *Gate valves*
- 23.060.40** *Pressure regulators*
 - *Including pressure-reducers
 - *Protection against excessive pressure, see 13.240
- 23.060.50** *Check valves*
- 23.060.99** *Other valves*

23.080 Pumps

- *Pumps for fluid power systems, see 23.100.10
- *Vacuum pumps, see 23.160

23.100 Fluid power systems

- 23.100.01** *Fluid power systems in general*
- 23.100.10** *Pumps and motors*
- 23.100.20** *Cylinders*
- 23.100.40** *Piping and couplings*
- 23.100.50** *Control components*
 - *Including valves
- 23.100.60** *Filters, seals and contamination of fluids*
 - *Hydraulic fluids, see 75.120
- 23.100.99** *Other fluid power system components*

23.120 Ventilators. Fans. Air-conditioners

- *Marine ventilation and air-conditioning systems, see 47.020.90
- *Mining ventilation and air-conditioning systems, see 73.100.20
- *Ventilation and air-conditioning in buildings, see 91.140.30

23.140 Compressors and pneumatic machines

* Compressed air, see 71.100.20

23.160 Vacuum technology

* Including vacuum pumps

25

MANUFACTURING ENGINEERING

*This group includes standards for general use

25.020 Manufacturing forming processes

25.030 Additive manufacturing

25.040 Industrial automation systems

*IT applications in industry, see 35.240.50

25.040.01 *Industrial automation systems in general*

25.040.10 *Machining centres*

25.040.20 *Numerically controlled machines*

25.040.30 *Industrial robots. Manipulators*

25.040.40 *Industrial process measurement and control*

25.040.99 *Other industrial automation systems*

25.060 Machine tool systems

25.060.01 *Machine tool systems in general*

25.060.10 *Modular units and other devices*

25.060.20 *Dividing and tool-workpiece holding devices*

25.060.99 *Other machine tool systems*

25.080 Machine tools

*Woodworking machines, see 79.120.10

25.080.01 *Machine tools in general*

25.080.10 *Lathes*

25.080.20 *Boring and milling machines*

25.080.25 *Planing machines*

25.080.30 *Broaching machines*

25.080.40 *Drilling machines*

25.080.50 *Grinding and polishing machines*

25.080.60 *Sawing machines*

25.080.99 *Other machine tools*

25.100 Cutting tools

*Including industrial diamonds

*Woodworking tools, see 79.120.20

25.100.01 *Cutting tools in general*

25.100.10 *Turning tools*

25.100.20 *Milling tools*

25.100.25 *Tools for planing and broaching machines*

25.100.30 *Drills, countersinks, reamers*

25.100.40 *Saws*

25.100.50 *Taps and threading dies*

25.100.60 *Files*

25.100.70 *Abrasives*

25.100.99 *Other cutting tools*

25.120 Chipless working equipment

25.120.01 *Chipless working equipment in general*

25.120.10 *Forging equipment. Presses. Shears*

25.120.20 *Rolling, extruding and drawing equipment*

25.120.30 *Moulding equipment*

25.120.40 *Electrochemical machines*

25.120.99 *Other chipless working equipment*

25.140 Hand-held tools

*Tools for working with voltages, see 13.260

25.140.01 *Hand-held tools in general*

25.140.10 *Pneumatic tools*

25.140.20 *Electric tools*

*Chain- and brush-saws, see 65.060.80

25.140.30 *Hand-operated tools*

*Including wrenches, screwdrivers, pliers, nippers, hammers, etc.

25.140.99 *Other hand-held tools*

25.160 Welding, brazing and soldering

*Including gas welding, electric welding, plasma welding, electron beam welding, plasma cutting, etc.

25.160.01 *Welding, brazing and soldering in general*

*Including welders' qualifications

25.160.10 *Welding processes*

*Including thermal cutting and cladding

25.160.20 *Welding consumables*

*Including electrodes, filler metals, gases, etc.

25.160.30 *Welding equipment*

*Including thermal cutting equipment

25.160.40 *Welded joints and welds*

*Including welding position and mechanical and non-destructive testing of welded joints

25.160.50 *Brazing and soldering*

*Including brazing and soldering alloys and equipment

25.180 Industrial furnaces

25.180.01 *Industrial furnaces in general*

25.180.10 *Electric furnaces*

25.180.20 *Fuel furnaces*

25.200 Heat treatment

25.220 Surface treatment and coating

*Including processes and equipment for surface treatment and coating

*Heat treatment, see 25.200

*Surface treatment and coating in aerospace industry, see 49.040

*Corrosion of metals, see 77.060

*Paint coating, see 87.020

25.220.01 *Surface treatment and coating in general*

25.220.10 *Surface preparation*

*Including surface preparation for painting, cleaning, scouring, blasting, etc.

25.220.20 *Surface treatment*

*Including anodization, conversion coating, thermal spraying, etc.

25.220.40 *Metallic coatings*

*Including electrolytic depositions, cathodic coatings, autocatalytic coatings, etc.

25.220.50 *Enamels*

25.220.60 *Organic coatings*

25.220.99 *Other treatments and coatings*

27

ENERGY AND HEAT TRANSFER ENGINEERING

27.010 Energy and heat transfer engineering in general

27.015 Energy efficiency. Energy conservation in general

* Including energy audits

* Energy management systems, see 03.100.70

* Energy efficiency of buildings, see 91.120.10

27.020 Internal combustion engines

* This group includes standards for general use

* Internal combustion engines for current generating sets, see 29.160.40

* Internal combustion engines for road vehicles, see 43.060

* Marine engines, see 47.020.20

27.040 Gas and steam turbines. Steam engines

* Hydraulic turbines, see 27.140

27.060 Burners. Boilers

27.060.01 *Burners and boilers in general*

* Burners and boilers for central heating systems, see 91.140.10

27.060.10 *Liquid and solid fuel burners*

27.060.20 *Gas fuel burners*

27.060.30 *Boilers and heat exchangers*

* Including steam pressure vessels

* Heat exchangers for medical use, see 11.040.10

* Heat exchangers for the chemical industry, see 71.120.30

* Heat exchangers for the petroleum and natural gas industry, see 75.180.20

* Heating appliances for buildings, see 97.100

27.070 Fuel cells

27.075 Hydrogen technologies

* Industrial application of gases, see 71.100.20

27.080 Heat pumps

27.100 Power stations in general

- * Including thermal power plants
- * Nuclear power plants, see 27.120.20
- * Hydraulic power plants, see 27.140
- * Solar power stations, see 27.160
- * Wind turbine systems, see 27.180

27.120 Nuclear energy engineering

27.120.01 *Nuclear energy in general*

27.120.10 *Reactor engineering*

27.120.20 *Nuclear power plants. Safety*

- * Radiation protection, see 13.280

27.120.30 *Fissile materials and nuclear fuel technology*

- * Including raw materials
- * Radioactive wastes, see 13.030.30

27.120.99 *Other standards related to nuclear energy*

27.140 Hydraulic energy engineering

- * Including hydraulic turbines

27.160 Solar energy engineering

- * Including photovoltaic energy systems

27.180 Wind turbine energy systems

- * Including generation of electrical energy

27.190 Biological sources and alternative sources of energy

27.200 Refrigerating technology

- * Air-conditioners, see 23.120
- * Refrigerants, see 71.100.45
- * Household refrigerating appliances, see 97.040.30
- * Commercial refrigerating appliances, see 97.130.20

27.220 Heat recovery. Thermal insulation

- * This group includes standards for general use
- * Thermal insulation of buildings, see 91.120.10

29

ELECTRICAL ENGINEERING

29.020 Electrical engineering in general

*Including voltages, general electrical terminology, electrical documentation, electrical tables, safety, fire hazard testing, etc.

*Electrical diagrams and charts, see 01.100.25

*Electrical power stations, see 27.100

*Electromagnetic compatibility, see 33.100

29.030 Magnetic materials

*Steels with special magnetic properties, see 77.140.40

29.035 Insulating materials

29.035.01 *Insulating materials in general*

29.035.10 *Paper and board insulating materials*

29.035.20 *Plastics and rubber insulating materials*

*Including adhesive tapes

29.035.30 *Glass and ceramic insulating materials*

29.035.50 *Mica based materials*

29.035.60 *Varnished fabrics*

29.035.99 *Other insulating materials*

29.040 Insulating fluids

29.040.01 *Insulating fluids in general*

29.040.10 *Insulating oils*

29.040.20 *Insulating gases*

29.040.99 *Other insulating fluids*

29.045 Semiconducting materials

29.050 Superconductivity and conducting materials

29.060 Electrical wires and cables

29.060.01 *Electrical wires and cables in general*

29.060.10 *Wires*

*Including electric rods, busbars, etc.

29.060.20 *Cables*

29.080 Insulation

*Insulating materials, see 29.035

*Insulating fluids, see 29.040

29.080.01 *Electrical insulation in general*

29.080.10 *Insulators*

*Including fittings and other components for insulators

29.080.20 *Bushings*

29.080.30 *Insulation systems*

29.080.99 *Other standards related to insulation*

29.100 Components for electrical equipment

*Electronic components, see 31

29.100.01 *Components for electrical equipment in general*

29.100.10 *Magnetic components*

29.100.20 *Electric and electromechanical components*

29.100.99 *Other components for electrical equipment*

29.120 Electrical accessories

29.120.01 *Electrical accessories in general*

29.120.10 *Conduits for electrical purposes*

29.120.20 *Connecting devices*

29.120.30 *Plugs, socket-outlets, couplers*

29.120.40 *Switches*

29.120.50 *Fuses and other overcurrent protection devices*

29.120.70 *Relays*

29.120.99 *Other electrical accessories*

29.130 Switchgear and controlgear

29.130.01 *Switchgear and controlgear in general*

29.130.10 *High voltage switchgear and controlgear*

*Including enclosed switchgear and controlgear

29.130.20 *Low voltage switchgear and controlgear*

*Including switchgear and controlgear assemblies

29.130.99 *Other switchgear and controlgear*

29.140 Lamps and related equipment

29.140.01 *Lamps in general*

29.140.10 *Lamp caps and holders*

29.140.20 *Incandescent lamps*

29.140.30 *Fluorescent lamps. Discharge lamps*

29.140.40 *Luminaires*

29.140.50 *Lighting installation systems*

*Including supply track systems

29.140.99 *Other standards related to lamps*

29.160 Rotating machinery

29.160.01 *Rotating machinery in general*

29.160.10 *Components for rotating machines*

29.160.20 *Generators*

29.160.30 *Motors*

29.160.40 *Generating sets*

29.160.99 *Other standards related to rotating machinery*

29.180 Transformers. Reactors

*Instrument transformers, see 17.220.20

29.200 Rectifiers. Converters. Stabilized power supply

*Including semiconductor converters

29.220 Galvanic cells and batteries

29.220.01 *Galvanic cells and batteries in general*

29.220.10 *Primary cells and batteries*

29.220.20 *Acid secondary cells and batteries*

29.220.30 *Alkaline secondary cells and batteries*

29.220.99 *Other cells and batteries*

29.240 Power transmission and distribution networks

*Electricity supply systems in buildings, see 91.140.50

29.240.01 *Power transmission and distribution networks in general*

*Powerline telecommunications, see 33.040.60

29.240.10 *Substations. Surge arresters*

29.240.20 *Power transmission and distribution lines*

29.240.30 *Control equipment for electric power systems*

* Measuring instruments for electrical quantities, see 17.220.20

29.240.99 *Other equipment related to power transmission and distribution networks*

* Including capacitors for power networks

29.260 Electrical equipment for working in special conditions

29.260.01 *Electrical equipment for working in special conditions in general*

29.260.10 *Electrical installations for outdoor use*

29.260.20 *Electrical apparatus for explosive atmospheres*

29.260.99 *Other electrical equipment for working in special conditions*

29.280 Electric traction equipment

* Including railway electric fixed installations

* Electric road vehicles, see 43.120

* Non-electric railway tractive stock, see 45.060.10

31

ELECTRONICS

31.020 Electronic components in general

*Magnetic components, see 29.100.10

31.040 Resistors

31.040.01 *Resistors in general*

31.040.10 *Fixed resistors*

31.040.20 *Potentiometers, variable resistors*

31.040.30 *Thermistors*

31.040.99 *Other resistors*

31.060 Capacitors

31.060.01 *Capacitors in general*

31.060.10 *Fixed capacitors*

31.060.20 *Ceramic and mica capacitors*

31.060.30 *Paper and plastics capacitors*

31.060.40 *Tantalum electrolytic capacitors*

31.060.50 *Aluminium electrolytic capacitors*

31.060.60 *Variable capacitors*

31.060.70 *Power capacitors*

*Capacitors for power networks, see 29.240.99

31.060.99 *Other capacitors*

31.080 Semiconductor devices

*Semiconducting materials, see 29.045

31.080.01 *Semiconductor devices in general*

31.080.10 *Diodes*

31.080.20 *Thyristors*

31.080.30 *Transistors*

31.080.99 *Other semiconductor devices*

31.100 Electronic tubes

31.120 Electronic display devices

*Including liquid crystal displays

31.140 Piezoelectric devices

31.160 Electric filters

31.180 Printed circuits and boards

31.190 Electronic component assemblies

*Including preassembled modules

31.200 Integrated circuits. Microelectronics

*Including electronic chips, logical and analogue microstructures

*Microprocessors, see 35.160

31.220 Electromechanical components for electronic and telecommunications equipment

31.220.01 *Electromechanical components in general*

31.220.10 *Plug-and-socket devices. Connectors*

31.220.20 *Switches*

31.220.99 *Other electromechanical components*

31.240 Mechanical structures for electronic equipment

31.260 Optoelectronics. Laser equipment

*Including photoelectric tubes and cells

33

TELECOMMUNICATIONS. AUDIO AND VIDEO ENGINEERING

33.020 Telecommunications in general

*Including infrastructure

33.030 Telecommunication services. Applications

*Including supplementary services, service aspects and associated legal traceability aspects

33.040 Telecommunication systems

*Including network (system) aspects

33.040.01 *Telecommunication systems in general*

33.040.20 *Transmission systems*

*Including synchronization, cable systems, integrated cabling, pathways and multiplexing

33.040.30 *Switching and signalling systems*

*Including telecommunication call charging and billing aspects

33.040.35 *Telephone networks*

*Including Public Switched Telephone Networks (PSTN), Private Telecommunication Networks (PTN) and Private Integrated Service Networks (PISN)

33.040.40 *Data communication networks*

*Including Packet Switched Public Data Networks (PSPDN) and Ethernet

*ISDN, see 33.080

*OSI local, wide and metropolitan area networks, see 35.110

*Modems, see 35.180

33.040.50 *Lines, connections and circuits*

*Including access networks and network elements

33.040.60 *Powerline telecommunications*

*Power transmission and distribution, see 29.240.01

33.040.99 *Other equipment for telecommunication systems*

33.050 Telecommunication terminal equipment

33.050.01 *Telecommunication terminal equipment in general*

33.050.10 *Telephone equipment*

33.050.20 *Paging equipment*

33.050.30 *Equipment for telex, teletext, telefax*

*Modems, see 35.180

33.050.99 *Other telecommunication terminal equipment*

33.060 Radiocommunications

33.060.01 *Radiocommunications in general*

33.060.20 *Receiving and transmitting equipment*

33.060.30 *Radio relay and fixed satellite communications systems*

33.060.40 *Cabled distribution systems*

33.060.99 *Other equipment for radiocommunications*

33.070 Mobile services

33.070.01 *Mobile services in general*

33.070.10 *Terrestrial Trunked Radio (TETRA)*

33.070.20 *Paging systems*

*Including European Radio Message System (ERMES)

33.070.30 *Digital Enhanced Cordless Telecommunications (DECT)*

33.070.40 *Satellite*

*Including Global Positioning System (GPS)

33.070.50 *Global System for Mobile Communication (GSM)*

33.070.99 *Other mobile services*

33.080 Integrated Services Digital Network (ISDN)

33.100 Electromagnetic compatibility (EMC)

*Including radio interference

33.100.01 *Electromagnetic compatibility in general*

33.100.10 *Emission*

33.100.20 *Immunity*

33.100.99 *Other aspects related to EMC*

33.120 Components and accessories for telecommunications equipment

*Plug-and-socket devices, connectors, see 31.220.10

*Switches, see 31.220.20

33.120.01 *Components and accessories in general*

33.120.10 *Coaxial cables. Waveguides*

33.120.20 *Wires and symmetrical cables*

33.120.30 *RF connectors*

33.120.40 *Aerials*

33.120.99 *Other components and accessories*

33.140 Special measuring equipment for use in telecommunications

33.160 Audio, video and audiovisual engineering

33.160.01 *Audio, video and audiovisual systems in general*

*Stage and studio equipment, see 97.200.10

33.160.10 *Amplifiers*

33.160.20 *Radio receivers*

33.160.25 *Television receivers*

33.160.30 *Audio systems*

*Including tape recorders, records, magnetic tapes, cassettes, CDs, etc.

33.160.40 *Video systems*

*Including video tape recorders, cameras, cassettes, laser disks, etc.

33.160.50 *Accessories*

*Including headphones, loudspeakers, microphones, etc.

33.160.60 *Multimedia systems and teleconferencing equipment*

33.160.99 *Other audio, video and audiovisual equipment*

33.170 Television and radio broadcasting

*Equipment for television and radio broadcasting, see 33.160

*Stage and studio equipment, see 97.200.10

33.180 Fibre optic communications

33.180.01 *Fibre optic systems in general*

33.180.10 *Fibres and cables*

33.180.20 *Fibre optic interconnecting devices*

33.180.30 *Optic amplifiers*

33.180.99 *Other fibre optic equipment*

33.200 Telecontrol. Telemetry

*Including Supervising, Control and Data Acquisition System (SCADA)

35

INFORMATION TECHNOLOGY

35.020 Information technology (IT) in general

*Including general aspects of IT equipment

35.030 IT Security

*Including encryption

35.040 Information coding

*Including coding of audio, picture, multimedia and hypermedia information, bar coding, etc.

*IT security techniques, see 35.030

35.040.01 *Information coding in general*

35.040.10 *Coding of character sets*

35.040.30 *Coding of graphical and photographic information*

35.040.40 *Coding of audio, video, multimedia and hypermedia information*

35.040.50 *Automatic identification and data capture techniques*

*Including RFID, OCR, bar coding, etc.

35.040.99 *Other standards related to information coding*

35.060 Languages used in information technology

35.080 Software

*Including software development, documentation and use

*Internet applications, see 35.240.95

35.100 Open systems interconnection (OSI)

35.100.01 *Open systems interconnection in general*

35.100.05 *Multilayer applications*

*Including International Standardized Profiles

35.100.10 *Physical layer*

35.100.20 *Data link layer*

35.100.30 *Network layer*

35.100.40 *Transport layer*

35.100.50 *Session layer*

35.100.60 *Presentation layer*

35.100.70 *Application layer*

35.110 Networking

*Including local area networks (LAN), metropolitan area networks (MAN), wide area networks (WAN), etc.

*Private Integrated Services Network (PISN), see 33.040.35

*Integrated Services Digital Network (ISDN), see 33.080

35.140 Computer graphics

35.160 Microprocessor systems

*Including PCs, calculators, etc.

*Integrated circuits, see 31.200

35.180 IT terminal and other peripheral equipment

*Including modems

35.200 Interface and interconnection equipment

35.210 Cloud computing

35.220 Data storage devices

35.220.01 *Data storage devices in general*

35.220.10 *Paper cards and tapes*

35.220.20 *Magnetic storage devices in general*

35.220.21 *Magnetic disks*

*Including flexible disks, diskettes, disk packs, disk cartridges, etc.

35.220.22 *Magnetic tapes*

35.220.23 *Cassettes and cartridges for magnetic tapes*

35.220.30 *Optical storage devices*

*Including CD and magneto-optical devices (MO)

35.220.99 *Other data storage devices*

35.240 Applications of information technology

35.240.01 *Application of information technology in general*

35.240.10 *Computer-aided design (CAD)*

35.240.15 *Identification cards. Chip cards. Biometrics*

*Including application of cards for banking, trade, telecommunications, transport, etc.

35.240.20 *IT applications in office work*

*Including text processing systems, text communication, text presentation, Office Document Architecture (ODA), etc.

35.240.30 *IT applications in information, documentation and publishing*

*Including Standard Generalized Markup Language (SGML), Extensible Markup Language (XML), automatic translation machines, etc.

35.240.40 *IT applications in banking*

*Including automatic banking facilities

*Identification cards for banking purposes, see 35.240.15

35.240.50 *IT applications in industry*

*Including design automation

35.240.60 *IT applications in transport*

35.240.63 *IT applications in trade*

*Including EDIFACT and e-commerce

35.240.67 *IT applications in building and construction industry*

* Including building information modelling, Home and Building Electronic Systems (HBES)

35.240.68 *IT applications in agriculture*

35.240.69 *IT applications in postal services*

35.240.70 *IT applications in science*

*Including digital geographic information

35.240.80 *IT applications in health care technology*

*Including computer tomography

35.240.90 *IT applications in education*

*Including e-learning

35.240.95 *Internet applications*

35.240.99 *IT applications in other fields*

35.260 Office machines

*Including typewriters, dictation equipment, addressing machines, letter opening machines, letter folding machines, postal franking machines, their ribbons and other accessories, etc.

*Telephones, see 33.050.10

*Telex and telefax, see 33.050.30

*Copying machines, see 37.100.10

*Wrapping and packaging equipment, see 55.200

*Paper based stationery, see 85.080

*Office furniture, see 97.140

*Non-paper based stationery, see 97.180

37

IMAGE TECHNOLOGY

37.020 Optical equipment

*Including microscopes, telescopes, binoculars, optical materials, optical components and optical systems

*Ophthalmic equipment, see 11.040.70

*Optical measuring instruments, see 17.180.30

*Photographic equipment lenses, see 37.040.10

37.040 Photography

*Photographic studios, see 97.200.10

37.040.01 *Photography in general*

37.040.10 *Photographic equipment. Projectors*

37.040.20 *Photographic paper, films and plates. Cartridges*

37.040.25 *Radiographic films*

*Including dental, medical and industrial radiographic films

37.040.30 *Photographic chemicals*

37.040.99 *Other standards related to photography*

37.060 Cinematography

*Cinematographic studios, see 97.200.10

37.060.01 *Cinematography in general*

37.060.10 *Motion picture equipment*

37.060.20 *Motion picture films. Cartridges*

37.060.99 *Other standards related to cinematography*

37.080 Document imaging applications

*Including micrographic, electronic and optical applications

*Optical storage devices, see 35.220.30

37.100 Graphic technology

37.100.01 *Graphic technology in general*

*Including proof corrections

37.100.10 *Reproduction equipment*

*Including printing, copying and duplicating machines, bookbinding equipment, etc.

37.100.20 *Materials for graphic technology*

*Inks, see 87.080

37.100.99 *Other standards related to graphic technology*

39

PRECISION MECHANICS. JEWELLERY

39.020 Precision mechanics

*Including microsystems

39.040 Horology

39.040.01 *Horology in general*

39.040.10 *Watches*

39.040.20 *Clocks*

39.040.99 *Other time-measuring instruments*

39.060 Jewellery

*Including precious metals, precious and semi-precious stones

*Industrial diamonds, see 25.100

43

ROAD VEHICLES ENGINEERING

43.020 Road vehicles in general

- * Including testing and recycling of road vehicles
- * Road transport, see 03.220.20
- * Transport exhaust emissions, see 13.040.50

43.040 Road vehicle systems

- * Electric road vehicle systems, see 43.120
- * Motorcycle and moped systems, see 43.140
- * Cycle systems, see 43.150

43.040.01 *Road vehicle systems in general*

43.040.10 *Electrical and electronic equipment*

43.040.15 *Car informatics. On board computer systems*

- * Including navigation systems, car radio, etc.

43.040.20 *Lighting, signalling and warning devices*

43.040.30 *Indicating and control devices*

43.040.40 *Braking systems*

43.040.50 *Transmissions, suspensions*

- * Including clutches, gearboxes, power-steering systems, cardan shafts, differentials, wheels, rims, etc.
- * Tyres for road vehicles, see 83.160.10

43.040.60 *Bodies and body components*

- * Including vehicle frame and structure, heating devices, air-conditioning systems for passenger/driver compartments, roof load carriers, etc.
- * Loading compartments, see 43.080.10

43.040.65 *Glazing and wiper systems*

- * Including cleaning, defrosting and demisting devices, mirrors, etc.

43.040.70 *Couplings*

- * Including towing attachments and fifth wheel assemblies

43.040.80 *Crash protection and restraint systems*

- * Including airbags, safety belts, traffic accident issues and safety enhancement matters

43.040.99 *Other road vehicle systems*

43.060 Internal combustion engines for road vehicles

- * Standards for internal combustion engines for general use, see 27.020

43.060.01 *Internal combustion engines for road vehicles in general*

43.060.10 *Engine block and internal components*

43.060.20 *Pressure charging and air/exhaust gas ducting systems*

43.060.30 *Cooling systems. Lubricating systems*

*Antifreezes, see 71.100.45

*Lubricants, see 75.100

43.060.40 *Fuel systems*

43.060.50 *Electrical and electronic equipment. Control systems*

*Including ignition systems and starter motors

43.060.99 *Other components and systems of internal combustion engines*

43.080 Commercial vehicles

*Road vehicle systems, see 43.040

*Tyres for road vehicles, see 83.160.10

43.080.01 *Commercial vehicles in general*

43.080.10 *Trucks and trailers*

*Including tanker trucks and loading compartments

*Industrial trucks, see 53.060

43.080.20 *Buses*

43.080.99 *Other commercial vehicles*

43.100 Passenger cars. Caravans and light trailers

*Road vehicle systems, see 43.040

*Tyres for road vehicles, see 83.160.10

*Camping equipment, see 97.200.30

43.120 Electric road vehicles

*Including their components and systems

*Tyres for road vehicles, see 83.160.10

43.140 Motorcycles and mopeds

*Including their components and systems

*Tyres for road vehicles, see 83.160.10

43.150 Cycles

*Including their components and systems

*Tyres for road vehicles, see 83.160.10

43.160 Special purpose vehicles

- * Including waste collection vehicles and components and systems for special purpose vehicles
- * Fire-fighting vehicles, see 13.220.10
- * Mobile cranes, see 53.020.20
- * Earth-moving machinery, see 53.100
- * Agricultural tractors and trailed vehicles, see 65.060.10

43.180 Diagnostic, maintenance and test equipment

- * Including repairing facilities
- * Petrol stations, see 75.200

45

RAILWAY ENGINEERING

45.020 Railway engineering in general

* Railway traffic, see 03.220.30

* Construction of railways, see 93.100

45.040 Materials and components for railway engineering

45.060 Railway rolling stock

* Including materials, components, electric and electronic equipment for railway rolling stock

45.060.01 *Railway rolling stock in general*

45.060.10 *Tractive stock*

* Electric traction equipment, see 29.280

45.060.20 *Trailing stock*

* Including tank wagons

45.080 Rails and railway components

* Including track components

45.100 Cableway equipment

* Including ropeway equipment

45.120 Equipment for railway/cableway construction and maintenance

45.140 Metro, tram and light rail equipment

47

SHIPBUILDING AND MARINE STRUCTURES

47.020 Shipbuilding and marine structures in general

*Including offshore structures, except offshore structures for petroleum and natural gas industries, and seabed mining

*Water transport, see 03.220.40

*Offshore structures for seabed mining, see 73.100.30

*Offshore structures for petroleum and natural gas industries, see 75.180.10

47.020.01 *General standards related to shipbuilding and marine structures*

47.020.05 *Materials and components for shipbuilding*

47.020.10 *Hulls and their structure elements*

47.020.20 *Marine engines and propulsion systems*

*Standards for internal combustion engines for general use, see 27.020

47.020.30 *Piping systems*

47.020.40 *Lifting and cargo handling equipment*

47.020.50 *Deck equipment and installations*

47.020.60 *Electrical equipment of ships and of marine structures*

47.020.70 *Navigation and control equipment*

*Radiocommunications equipment, see 33.060

47.020.80 *Accommodation spaces*

47.020.85 *Cargo spaces*

*Including tanks and tankers

47.020.90 *Marine ventilation, air conditioning and heating systems*

47.020.99 *Other standards related to shipbuilding and marine structures*

47.040 Seagoing vessels

*Including their systems and components

47.060 Inland navigation vessels

*Including their systems and components

47.080 Small craft

*Including small craft systems and components, and life-saving appliances

*Personal flotation devices (life jackets), see 13.340.70

49

AIRCRAFT AND SPACE VEHICLE ENGINEERING

49.020 Aircraft and space vehicles in general

*Including aircraft performance, flight dynamics, etc.

*Air transport, see 03.220.50

49.025 Materials for aerospace construction

49.025.01 *Materials for aerospace construction in general*

49.025.05 *Ferrous alloys in general*

49.025.10 *Steels*

49.025.15 *Non-ferrous alloys in general*

49.025.20 *Aluminium*

49.025.30 *Titanium*

49.025.40 *Rubber and plastics*

49.025.50 *Adhesives*

49.025.60 *Textiles*

*Including textile glass and coated fabrics

49.025.99 *Other materials*

49.030 Fasteners for aerospace construction

*Fasteners for general use, see 21.060

49.030.01 *Fasteners in general*

49.030.10 *Screw threads*

*Screw threads for general use, see 21.040

49.030.20 *Bolts, screws, studs*

49.030.30 *Nuts*

49.030.40 *Pins, nails*

49.030.50 *Washers and other locking elements*

49.030.60 *Rivets*

49.030.99 *Other fasteners*

49.035 Components for aerospace construction

* Including bearings, rod ends and other mechanical components

* Tyres for aircraft, see 83.160.20

49.040 Coatings and related processes used in aerospace industry

* Coatings for general use, see 25.220

49.045 Structure and structure elements

49.050 Aerospace engines and propulsion systems

* Including fuel systems

49.060 Aerospace electric equipment and systems

* Including Avionics

49.080 Aerospace fluid systems and components

49.090 On-board equipment and instruments

* Including navigation instruments and telecommunications equipment

49.095 Passenger and cabin equipment

49.100 Ground service and maintenance equipment

49.120 Cargo equipment

* Air mode containers, pallets and nets, see 55.180.30

49.140 Space systems and operations

* Including space data and information transfer systems, and ground support equipment for launch site operations

53

MATERIALS HANDLING EQUIPMENT

53.020 Lifting equipment

* Lifting equipment for shipbuilding, see 47.020.40

* Lifts and escalators, see 91.140.90

53.020.01 *Lifting appliances in general*

* Lifting platforms for disabled people, see 11.180.10

53.020.20 *Cranes*

* Including mobile cranes, tower cranes, jib cranes, bridge cranes, etc.

53.020.30 *Accessories for lifting equipment*

* Including lifting hooks, shackles, link chains, wire ropes, etc.

* Wire ropes and link chains for general use, see 77.140.65

53.020.99 *Other lifting equipment*

* Including elevating work platforms

53.040 Continuous handling equipment

53.040.01 *Continuous handling equipment in general*

53.040.10 *Conveyors*

53.040.20 *Components for conveyors*

* Including conveyor belts, chains, chain wheels, etc.

53.040.30 *Pneumatic transport and its components*

53.040.99 *Other continuous handling equipment*

53.060 Industrial trucks

* Including fork-lift trucks, sliding platforms, etc.

* Trucks and trailers, see 43.080.10

53.080 Storage equipment

* Including loading devices, shelves, etc.

* Storing and warehousing, see 55.220

* Installations for storage of agricultural produce, see 65.040.20

* Shelving for shops, see 97.130.10

53.100 Earth-moving machinery

* Including tractors, excavators, loaders, graders, etc.

53.120 Equipment for manual handling

* Including shovels, spades, crowbars, picks, etc.

55

PACKAGING AND DISTRIBUTION OF GOODS

55.020 Packaging and distribution of goods in general

55.040 Packaging materials and accessories

* Including wrappers, paper, films, foils, cords, sealing devices, cushioning, etc.

* Adhesive tapes for general purposes, see 83.180

55.060 Spools. Bobbins

* Including holders, supports, etc. for externally wound or mounted material

* Photographic and cinematographic film rolls, cores, spools, reels, etc., see 37.040.20

* Photographic film rolls, cores, spools, reels, etc., see 37.060.20

* Cones, tubes, beams, etc. for textile materials, see 59.120.20

55.080 Sacks. Bags

* Including sachets, envelopes

55.100 Bottles. Pots. Jars

* Small containers for liquids and their closures

* Containers for transfusion use, see 11.040.20

* Containers for pharmaceutical preparations, see 11.120.99

55.120 Cans. Tins. Tubes

* Light gauge metal and plastics containers

55.130 Aerosol containers

55.140 Barrels. Drums. Canisters

* Containers mainly for transportation of fluids, including also casks, pails, large tin cans for shipping materials, etc.

* Fluid storage devices, see 23.020

55.160 Cases. Boxes. Crates

* Containers for solid goods or objects and bulk materials

55.180 Freight distribution of goods

55.180.01 *Freight distribution of goods in general*

55.180.10 *General purpose containers*

55.180.20 *General purpose pallets*

55.180.30 *Air mode containers, pallets and nets*

55.180.40 *Complete, filled transport packages*

*Including reusable packages and unit loads

55.180.99 *Other standards related to freight distribution of goods*

*Including intermediate bulk containers

55.200 Packaging machinery

*Including labelling, marking, branding, filling, sealing machines, etc.

55.220 Storing. Warehousing

*Storage equipment, see 53.080

55.230 Distribution and vending machines

*Including distribution of tickets, food, beverages, tobacco products, etc.

59

TEXTILE AND LEATHER TECHNOLOGY

59.020 Processes of the textile industry

59.040 Textile auxiliary materials

* Including feathers and down

* Surface active agents, see 71.100.40

59.060 Textile fibres

59.060.01 *Textile fibres in general*

* Including mixtures of fibres

59.060.10 *Natural fibres*

59.060.20 *Man-made fibres*

59.060.30 *Mineral and metal fibres*

59.060.99 *Other textile fibres*

59.080 Products of the textile industry

* Materials for the reinforcement of composites, see 59.100

* Fishing nets, see 65.150

* Upholstery, see 97.140

* Textile floor coverings, see 97.150

* Home textiles and linen, see 97.160

59.080.01 *Textiles in general*

* Including colour fastness of textiles

59.080.20 *Yarns*

* Including plied yarns, textured yarns, threads

59.080.30 *Textile fabrics*

* Including nonwovens, felts, lace, etc.

59.080.40 *Coated fabrics*

59.080.50 *Ropes*

* Including strings, straps, bands

* Wire ropes for lifting, see 53.020.30

* Steel wire ropes, see 77.140.65

59.080.70 *Geotextiles*

* Including geosynthetics

59.080.80 *Smart textiles*

59.080.99 *Other products of the textile industry*

59.100 Materials for the reinforcement of composites

59.100.01 *Materials for the reinforcement of composites in general*

59.100.10 *Textile glass materials*

59.100.20 *Carbon materials*

59.100.30 *Aramide materials*

59.100.99 *Other materials for the reinforcement of composites*

59.120 Textile machinery

59.120.01 *Textile machinery in general*

59.120.10 *Spinning, twisting and texturing machines*

*Including machines and equipment for manufacturing man-made filaments and fibres and for preparing fibres for spinning

59.120.20 *Winding machines and equipment*

*Including machines and equipment for reeling, balling, warping, sizing, beaming, etc. of yarns

59.120.30 *Looms. Weaving machines*

59.120.40 *Knitting machines*

*Including household knitting machines

59.120.50 *Dyeing and finishing equipment*

*Laundry appliances, see 97.060

59.120.99 *Other textile machinery*

59.140 Leather technology

*Including fur and imitation leather

*Footwear, see 61.060

*Sewing machines and machines for footwear production, see 61.080

59.140.01 *Leather technology in general*

59.140.10 *Processes and auxiliary materials*

59.140.20 *Raw skins, hides and pelts*

59.140.30 *Leather and furs*

59.140.35 *Leather products*

*Including trunks, suitcases, handbags, purses, wallets, dog-collars, etc. made of materials other than leather

*Products of the clothing industry, see 61

59.140.40 *Machines and equipment for leather and fur production*

59.140.99 *Other standards related to leather technology*

61

CLOTHING INDUSTRY

61.020 Clothes

* Including underwear, nightwear, knitwear, military clothing, hosiery, etc. and their labelling and size coding schemes

* Medical garments, see 11.140

* Protective clothing, see 13.340.10

61.040 Headgear. Clothing accessories. Fastening of clothing

* Including ties, gloves, scarves, handkerchiefs, belts, braces, buttons, zip-fasteners, umbrellas, etc.

* Protective headgear, see 13.340.20

* Protective gloves, see 13.340.40

61.060 Footwear

* Including shoelaces

* Protective footwear, see 13.340.50

61.080 Sewing machines and other equipment for the clothing industry

* Including household sewing machines

* Washing machines, driers, ironing and pressing appliances, see 97.060

65

AGRICULTURE

65.020 Farming and forestry

*Pedology, soil analysis, see 13.080

*Logging, see 79.020

65.020.01 *Farming and forestry in general*

65.020.20 *Plant growing*

*Including horticulture, floriculture, seeds, plant diseases

65.020.30 *Animal husbandry and breeding*

*Including sanitary inspection

*Veterinary medicine, see 11.220

65.020.40 *Landscaping and silviculture*

65.020.99 *Other standards related to farming and forestry*

65.040 Farm buildings, structures and installations

65.040.01 *Farm buildings and installations in general*

65.040.10 *Livestock buildings, installations and equipment*

*Including milking machines

65.040.20 *Buildings and installations for processing and storage of agricultural produce*

*Including slaughterhouses and related equipment

65.040.30 *Greenhouses and other installations*

65.040.99 *Other standards related to farm buildings and installations*

65.060 Agricultural machines, implements and equipment

*Tyres for agricultural machinery, see 83.160.30

65.060.01 *Agricultural machines and equipment in general*

65.060.10 *Agricultural tractors and trailed vehicles*

65.060.20 *Soil-working equipment*

65.060.25 *Equipment for storage, preparation and distribution of fertilizers*

65.060.30 *Sowing and planting equipment*

65.060.35 *Irrigation and drainage equipment*

65.060.40 *Plant care equipment*

65.060.50 *Harvesting equipment*

65.060.60 *Viticultural and wine-making equipment*

65.060.70 *Horticultural equipment*

*Including lawnmowers, equipment for olive cultivation and olive production

65.060.80 *Forestry equipment*

*Including chain- and brush-saws

65.060.99 *Other agricultural machines and equipment*

65.080 Fertilizers

*Including soil conditioners and culture medium

65.100 Pesticides and other agrochemicals

65.100.01 *Pesticides and other agrochemicals in general*

65.100.10 *Insecticides*

*Wood-protecting chemicals, see 71.100.50

65.100.20 *Herbicides*

65.100.30 *Fungicides*

*Wood-protecting chemicals, see 71.100.50

65.100.99 *Other pesticides and agrochemicals*

65.120 Animal feeding stuffs

*Microbiology of animal feeding stuffs, see 07.100.30

65.140 Beekeeping

*Including equipment and installations for beekeeping

*Honey, see 67.180.10

65.145 Hunting

*Including equipment and installations for hunting

65.150 Fishing and fish breeding

*Including hunting of marine mammals and reptiles, collection and breeding of aquatic molluscs and other marine products, equipment and installations for fishing and fish breeding, etc.

*Water for fish breeding, see 13.060.25

*Fish and fishery products, see 67.120.30

65.160 Tobacco, tobacco products and related equipment

67

FOOD TECHNOLOGY

67.020 Processes in the food industry

*Including food hygiene and food safety

67.040 Food products in general

67.050 General methods of tests and analysis for food products

*Food microbiology, see 07.100.30

*Sensory analysis, see 67.240

67.060 Cereals, pulses and derived products

*Including grains, corn, flours, baked products, etc.

67.080 Fruits. Vegetables

*Including canned, dried and quick-frozen fruits and vegetables

*Fruit and vegetable juices and nectars, see 67.160.20

67.080.01 *Fruits, vegetables and derived products in general*

67.080.10 *Fruits and derived products*

*Including nuts

67.080.20 *Vegetables and derived products*

*Including tomato concentrates, ketchup, etc.

67.100 Milk and milk products

67.100.01 *Milk and milk products in general*

67.100.10 *Milk and processed milk products*

*Including dried milk, condensed milk and evaporated milk

67.100.20 *Butter*

67.100.30 *Cheese*

*Including cottage cheese, whey cheese

67.100.40 *Ice cream and ice confectionery*

*Including sorbets

67.100.99 *Other milk products*

67.120 Meat, meat products and other animal produce

*Including frozen products

67.120.01 *Animal produce in general*

67.120.10 *Meat and meat products*

67.120.20 *Poultry and eggs*

67.120.30 *Fish and fishery products*

*Including aquatic molluscs and other marine products

67.120.99 *Other animal produce*

67.140 Tea. Coffee. Cocoa

67.140.10 *Tea*

*Including herb teas

67.140.20 *Coffee and coffee substitutes*

67.140.30 *Cocoa*

67.160 Beverages

67.160.01 *Beverages in general*

67.160.10 *Alcoholic beverages*

*Including beer, wine, spirits, etc.

67.160.20 *Non-alcoholic beverages*

*Including juices, nectars, mineral waters, lemonades, root beer, cola drinks, etc.

*Tea, coffee, cocoa, see 67.140

67.180 Sugar. Sugar products. Starch

67.180.10 *Sugar and sugar products*

*Including molasses, sweets, sugar confectionary, honey, etc.

67.180.20 *Starch and derived products*

*Including glucose syrups, etc.

67.190 Chocolate

67.200 Edible oils and fats. Oilseeds

67.200.10 *Animal and vegetable fats and oils*

*Butter, see 67.100.20

67.200.20 *Oilseeds*

67.220 Spices and condiments. Food additives

67.220.10 *Spices and condiments*

67.220.20 *Food additives*

*Including salt, vinegar, food preservation additives, etc.

67.230 Prepackaged and prepared foods

*Including baby food

67.240 Sensory analysis

67.250 Materials and articles in contact with foodstuffs

*Including catering containers, and materials and articles in contact with drinking water

67.260 Plants and equipment for the food industry

*Refrigerating equipment, see 27.200

*Cold rooms, see 97.130.20

71

CHEMICAL TECHNOLOGY

71.020 Production in the chemical industry

*Including plant layout and services, process design and control, processing operations, security measures, etc.

71.040 Analytical chemistry

*This group includes standards for general use

71.040.01 *Analytical chemistry in general*

71.040.10 *Chemical laboratories. Laboratory equipment*

*Including hydrometers, alcoholometers, etc.

*Apparatus for measurement of volume, mass, density, viscosity, see 17.060

*Spectroscopes, see 17.180.30

*Temperature-measuring instruments, see 17.200.20

*Laboratory ware, see 71.040.20

71.040.20 *Laboratory ware and related apparatus*

71.040.30 *Chemical reagents*

*Including reference materials

71.040.40 *Chemical analysis*

*Including analysis of gases and surface chemical analysis

71.040.50 *Physicochemical methods of analysis*

*Including spectrophotometric and chromatographic analysis

71.040.99 *Other standards related to analytical chemistry*

71.060 Inorganic chemicals

71.060.01 *Inorganic chemicals in general*

71.060.10 *Chemical elements*

71.060.20 *Oxides*

*Including dioxides, peroxides, etc.

71.060.30 *Acids*

71.060.40 *Bases*

71.060.50 *Salts*

71.060.99 *Other inorganic chemicals*

71.080 Organic chemicals

71.080.01 *Organic chemicals in general*

71.080.10 *Aliphatic hydrocarbons*

71.080.15 *Aromatic hydrocarbons*

71.080.20 *Halogenated hydrocarbons*

71.080.30 *Organic nitrogen compounds*

71.080.40 *Organic acids*

71.080.50 *Anhydrides*

71.080.60 *Alcohols. Ethers*

71.080.70 *Esters*

71.080.80 *Aldehydes and ketones*

71.080.90 *Phenols*

71.080.99 *Other organic chemicals*

71.100 Products of the chemical industry

*Photographic chemicals, see 37.040.30

*Raw materials for rubber and plastics, see 83.040

*Paints and varnishes, see 87.040

*Inks, see 87.080

71.100.01 *Products of the chemical industry in general*

71.100.10 *Materials for aluminium production*

71.100.20 *Gases for industrial application*

*Including compressed air and hydrogen

*Hydrogen technologies, see 27.075

*Liquefied petroleum gases, see 75.160.30

71.100.30 *Explosives. Pyrotechnics and fireworks*

71.100.35 *Chemicals for industrial and domestic disinfection purposes*

*Medical disinfectants and antiseptics, see 11.080.20

71.100.40 *Surface active agents*

71.100.45 *Refrigerants and antifreezes*

71.100.50 *Wood-protecting chemicals*

71.100.55 *Silicones*

71.100.60 *Essential oils*

71.100.70 *Cosmetics. Toiletries*

*Cosmetics microbiology, see 07.100.40

71.100.80 *Chemicals for purification of water*

71.100.99 *Other products of the chemical industry*

71.120 Equipment for the chemical industry

*Transport of dangerous chemicals, see 13.300

71.120.01 *Equipment for the chemical industry in general*

71.120.10 *Reaction vessels and their components*

71.120.20 *Columns*

71.120.30 *Heat exchangers*

71.120.99 *Other equipment for the chemical industry*

73

MINING AND MINERALS

73.020 Mining and quarrying

* Including exploration, opening-up, development, working of mineral deposits, drilling, construction of mines, mining operations, processing of minerals, etc.

73.040 Coals

* Including lignites

* Coal products, see 75.160.10

73.060 Metalliferous minerals and their concentrates

* Uranium-containing minerals, see 27.120.30

73.060.01 *Metalliferous minerals in general*

73.060.10 *Iron ores*

73.060.20 *Manganese ores*

73.060.30 *Chromium ores*

73.060.40 *Aluminium ores*

73.060.99 *Other metalliferous minerals*

73.080 Non-metalliferous minerals

* Including mica, fluorspar, etc.

* Industrial diamonds, see 25.100

* Precious and semi-precious stones, see 39.060

73.100 Mining equipment

* Electrical apparatus for explosive atmospheres, see 29.260.20

73.100.01 *Mining equipment in general*

73.100.10 *Tunnelling and tubing equipment*

73.100.20 *Ventilation, air-conditioning and illumination equipment*

73.100.30 *Equipment for drilling and mine excavation*

* Including equipment for seabed mining

* Drilling equipment for the petroleum industry, see 75.180.10

73.100.40 *Haulage and hoisting equipment*

73.100.99 *Other mining equipment*

73.120 Equipment for processing of minerals

* Including equipment for milling, sizing, separation, flotation, concentration, etc.

75

PETROLEUM AND RELATED TECHNOLOGIES

75.020 Extraction and processing of petroleum and natural gas

75.040 Crude petroleum

75.060 Natural gas

75.080 Petroleum products in general

75.100 Lubricants, industrial oils and related products

* Including mineral oils, fluids for metal working and for temporary protection against corrosion

* Lubrication systems, see 21.260

* Insulating oils, see 29.035.40

75.120 Hydraulic fluids

* Fluid power systems, see 23.100

75.140 Waxes, bituminous materials and other petroleum products

* Asphalts for building, see 91.100.50

* Asphalts for road construction, see 93.080.20

75.160 Fuels

75.160.01 *Fuels in general*

75.160.10 *Solid fuels*

* Including coal products, coke, peat, wood, derivatives of coal pyrolysis, etc.

* Coals, see 73.040

* Solid biofuels, see 75.160.40

75.160.20 *Liquid fuels*

* Including gasoline, diesel, kerosene, etc.

* Liquid biofuels, see 75.160.40

75.160.30 *Gaseous fuels*

* Including liquefied petroleum gases

* Hydrogen, see 71.100.20

* Natural gas, see 75.060

* Biogas, see 75.160.40

75.160.40 *Biofuels*

* Including solid biofuels, liquid biofuels and biogas

75.180 Equipment for petroleum and natural gas industries

75.180.01 *Equipment for petroleum and natural gas industries in general*

75.180.10 *Exploratory, drilling and extraction equipment*

**Including offshore structures*

75.180.20 *Processing equipment*

75.180.30 *Volumetric equipment and measurements*

75.180.99 *Other equipment for petroleum and natural gas industries*

75.200 Petroleum products and natural gas handling equipment

**Including petroleum and natural gas storage devices, distribution systems, pipelines, petrol stations, dispensing devices, etc.*

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77.020 Production of metals

77.040 Testing of metals

77.040.01 *Testing of metals in general*

77.040.10 *Mechanical testing of metals*

* Mechanical testing in general, see 19.060

* Mechanical testing of welded joints, see 25.160.40

77.040.20 *Non-destructive testing of metals*

* Non-destructive testing in general, see 19.100

* Non-destructive testing of welded joints, see 25.160.40

77.040.30 *Chemical analysis of metals*

* Chemical analysis in general, see 71.040.40

* Chemical analysis of ferrous metals, see 77.080

* Chemical analysis of ferroalloys, see 77.100

* Chemical analysis of non-ferrous metals, see 77.120

* Chemical analysis of sintered metals and hard metals, see 77.160

77.040.99 *Other methods of testing of metals*

77.060 Corrosion of metals

* Surface treatment and coating, see 25.220

77.080 Ferrous metals

* Including classification, designation, sampling, chemical analysis, etc.

* Dimensions and quality grades of iron and steel products, see 77.140

77.080.01 *Ferrous metals in general*

77.080.10 *Irons*

77.080.20 *Steels*

77.100 Ferroalloys

* Including classification, designation, sampling, chemical analysis, etc.

77.120 Non-ferrous metals

* Including classification, designation, sampling, chemical analysis, etc.

* Precious metals for dentistry, see 11.060.10

* Precious metals for jewellery, see 39.060

* Dimensions and quality grades of non-ferrous metal products, see 77.150

- 77.120.01** *Non-ferrous metals in general*
- 77.120.10** *Aluminium and aluminium alloys*
- 77.120.20** *Magnesium and magnesium alloys*
- 77.120.30** *Copper and copper alloys*
- 77.120.40** *Nickel, chromium and their alloys*
- 77.120.50** *Titanium and titanium alloys*
- 77.120.60** *Lead, zinc, tin and their alloys*
- 77.120.70** *Cadmium, cobalt and their alloys*
- 77.120.99** *Other non-ferrous metals and their alloys*

77.140 Iron and steel products

- *Standards containing quality grades and form of products should be classified in both types of relevant sub-groups
- *Steel products for aerospace construction, see 49.025.10

- 77.140.01** *Iron and steel products in general*
- 77.140.10** *Heat-treatable steels*
- 77.140.15** *Steels for reinforcement of concrete*
- 77.140.20** *Stainless steels*
 - *Including alloyed steels, corrosion-resistant steels, heat-resisting steels, etc.
- 77.140.25** *Spring steels*
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- 77.140.40** *Steels with special magnetic properties*
- 77.140.45** *Non-alloyed steels*
- 77.140.50** *Flat steel products and semi-products*
 - *Including plate, sheet and strip
 - *Steel strips for springs, see 77.140.25
- 77.140.60** *Steel bars and rods*
- 77.140.65** *Steel wire, wire ropes and link chains*
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 - *Steel wire for springs, see 77.140.25
- 77.140.70** *Steel profiles*
 - *Including sections
- 77.140.75** *Steel pipes and tubes for specific use*
 - *Including hollow steel bars and sections for construction
 - *Steel pipes for conducting fluids, see 23.040.10
- 77.140.80** *Iron and steel castings*

77.140.85 *Iron and steel forgings*

77.140.99 *Other iron and steel products*

77.150 Products of non-ferrous metals

*Including products of non-ferrous metal alloys

*Products of non-ferrous metals for aerospace construction, see 49.025

77.150.01 *Products of non-ferrous metals in general*

77.150.10 *Aluminium products*

77.150.20 *Magnesium products*

77.150.30 *Copper products*

77.150.40 *Nickel and chromium products*

77.150.50 *Titanium products*

77.150.60 *Lead, zinc and tin products*

77.150.70 *Cadmium and cobalt products*

77.150.99 *Other products of non-ferrous metals*

77.160 Powder metallurgy

*Including sintered metal materials and hardmetals

77.180 Equipment for the metallurgical industry

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WOOD TECHNOLOGY

79.020 Wood technology processes

*Including logging and wood treatment

*Wood-protecting chemicals, see 71.100.50

79.040 Wood, sawlogs and sawn timber

79.060 Wood-based panels

79.060.01 *Wood-based panels in general*

79.060.10 *Plywood*

79.060.20 *Fibre and particle boards*

79.060.99 *Other wood-based panels*

79.080 Semi-manufactures of timber

*Including parquet, wood paving, handles, etc.

79.100 Cork and cork products

79.120 Woodworking equipment

79.120.01 *Woodworking equipment in general*

79.120.10 *Woodworking machines*

*Chain- and brush-saws, see 65.060.80

79.120.20 *Woodworking tools*

79.120.99 *Other woodworking equipment*

81

GLASS AND CERAMICS INDUSTRIES

81.020 Processes in the glass and ceramics industries

81.040 Glass

81.040.01 *Glass in general*

81.040.10 *Raw materials and raw glass*

81.040.20 *Glass in building*

81.040.30 *Glass products*

*Bottles, pots, jars, see 55.100

*Laboratory glassware, see 71.040.20

81.060 Ceramics

*Including glass-ceramics

81.060.01 *Ceramics in general*

81.060.10 *Raw materials*

81.060.20 *Ceramic products*

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*Sanitary ceramic products, see 91.140.70

81.060.30 *Advanced ceramics*

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81.080 Refractories

*Including ceramic refractories

81.100 Equipment for the glass and ceramics industries

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83.020 Manufacturing processes in the rubber and plastics industries

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83.040.01 *Raw materials for rubber and plastics in general*

83.040.10 *Latex and raw rubber*

83.040.20 *Rubber compounding ingredients*

*Including carbon black, kaolin clay, etc.

83.040.30 *Auxiliary materials and additives for plastics*

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83.060 Rubber

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83.080.01 *Plastics in general*

83.080.10 *Thermosetting materials*

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83.140.30 *Plastics pipes and fittings for non fluid use*

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*Including tubes and valves

83.160.01 *Tyres in general*

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*Including cycle tyres, and tyre retreading and repair processes

83.160.20 *Aircraft tyres*

83.160.30 *Tyres for agricultural machinery*

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*Including adhesive tapes

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83.200 Equipment for the rubber and plastics industries

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85.020 Paper production processes

*Including paper recycling

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85.080 Paper products

*Including paper based stationery

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85.080.01 *Paper products in general*

85.080.10 *Office paper*

85.080.20 *Tissue paper*

85.080.30 *Cardboard*

*Including corrugated fibreboard

*Paper for packaging, see 55.040

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85.100 Equipment for the paper industry

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87.020 Paint coating processes

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87.040 Paints and varnishes

*Including coating powders, paint coatings and protective paint systems

87.060 Paint ingredients

87.060.01 *Paint ingredients in general*

87.060.10 *Pigments and extenders*

87.060.20 *Binders*

87.060.30 *Solvents*

87.060.99 *Other paint ingredients*

87.080 Inks. Printing inks

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91.010 Construction industry

91.010.01 *Construction industry in general*

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91.010.10 *Legal aspects*

91.010.20 *Contractual aspects*

*Including construction procurement

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*Including tolerances, modular coordination, etc.

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91.020 Physical planning. Town planning

91.040 Buildings

91.040.01 *Buildings in general*

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*Building materials, see 91.100

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*Including ecclesiastical buildings and hospitals

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91.060 Elements of buildings

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*Including flues and flue pipes

91.060.50 *Doors and windows*

*Including doorsets, their components, blinds, shutters

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91.060.99 *Other elements of buildings*

91.080 Structures of buildings

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*Including the repair and protection of concrete products and structures

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91.140.40 *Gas supply systems*

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91.140.50 *Electricity supply systems*

* Including electric energy meters in buildings, emergency electrical supplies, etc.

91.140.60 *Water supply systems*

* Including water meters in buildings

* External water conveyance systems, see 93.025

* Pipelines and its parts for external water conveyance systems, see 23.040.03

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91.140.70 *Sanitary installations*

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91.140.80 *Drainage systems*

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91.140.90 *Lifts. Escalators*

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91.160 Lighting

* Including oil and gas lamps

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91.180 Interior finishing

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* Including the construction of tramways, funicular railways, cableways, rail traffic control equipment and installations, etc.

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97.030 Domestic electrical appliances in general

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97.040.30 *Domestic refrigerating appliances*

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(NO TITLE)

*This field is reserved for internal miscellaneous purposes

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11.160	Aid • First aid
11.180	Aids • Aids for disabled or handicapped persons
11.180.01	Aids • Aids for disabled and handicapped persons in general
11.180.10	Aids • Aids and adaptation for moving
11.180.15	Aids • Aids for deaf and hearing impaired people
11.180.20	Aids • Aids for incontinence and ostomy
11.180.30	Aids • Aids for blind or partially sighted people
11.180.40	Aids • Aids for drinking and eating
11.180.99	Aids • Other standards related to aids for disabled and handicapped people
13.340.70	Aids • Lifejackets, buoyancy aids and flotation devices
03.220.50	Air • Air transport
13.040	Air • Air quality
13.040.01	Air • Air quality in general
13.040.99	Air • Other standards related to air quality
47.020.90	Air • Marine ventilation, air conditioning and heating systems
55.180.30	Air • Air mode containers, pallets and nets
23.120	Air-conditioners • Ventilators. Fans. Air-conditioners
73.100.20	Air-conditioning • Ventilation, air-conditioning and illumination equipment
91.140.30	Air-conditioning • Ventilation and air-conditioning systems
43.060.20	Air/exhaust • Pressure charging and air/exhaust gas ducting systems
01.040.49	Aircraft • Aircraft and space vehicle engineering (Vocabularies)
49	Aircraft • Aircraft and space vehicle engineering
49.020	Aircraft • Aircraft and space vehicles in general
83.160.20	Aircraft • Aircraft tyres
93.120	Airports • Construction of airports
13.320	Alarm • Alarm and warning systems
67.160.10	Alcoholic • Alcoholic beverages
71.080.60	Alcohols • Alcohols. Ethers
71.080.80	Aldehydes • Aldehydes and ketones
71.080.10	Aliphatic • Aliphatic hydrocarbons
29.220.30	Alkaline • Alkaline secondary cells and batteries
49.025.05	Alloys • Ferrous alloys in general
49.025.15	Alloys • Non-ferrous alloys in general

77.120.10	Alloys • Aluminium and aluminium alloys
77.120.20	Alloys • Magnesium and magnesium alloys
77.120.30	Alloys • Copper and copper alloys
77.120.40	Alloys • Nickel, chromium and their alloys
77.120.50	Alloys • Titanium and titanium alloys
77.120.60	Alloys • Lead, zinc, tin and their alloys
77.120.70	Alloys • Cadmium, cobalt and their alloys
77.120.99	Alloys • Other non-ferrous metals and their alloys
27.190	Alternative • Biological sources and alternative sources of energy
31.060.50	Aluminium • Aluminium electrolytic capacitors
49.025.20	Aluminium • Aluminium
71.100.10	Aluminium • Materials for aluminium production
73.060.40	Aluminium • Aluminium ores
77.120.10	Aluminium • Aluminium and aluminium alloys
77.150.10	Aluminium • Aluminium products
91.080.17	Aluminium • Aluminium structures
13.040.20	Ambient • Ambient atmospheres
33.160.10	Amplifiers • Amplifiers
33.180.30	Amplifiers • Optic amplifiers
11.040.10	Anaesthetic • Anaesthetic, respiratory and reanimation equipment
11.100.30	Analysis • Analysis of blood and urine
19.120	Analysis • Particle size analysis. Sieving
67.050	Analysis • General methods of tests and analysis for food products
67.240	Analysis • Sensory analysis
71.040.40	Analysis • Chemical analysis
71.040.50	Analysis • Physicochemical methods of analysis
77.040.30	Analysis • Chemical analysis of metals
71.040	Analytical • Analytical chemistry
71.040.01	Analytical • Analytical chemistry in general
71.040.99	Analytical • Other standards related to analytical chemistry
17.040	Angular • Linear and angular measurements
17.040.01	Angular • Linear and angular measurements in general
17.040.99	Angular • Other standards related to linear and angular measurements
17.080	Angular • Measurement of time, velocity, acceleration, angular velocity
71.080.50	Anhydrides • Anhydrides
65.020.30	Animal • Animal husbandry and breeding
65.120	Animal • Animal feeding stuffs
67.120	Animal • Meat, meat products and other animal produce
67.120.01	Animal • Animal produce in general
67.120.99	Animal • Other animal produce
67.200.10	Animal • Animal and vegetable fats and oils
71.100.45	Antifreezes • Refrigerants and antifreezes
11.080.20	Antiseptics • Disinfectants and antiseptics
01.040.07	Applied • Natural and applied sciences (Vocabularies)
07	Applied • Natural and applied sciences
59.100.30	Aramide • Aramide materials
13.340.40	Arm • Hand and arm protection
71.080.15	Aromatic • Aromatic hydrocarbons
29.240.10	Arresters • Substations. Surge arresters

97.195	Art • Items of art and handicrafts. Cultural property and heritage
67.250	Articles • Materials and articles in contact with foodstuffs
21.080	Articulated • Hinges, eyelets and other articulated joints
23.040.70	Assemblies • Hoses and hose assemblies
23.040.80	Assemblies • Seals for pipe and hose assemblies
31.190	Assemblies • Electronic component assemblies
03.120.20	Assessment • Product and company certification. Conformity assessment
13.020.30	Assessment • Environmental impact assessment
03.120.10	Assurance • Quality management and quality assurance
07.040	Astronomy • Astronomy. Geodesy. Geography
13.040.20	Atmospheres • Ambient atmospheres
13.040.30	Atmospheres • Workplace atmospheres
29.260.20	Atmospheres • Electrical apparatus for explosive atmospheres
01.040.33	Audio • Telecommunications. Audio and video engineering (Vocabularies)
33	Audio • Telecommunications. Audio and video engineering
33.160	Audio • Audio, video and audiovisual engineering
33.160.01	Audio • Audio, video and audiovisual systems in general
33.160.30	Audio • Audio systems
33.160.99	Audio • Other audio, video and audiovisual equipment
35.040.40	Audio • Coding of audio, video, multimedia and hypermedia information
33.160	Audiovisual • Audio, video and audiovisual engineering
33.160.01	Audiovisual • Audio, video and audiovisual systems in general
33.160.99	Audiovisual • Other audio, video and audiovisual equipment
35.040.50	Automatic • Automatic identification and data capture techniques
97.120	Automatic • Automatic controls for household use
25.040	Automation • Industrial automation systems
25.040.01	Automation • Industrial automation systems in general
25.040.99	Automation • Other industrial automation systems

B

55.080	Bags • Sacks. Bags
21.120.40	Balancing • Balancing and balancing machines
23.060.20	Ball • Ball and plug valves
03.060	Banking • Finances. Banking. Monetary systems. Insurance
35.240.40	Banking • IT applications in banking
55.140	Barrels • Barrels. Drums. Canisters
77.140.60	Bars • Steel bars and rods
71.060.40	Bases • Bases
29.220	Batteries • Galvanic cells and batteries
29.220.01	Batteries • Galvanic cells and batteries in general
29.220.10	Batteries • Primary cells and batteries
29.220.20	Batteries • Acid secondary cells and batteries
29.220.30	Batteries • Alkaline secondary cells and batteries
29.220.99	Batteries • Other cells and batteries

21.100	Bearings • Bearings
21.100.01	Bearings • Bearings in general
21.100.10	Bearings • Plain bearings
21.100.20	Bearings • Rolling bearings
65.140	Beekeeping • Beekeeping
13.220.40	Behaviour • Ignitability and burning behaviour of materials and products
13.140	Beings • Noise with respect to human beings
13.160	Beings • Vibration and shock with respect to human beings
21.220.10	Belt • Belt drives and their components
67.160	Beverages • Beverages
67.160.01	Beverages • Beverages in general
67.160.10	Beverages • Alcoholic beverages
67.160.20	Beverages • Non-alcoholic beverages
87.060.20	Binders • Binders
91.100.50	Binders • Binders. Sealing materials
13.020.55	Biobased • Biobased products
75.160.40	Biofuels • Biofuels
11.100.20	Biological • Biological evaluation of medical devices
13.060.70	Biological • Examination of biological properties of water
13.080.30	Biological • Biological properties of soils
27.190	Biological • Biological sources and alternative sources of energy
07.080	Biology • Biology. Botany. Zoology
35.240.15	Biometrics • Identification cards. Chip cards. Biometrics
11.200	Birth • Birth control. Mechanical contraceptives
75.140	Bituminous • Waxes, bituminous materials and other petroleum products
11.180.30	Blind • Aids for blind or partially sighted people
43.060.10	Block • Engine block and internal components
11.100.30	Blood • Analysis of blood and urine
29.035.10	Board • Paper and board insulating materials
43.040.15	Board • Car informatics. On board computer systems
85.060	Board • Paper and board
31.180	Boards • Printed circuits and boards
79.060.20	Boards • Fibre and particle boards
55.060	Bobbins • Spools. Bobbins
43.040.60	Bodies • Bodies and body components
43.040.60	Body • Bodies and body components
97.170	Body • Body care equipment
27.060	Boilers • Burners. Boilers
27.060.01	Boilers • Burners and boilers in general
27.060.30	Boilers • Boilers and heat exchangers
21.060.10	Bolts • Bolts, screws, studs
49.030.20	Bolts • Bolts, screws, studs
25.080.20	Boring • Boring and milling machines
07.080	Botany • Biology. Botany. Zoology
55.100	Bottles • Bottles. Pots. Jars
55.160	Boxes • Cases. Boxes. Crates
43.040.40	Braking • Braking systems
25.160	Brazing • Welding, brazing and soldering
25.160.01	Brazing • Welding, brazing and soldering in general

25.160.50	Brazing • Brazing and soldering
65.020.30	Breeding • Animal husbandry and breeding
65.150	Breeding • Fishing and fish breeding
93.040	Bridge • Bridge construction
25.080.30	Broaching • Broaching machines
25.100.25	Broaching • Tools for planing and broaching machines
33.170	Broadcasting • Television and radio broadcasting
01.040.91	Building • Construction materials and building (Vocabularies)
13.220.50	Building • Fire-resistance of building materials and elements
35.240.67	Building • IT applications in building and construction industry
81.040.20	Building • Glass in building
91	Building • Construction materials and building
91.100.25	Building • Terracotta building products
91.120.20	Building • Acoustics in building. Sound insulation
91.160.20	Building • Exterior building lighting
91.190	Building • Building accessories
65.040	Buildings • Farm buildings, structures and installations
65.040.01	Buildings • Farm buildings and installations in general
65.040.10	Buildings • Livestock buildings, installations and equipment
65.040.20	Buildings • Buildings and installations for processing and storage of agricultural produce
65.040.99	Buildings • Other standards related to farm buildings and installations
91.040	Buildings • Buildings
91.040.01	Buildings • Buildings in general
91.040.10	Buildings • Public buildings
91.040.20	Buildings • Buildings for commerce and industry
91.040.30	Buildings • Residential buildings
91.040.99	Buildings • Other buildings
91.060	Buildings • Elements of buildings
91.060.01	Buildings • Elements of buildings in general
91.060.99	Buildings • Other elements of buildings
91.080	Buildings • Structures of buildings
91.080.01	Buildings • Structures of buildings in general
91.120	Buildings • Protection of and in buildings
91.120.01	Buildings • Protection of and in buildings in general
91.120.10	Buildings • Thermal insulation of buildings
91.120.99	Buildings • Other standards related to protection of and in buildings
91.140	Buildings • Installations in buildings
91.140.01	Buildings • Installations in buildings in general
91.140.99	Buildings • Other installations in buildings
13.340.70	Buoyancy • Lifejackets, buoyancy aids and flotation devices
27.060	Burners • Burners. Boilers
27.060.01	Burners • Burners and boilers in general
27.060.10	Burners • Liquid and solid fuel burners
27.060.20	Burners • Gas fuel burners
13.220.40	Burning • Ignitability and burning behaviour of materials and products
43.080.20	Buses • Buses
21.060.60	Bushes • Rings, bushes, sleeves, collars
29.080.20	Bushings • Bushings
67.100.20	Butter • Butter

C

49.095	Cabin • Passenger and cabin equipment
21.220.20	Cable • Cable or rope drives and their components
33.060.40	Cabled • Cabled distribution systems
29.060	Cables • Electrical wires and cables
29.060.01	Cables • Electrical wires and cables in general
29.060.20	Cables • Cables
33.120.10	Cables • Coaxial cables. Waveguides
33.120.20	Cables • Wires and symmetrical cables
33.180.10	Cables • Fibres and cables
45.100	Cableway • Cableway equipment
35.240.10	Cad • Computer-aided design (CAD)
77.120.70	Cadmium • Cadmium, cobalt and their alloys
77.150.70	Cadmium • Cadmium and cobalt products
17.200.10	Calorimetry • Heat. Calorimetry
97.200.30	Camp-sites • Camping equipment and camp-sites
97.200.30	Camping • Camping equipment and camp-sites
55.140	Canisters • Barrels. Drums. Canisters
55.120	Cans • Cans. Tins. Tubes
31.060	Capacitors • Capacitors
31.060.01	Capacitors • Capacitors in general
31.060.10	Capacitors • Fixed capacitors
31.060.20	Capacitors • Ceramic and mica capacitors
31.060.30	Capacitors • Paper and plastics capacitors
31.060.40	Capacitors • Tantalum electrolytic capacitors
31.060.50	Capacitors • Aluminium electrolytic capacitors
31.060.60	Capacitors • Variable capacitors
31.060.70	Capacitors • Power capacitors
31.060.99	Capacitors • Other capacitors
29.140.10	Caps • Lamp caps and holders
35.040.50	Capture • Automatic identification and data capture techniques
43.040.15	Car • Car informatics. On board computer systems
43.100	Caravans • Passenger cars. Caravans and light trailers
59.100.20	Carbon • Carbon materials
85.080.30	Cardboard • Cardboard
35.220.10	Cards • Paper cards and tapes
35.240.15	Cards • Identification cards. Chip cards. Biometrics
01.040.11	Care • Health care technology (Vocabularies)
11	Care • Health care technology
11.020	Care • Medical sciences and health care facilities in general
11.020.01	Care • Quality and environmental management in health care
11.020.10	Care • Health care services in general
11.020.99	Care • Other standards related to health care in general

35.240.80	Care • IT applications in health care technology
65.060.40	Care • Plant care equipment
97.170	Care • Body care equipment
47.020.40	Cargo • Lifting and cargo handling equipment
47.020.85	Cargo • Cargo spaces
49.120	Cargo • Cargo equipment
43.100	Cars • Passenger cars. Caravans and light trailers
35.220.23	Cartridges • Cassettes and cartridges for magnetic tapes
37.040.20	Cartridges • Photographic paper, films and plates. Cartridges
37.060.20	Cartridges • Motion picture films. Cartridges
55.160	Cases • Cases. Boxes. Crates
35.220.23	Cassettes • Cassettes and cartridges for magnetic tapes
77.140.80	Castings • Iron and steel castings
11.040.25	Catheters • Syringes, needles and catheters
91.060.30	Ceilings • Ceilings. Floors. Stairs
27.070	Cells • Fuel cells
29.220	Cells • Galvanic cells and batteries
29.220.01	Cells • Galvanic cells and batteries in general
29.220.10	Cells • Primary cells and batteries
29.220.20	Cells • Acid secondary cells and batteries
29.220.30	Cells • Alkaline secondary cells and batteries
29.220.99	Cells • Other cells and batteries
83.100	Cellular • Cellular materials
91.100.10	Cement • Cement. Gypsum. Lime. Mortar
91.100.40	Cement • Products in fibre-reinforced cement
91.140.10	Central • Central heating systems
25.040.10	Centres • Machining centres
29.035.30	Ceramic • Glass and ceramic insulating materials
31.060.20	Ceramic • Ceramic and mica capacitors
81.060.20	Ceramic • Ceramic products
91.100.23	Ceramic • Ceramic tiles
01.040.81	Ceramics • Glass and ceramics industries (Vocabularies)
81	Ceramics • Glass and ceramics industries
81.020	Ceramics • Processes in the glass and ceramics industries
81.060	Ceramics • Ceramics
81.060.01	Ceramics • Ceramics in general
81.060.30	Ceramics • Advanced ceramics
81.060.99	Ceramics • Other standards related to ceramics
81.100	Ceramics • Equipment for the glass and ceramics industries
67.060	Cereals • Cereals, pulses and derived products
03.120.20	Certification • Product and company certification. Conformity assessment
21.220.30	Chain • Chain drives and their components
77.140.65	Chains • Steel wire, wire ropes and link chains
17.120.20	Channels • Flow in open channels
01.075	Character • Character symbols
35.040.10	Character • Coding of character sets
43.060.20	Charging • Pressure charging and air/exhaust gas ducting systems
01.080.40	Charts • Graphical symbols for use on electrical and electronics engineering drawings, diagrams, charts and in relevant technical product documentation

23.060.50	Check • Check valves
67.100.30	Cheese • Cheese
37.040.30	Chemicals • Photographic chemicals
71.060	Chemicals • Inorganic chemicals
71.060.01	Chemicals • Inorganic chemicals in general
71.060.99	Chemicals • Other inorganic chemicals
71.080	Chemicals • Organic chemicals
71.080.01	Chemicals • Organic chemicals in general
71.080.99	Chemicals • Other organic chemicals
71.100.35	Chemicals • Chemicals for industrial and domestic disinfection purposes
71.100.50	Chemicals • Wood-protecting chemicals
71.100.80	Chemicals • Chemicals for purification of water
07.030	Chemistry • Physics. Chemistry
71.040	Chemistry • Analytical chemistry
71.040.01	Chemistry • Analytical chemistry in general
71.040.99	Chemistry • Other standards related to analytical chemistry
97.190	Children • Equipment for children
91.060.40	Chimneys • Chimneys, shafts, ducts
35.240.15	Chip • Identification cards. Chip cards. Biometrics
25.120	Chipless • Chipless working equipment
25.120.01	Chipless • Chipless working equipment in general
25.120.99	Chipless • Other chipless working equipment
67.190	Chocolate • Chocolate
73.060.30	Chromium • Chromium ores
77.120.40	Chromium • Nickel, chromium and their alloys
77.150.40	Chromium • Nickel and chromium products
37.060	Cinematography • Cinematography
37.060.01	Cinematography • Cinematography in general
37.060.99	Cinematography • Other standards related to cinematography
31.180	Circuits • Printed circuits and boards
31.200	Circuits • Integrated circuits. Microelectronics
33.040.50	Circuits • Lines, connections and circuits
01.040.93	Civil • Civil engineering (Vocabularies)
93	Civil • Civil engineering
93.010	Civil • Civil engineering in general
21.060.70	Clamps • Clamps and staples
97.080	Cleaning • Cleaning appliances
13.040.35	Cleanrooms • Cleanrooms and associated controlled environments
39.040.20	Clocks • Clocks
17.120.10	Closed • Flow in closed conduits
61.020	Clothes • Clothes
01.040.61	Clothing • Clothing industry (Vocabularies)
13.340.10	Clothing • Protective clothing
61	Clothing • Clothing industry
61.040	Clothing • Headgear. Clothing accessories. Fastening of clothing
61.080	Clothing • Sewing machines and other equipment for the clothing industry
35.210	Cloud • Cloud computing
73.040	Coals • Coals
59.080.40	Coated • Coated fabrics

25.220	Coating • Surface treatment and coating
25.220.01	Coating • Surface treatment and coating in general
87.020	Coating • Paint coating processes
87.100	Coating • Paint coating equipment
25.220.40	Coatings • Metallic coatings
25.220.60	Coatings • Organic coatings
25.220.99	Coatings • Other treatments and coatings
49.040	Coatings • Coatings and related processes used in aerospace industry
33.120.10	Coaxial • Coaxial cables. Waveguides
77.120.70	Cobalt • Cadmium, cobalt and their alloys
77.150.70	Cobalt • Cadmium and cobalt products
67.140	Cocoa • Tea. Coffee. Cocoa
67.140.30	Cocoa • Cocoa
01.070	Coding • Colour coding
35.040	Coding • Information coding
35.040.01	Coding • Information coding in general
35.040.10	Coding • Coding of character sets
35.040.30	Coding • Coding of graphical and photographic information
35.040.40	Coding • Coding of audio, video, multimedia and hypermedia information
35.040.99	Coding • Other standards related to information coding
67.140	Coffee • Tea. Coffee. Cocoa
67.140.20	Coffee • Coffee and coffee substitutes
21.060.60	Collars • Rings, bushes, sleeves, collars
01.040.87	Colour • Paint and colour industries (Vocabularies)
01.070	Colour • Colour coding
87	Colour • Paint and colour industries
17.180.20	Colours • Colours and measurement of light
71.120.20	Columns • Columns
27.020	Combustion • Internal combustion engines
43.060	Combustion • Internal combustion engines for road vehicles
43.060.01	Combustion • Internal combustion engines for road vehicles in general
43.060.99	Combustion • Other components and systems of internal combustion engines
01.140.30	Commerce • Documents in administration, commerce and industry
91.040.20	Commerce • Buildings for commerce and industry
01.040.97	Commercial • Domestic and commercial equipment. Entertainment. Sports (Vocabularies)
03.100.20	Commercial • Trade. Commercial function. Marketing
43.080	Commercial • Commercial vehicles
43.080.01	Commercial • Commercial vehicles in general
43.080.99	Commercial • Other commercial vehicles
97	Commercial • Domestic and commercial equipment. Entertainment. Sports
97.100	Commercial • Domestic, commercial and industrial heating appliances
97.130.20	Commercial • Commercial refrigerating appliances
97.180	Commercial • Miscellaneous domestic and commercial equipment
33.040.40	Communication • Data communication networks
33.070.50	Communication • Global System for Mobile Communication (GSM)
33.060.30	Communications • Radio relay and fixed satellite communications systems
33.180	Communications • Fibre optic communications
03.080.20	Companies • Services for companies

01.040.03	Company • Services. Company organization, management and quality. Administration. Transport. Sociology. (Vocabularies)
03	Company • Services. Company organization, management and quality. Administration. Transport. Sociology
03.100	Company • Company organization and management. Management systems
03.100.01	Company • Company organization and management in general
03.100.99	Company • Other standards related to company organization and management
03.120.20	Company • Product and company certification. Conformity assessment
33.100	Compatibility • Electromagnetic compatibility (EMC)
33.100.01	Compatibility • Electromagnetic compatibility in general
59.100	Composites • Materials for the reinforcement of composites
59.100.01	Composites • Materials for the reinforcement of composites in general
59.100.99	Composites • Other materials for the reinforcement of composites
83.040.20	Compounding • Rubber compounding ingredients
71.080.30	Compounds • Organic nitrogen compounds
11.120.20	Compresses • Wound dressings and compresses
23.140	Compressors • Compressors and pneumatic machines
35.140	Computer • Computer graphics
43.040.15	Computer • Car informatics. On board computer systems
35.240.10	Computer-aided • Computer-aided design (CAD)
35.210	Computing • Cloud computing
73.060	Concentrates • Metalliferous minerals and their concentrates
77.140.15	Concrete • Steels for reinforcement of concrete
91.080.40	Concrete • Concrete structures
91.100.30	Concrete • Concrete and concrete products
67.220	Condiments • Spices and condiments. Food additives
67.220.10	Condiments • Spices and condiments
47.020.90	Conditioning • Marine ventilation, air conditioning and heating systems
19.020	Conditions • Test conditions and procedures in general
29.260	Conditions • Electrical equipment for working in special conditions
29.260.01	Conditions • Electrical equipment for working in special conditions in general
29.260.99	Conditions • Other electrical equipment for working in special conditions
29.050	Conducting • Superconductivity and conducting materials
17.120.10	Conduits • Flow in closed conduits
29.120.10	Conduits • Conduits for electrical purposes
67.100.40	Confectionery • Ice cream and ice confectionery
03.120.20	Conformity • Product and company certification. Conformity assessment
29.120.20	Connecting • Connecting devices
33.040.50	Connections • Lines, connections and circuits
31.220.10	Connectors • Plug-and-socket devices. Connectors
33.120.30	Connectors • RF connectors
13.020.40	Conservation • Pollution, pollution control and conservation
27.015	Conservation • Energy efficiency. Energy conservation in general
01.040.91	Construction • Construction materials and building (Vocabularies)
01.080.30	Construction • Graphical symbols for use on mechanical engineering and construction drawings, diagrams, plans, maps and in relevant technical product documentation
01.100.30	Construction • Construction drawings
35.240.67	Construction • IT applications in building and construction industry
45.120	Construction • Equipment for railway/cableway construction and maintenance

49.025	Construction • Materials for aerospace construction
49.025.01	Construction • Materials for aerospace construction in general
49.030	Construction • Fasteners for aerospace construction
49.035	Construction • Components for aerospace construction
91	Construction • Construction materials and building
91.010	Construction • Construction industry
91.010.01	Construction • Construction industry in general
91.100	Construction • Construction materials
91.100.01	Construction • Construction materials in general
91.100.99	Construction • Other construction materials
91.200	Construction • Construction technology
91.220	Construction • Construction equipment
93.020	Construction • Earthworks. Excavations. Foundation construction. Underground works
93.040	Construction • Bridge construction
93.060	Construction • Tunnel construction
93.080.10	Construction • Road construction
93.080.20	Construction • Road construction materials
93.100	Construction • Construction of railways
93.110	Construction • Construction of ropeways
93.120	Construction • Construction of airports
93.140	Construction • Construction of waterways, ports and dykes
93.160	Construction • Hydraulic construction
25.160.20	Consumables • Welding consumables
03.080.30	Consumers • Services for consumers
67.250	Contact • Materials and articles in contact with foodstuffs
23.020.10	Containers • Stationary containers and tanks
23.020.20	Containers • Vessels and containers mounted on vehicles
55.130	Containers • Aerosol containers
55.180.10	Containers • General purpose containers
55.180.30	Containers • Air mode containers, pallets and nets
23.100.60	Contamination • Filters, seals and contamination of fluids
53.040	Continuous • Continuous handling equipment
53.040.01	Continuous • Continuous handling equipment in general
53.040.99	Continuous • Other continuous handling equipment
11.200	Contraceptives • Birth control. Mechanical contraceptives
91.010.20	Contractual • Contractual aspects
11.200	Control • Birth control. Mechanical contraceptives
13.020.40	Control • Pollution, pollution control and conservation
13.200	Control • Accident and disaster control
23.100.50	Control • Control components
25.040.40	Control • Industrial process measurement and control
29.240.30	Control • Control equipment for electric power systems
43.040.30	Control • Indicating and control devices
43.060.50	Control • Electrical and electronic equipment. Control systems
47.020.70	Control • Navigation and control equipment
29.130	Controlgear • Switchgear and controlgear
29.130.01	Controlgear • Switchgear and controlgear in general
29.130.10	Controlgear • High voltage switchgear and controlgear
29.130.20	Controlgear • Low voltage switchgear and controlgear

29.130.99	Controlgear • Other switchgear and controlgear
13.040.35	Controlled • Cleanrooms and associated controlled environments
25.040.20	Controlled • Numerically controlled machines
97.120	Controls • Automatic controls for household use
29.200	Converters • Rectifiers. Converters. Stabilized power supply
23.040.03	Conveyance • Pipelines and its parts for external water conveyance systems
93.025	Conveyance • External water conveyance systems
53.040.10	Conveyors • Conveyors
53.040.20	Conveyors • Components for conveyors
97.040.20	Cooking • Cooking ranges, working tables, ovens and similar appliances
97.040.60	Cookware • Cookware, cutlery and flatware
43.060.30	Cooling • Cooling systems. Lubricating systems
01.020	Coordination • Terminology (principles and coordination)
77.120.30	Copper • Copper and copper alloys
77.150.30	Copper • Copper products
33.070.30	Cordless • Digital Enhanced Cordless Telecommunications (DECT)
79.100	Cork • Cork and cork products
77.060	Corrosion • Corrosion of metals
07.100.40	Cosmetics • Cosmetics microbiology
71.100.70	Cosmetics • Cosmetics. Toiletries
25.100.30	Countersinks • Drills, countersinks, reamers
29.120.30	Couplers • Plugs, socket-outlets, couplers
21.120	Couplings • Shafts and couplings
21.120.01	Couplings • Shafts and couplings in general
21.120.20	Couplings • Couplings
21.120.99	Couplings • Other standards related to shafts and couplings
23.040.60	Couplings • Flanges, couplings and joints
23.100.40	Couplings • Piping and couplings
43.040.70	Couplings • Couplings
97.150	Coverings • Floor coverings
47.080	Craft • Small craft
53.020.20	Cranes • Cranes
43.040.80	Crash • Crash protection and restraint systems
55.160	Crates • Cases. Boxes. Crates
67.100.40	Cream • Ice cream and ice confectionery
13.310	Crime • Protection against crime
75.040	Crude • Crude petroleum
23.020.40	Cryogenic • Cryogenic vessels
97.195	Cultural • Items of art and handicrafts. Cultural property and heritage
97.040.60	Cutlery • Cookware, cutlery and flatware
25.100	Cutting • Cutting tools
25.100.01	Cutting • Cutting tools in general
25.100.99	Cutting • Other cutting tools
43.150	Cycles • Cycles
23.020.35	Cylinders • Gas cylinders
23.100.20	Cylinders • Cylinders

D

13.300	Dangerous • Protection against dangerous goods
33.040.40	Data • Data communication networks
35.040.50	Data • Automatic identification and data capture techniques
35.100.20	Data • Data link layer
35.220	Data • Data storage devices
35.220.01	Data • Data storage devices in general
35.220.99	Data • Other data storage devices
11.180.15	Deaf • Aids for deaf and hearing impaired people
47.020.50	Deck • Deck equipment and installations
33.070.30	Dect • Digital Enhanced Cordless Telecommunications (DECT)
03.020	Demography • Sociology. Demography
17.060	Density • Measurement of volume, mass, density, viscosity
11.060.10	Dental • Dental materials
11.060.15	Dental • Dental implants
11.060.20	Dental • Dental equipment
11.060.25	Dental • Dental instruments
11.060	Dentistry • Dentistry
11.060.01	Dentistry • Dentistry in general
21.020	Design • Characteristics and design of machines, apparatus, equipment
35.240.10	Design • Computer-aided design (CAD)
03.100.40	Development • Research and development
11.040.55	Diagnostic • Diagnostic equipment
11.100.10	Diagnostic • In vitro diagnostic test systems
43.180	Diagnostic • Diagnostic, maintenance and test equipment
01.080.30	Diagrams • Graphical symbols for use on mechanical engineering and construction drawings, diagrams, plans, maps and in relevant technical product documentation
01.080.40	Diagrams • Graphical symbols for use on electrical and electronics engineering drawings, diagrams, charts and in relevant technical product documentation
25.100.50	Dies • Taps and threading dies
33.070.30	Digital • Digital Enhanced Cordless Telecommunications (DECT)
33.080	Digital • Integrated Services Digital Network (ISDN)
31.080.10	Diodes • Diodes
11.180	Disabled • Aids for disabled or handicapped persons
11.180.01	Disabled • Aids for disabled and handicapped persons in general
11.180.99	Disabled • Other standards related to aids for disabled and handicapped people
13.200	Disaster • Accident and disaster control
29.140.30	Discharge • Fluorescent lamps. Discharge lamps
97.040.40	Dishwashers • Dishwashers
11.080.20	Disinfectants • Disinfectants and antiseptics
11.080	Disinfection • Sterilization and disinfection
11.080.01	Disinfection • Sterilization and disinfection in general
11.080.99	Disinfection • Other standards related to sterilization and disinfection

71.100.35	Disinfection • Chemicals for industrial and domestic disinfection purposes
35.220.21	Disks • Magnetic disks
31.120	Display • Electronic display devices
13.030.40	Disposal • Installations and equipment for waste disposal and treatment
01.040.55	Distribution • Packaging and distribution of goods (Vocabularies)
29.240	Distribution • Power transmission and distribution networks
29.240.01	Distribution • Power transmission and distribution networks in general
29.240.20	Distribution • Power transmission and distribution lines
29.240.99	Distribution • Other equipment related to power transmission and distribution networks
33.060.40	Distribution • Cabled distribution systems
55	Distribution • Packaging and distribution of goods
55.020	Distribution • Packaging and distribution of goods in general
55.180	Distribution • Freight distribution of goods
55.180.01	Distribution • Freight distribution of goods in general
55.180.99	Distribution • Other standards related to freight distribution of goods
55.230	Distribution • Distribution and vending machines
65.060.25	Distribution • Equipment for storage, preparation and distribution of fertilizers
23.040.07	District • Pipelines and its parts for district heat
25.060.20	Dividing • Dividing and tool-workpiece holding devices
37.080	Document • Document imaging applications
01	Documentation • Generalities. Terminology. Standardization. Documentation
01.040.01	Documentation • Generalities. Terminology. Standardization. Documentation (Vocabularies)
01.080.30	Documentation • Graphical symbols for use on mechanical engineering and construction drawings, diagrams, plans, maps and in relevant technical product documentation
01.080.40	Documentation • Graphical symbols for use on electrical and electronics engineering drawings, diagrams, charts and in relevant technical product documentation
01.080.50	Documentation • Graphical symbols for use on information technology and telecommunications technical drawings and in relevant technical product documentation
01.110	Documentation • Technical product documentation
35.240.30	Documentation • IT applications in information, documentation and publishing
01.140.30	Documents • Documents in administration, commerce and industry
01.040.97	Domestic • Domestic and commercial equipment. Entertainment. Sports (Vocabularies)
13.120	Domestic • Domestic safety
71.100.35	Domestic • Chemicals for industrial and domestic disinfection purposes
97	Domestic • Domestic and commercial equipment. Entertainment. Sports
97.030	Domestic • Domestic electrical appliances in general
97.040.30	Domestic • Domestic refrigerating appliances
97.100	Domestic • Domestic, commercial and industrial heating appliances
97.180	Domestic • Miscellaneous domestic and commercial equipment
91.060.50	Doors • Doors and windows
65.060.35	Drainage • Irrigation and drainage equipment
91.140.80	Drainage • Drainage systems
01.100.40	Drawing • Drawing equipment
25.120.20	Drawing • Rolling, extruding and drawing equipment
01.080.30	Drawings • Graphical symbols for use on mechanical engineering and construction drawings, diagrams, plans, maps and in relevant technical product documentation
01.080.40	Drawings • Graphical symbols for use on electrical and electronics engineering drawings, diagrams, charts and in relevant technical product documentation

01.080.50	Drawings • Graphical symbols for use on information technology and telecommunications technical drawings and in relevant technical product documentation
01.100	Drawings • Technical drawings
01.100.01	Drawings • Technical drawings in general
01.100.20	Drawings • Mechanical engineering drawings
01.100.25	Drawings • Electrical and electronics engineering drawings
01.100.27	Drawings • Technical drawings for telecommunications and information technology fields
01.100.30	Drawings • Construction drawings
01.100.99	Drawings • Other standards related to technical drawings
11.120.20	Dressings • Wound dressings and compresses
25.080.40	Drilling • Drilling machines
73.100.30	Drilling • Equipment for drilling and mine excavation
75.180.10	Drilling • Exploratory, drilling and extraction equipment
25.100.30	Drills • Drills, countersinks, reamers
11.180.40	Drinking • Aids for drinking and eating
13.060.20	Drinking • Drinking water
21.220	Drives • Flexible drives and transmissions
21.220.01	Drives • Flexible drives and transmissions in general
21.220.10	Drives • Belt drives and their components
21.220.20	Drives • Cable or rope drives and their components
21.220.30	Drives • Chain drives and their components
21.220.99	Drives • Other flexible drives and transmissions
55.140	Drums • Barrels. Drums. Canisters
43.060.20	Ducting • Pressure charging and air/exhaust gas ducting systems
91.060.40	Ducts • Chimneys, shafts, ducts
59.120.50	Dyeing • Dyeing and finishing equipment
93.140	Dykes • Construction of waterways, ports and dykes

E

53.100	Earth-moving • Earth-moving machinery
93.020	Earthworks • Earthworks. Excavations. Foundation construction. Underground works
11.180.40	Eating • Aids for drinking and eating
13.020.50	Ecolabelling • Ecolabelling
13.020.20	Economics • Environmental economics. Sustainability
97.020	Economics • Home economics in general
67.200	Edible • Edible oils and fats. Oilseeds
03.180	Education • Education
35.240.90	Education • IT applications in education
27.015	Efficiency • Energy efficiency. Energy conservation in general
67.120.20	Eggs • Poultry and eggs
13.260	Electric • Protection against electric shock. Live working
25.140.20	Electric • Electric tools
25.180.10	Electric • Electric furnaces
29.100.20	Electric • Electric and electromechanical components

29.240.30	Electric • Control equipment for electric power systems
29.280	Electric • Electric traction equipment
31.160	Electric • Electric filters
43.120	Electric • Electric road vehicles
49.060	Electric • Aerospace electric equipment and systems
97.100.10	Electric • Electric heaters
01.040.29	Electrical • Electrical engineering (Vocabularies)
01.080.40	Electrical • Graphical symbols for use on electrical and electronics engineering drawings, diagrams, charts and in relevant technical product documentation
01.100.25	Electrical • Electrical and electronics engineering drawings
17.220	Electrical • Electricity, Magnetism. Electrical and magnetic measurements
17.220.20	Electrical • Measurement of electrical and magnetic quantities
19.080	Electrical • Electrical and electronic testing
29	Electrical • Electrical engineering
29.020	Electrical • Electrical engineering in general
29.060	Electrical • Electrical wires and cables
29.060.01	Electrical • Electrical wires and cables in general
29.080.01	Electrical • Electrical insulation in general
29.100	Electrical • Components for electrical equipment
29.100.01	Electrical • Components for electrical equipment in general
29.100.99	Electrical • Other components for electrical equipment
29.120	Electrical • Electrical accessories
29.120.01	Electrical • Electrical accessories in general
29.120.10	Electrical • Conduits for electrical purposes
29.120.99	Electrical • Other electrical accessories
29.260	Electrical • Electrical equipment for working in special conditions
29.260.01	Electrical • Electrical equipment for working in special conditions in general
29.260.10	Electrical • Electrical installations for outdoor use
29.260.20	Electrical • Electrical apparatus for explosive atmospheres
29.260.99	Electrical • Other electrical equipment for working in special conditions
43.040.10	Electrical • Electrical and electronic equipment
43.060.50	Electrical • Electrical and electronic equipment. Control systems
47.020.60	Electrical • Electrical equipment of ships and of marine structures
97.030	Electrical • Domestic electrical appliances in general
17.220	Electricity • Electricity, Magnetism. Electrical and magnetic measurements
17.220.01	Electricity • Electricity, Magnetism. General aspects
17.220.99	Electricity • Other standards related to electricity and magnetism
91.140.50	Electricity • Electricity supply systems
17.140.50	Electroacoustics • Electroacoustics
25.120.40	Electrochemical • Electrochemical machines
31.060.40	Electrolytic • Tantalum electrolytic capacitors
31.060.50	Electrolytic • Aluminium electrolytic capacitors
33.100	Electromagnetic • Electromagnetic compatibility (EMC)
33.100.01	Electromagnetic • Electromagnetic compatibility in general
29.100.20	Electromechanical • Electric and electromechanical components
31.220	Electromechanical • Electromechanical components for electronic and telecommunications equipment
31.220.01	Electromechanical • Electromechanical components in general
31.220.99	Electromechanical • Other electromechanical components
19.080	Electronic • Electrical and electronic testing

31.020	Electronic • Electronic components in general
31.100	Electronic • Electronic tubes
31.120	Electronic • Electronic display devices
31.190	Electronic • Electronic component assemblies
31.220	Electronic • Electromechanical components for electronic and telecommunications equipment
31.240	Electronic • Mechanical structures for electronic equipment
43.040.10	Electronic • Electrical and electronic equipment
43.060.50	Electronic • Electrical and electronic equipment. Control systems
01.040.31	Electronics • Electronics (Vocabularies)
01.080.40	Electronics • Graphical symbols for use on electrical and electronics engineering drawings, diagrams, charts and in relevant technical product documentation
01.100.25	Electronics • Electrical and electronics engineering drawings
31	Electronics • Electronics
33.100	Emc • Electromagnetic compatibility (EMC)
33.100.99	Emc • Other aspects related to EMC
33.100.10	Emission • Emission
13.040.40	Emissions • Stationary source emissions
13.040.50	Emissions • Transport exhaust emissions
03.040	Employment • Labour. Employment
25.220.50	Enamels • Enamels
21.180	Enclosures • Housings, enclosures, other machine parts
01.040.27	Energy • Energy and heat transfer engineering (Vocabularies)
27	Energy • Energy and heat transfer engineering
27.010	Energy • Energy and heat transfer engineering in general
27.015	Energy • Energy efficiency. Energy conservation in general
27.120	Energy • Nuclear energy engineering
27.120.01	Energy • Nuclear energy in general
27.120.99	Energy • Other standards related to nuclear energy
27.140	Energy • Hydraulic energy engineering
27.160	Energy • Solar energy engineering
27.180	Energy • Wind turbine energy systems
27.190	Energy • Biological sources and alternative sources of energy
97.100.99	Energy • Heaters using other sources of energy
43.060.10	Engine • Engine block and internal components
27.020	Engines • Internal combustion engines
27.040	Engines • Gas and steam turbines. Steam engines
43.060	Engines • Internal combustion engines for road vehicles
43.060.01	Engines • Internal combustion engines for road vehicles in general
43.060.99	Engines • Other components and systems of internal combustion engines
47.020.20	Engines • Marine engines and propulsion systems
49.050	Engines • Aerospace engines and propulsion systems
33.070.30	Enhanced • Digital Enhanced Cordless Telecommunications (DECT)
01.040.97	Entertainment • Domestic and commercial equipment. Entertainment. Sports (Vocabularies)
97	Entertainment • Domestic and commercial equipment. Entertainment. Sports
97.200	Entertainment • Equipment for entertainment
97.200.01	Entertainment • Equipment for entertainment in general
97.200.99	Entertainment • Other equipment for entertainment
01.040.13	Environment • Environment. Health protection. Safety (Vocabularies)
13	Environment • Environment. Health protection. Safety

13.020.01	Environment • Environment and environmental protection in general
11.020.01	Environmental • Quality and environmental management in health care
13.020	Environmental • Environmental protection
13.020.01	Environmental • Environment and environmental protection in general
13.020.10	Environmental • Environmental management
13.020.20	Environmental • Environmental economics. Sustainability
13.020.30	Environmental • Environmental impact assessment
13.020.70	Environmental • Environmental projects
13.020.99	Environmental • Other standards related to environmental protection
19.040	Environmental • Environmental testing
13.040.35	Environments • Cleanrooms and associated controlled environments
13.180	Ergonomics • Ergonomics
91.140.90	Escalators • Lifts. Escalators
71.100.60	Essential • Essential oils
71.080.70	Esters • Esters
71.080.60	Ethers • Alcohols. Ethers
03.100.02	Ethics • Governance and ethics
11.100.20	Evaluation • Biological evaluation of medical devices
73.100.30	Excavation • Equipment for drilling and mine excavation
93.020	Excavations • Earthworks. Excavations. Foundation construction. Underground works
27.060.30	Exchangers • Boilers and heat exchangers
71.120.30	Exchangers • Heat exchangers
13.040.50	Exhaust • Transport exhaust emissions
75.180.10	Exploratory • Exploratory, drilling and extraction equipment
13.230	Explosion • Explosion protection
29.260.20	Explosive • Electrical apparatus for explosive atmospheres
71.100.30	Explosives • Explosives. Pyrotechnics and fireworks
87.060.10	Extenders • Pigments and extenders
91.160.20	Exterior • Exterior building lighting
75.020	Extraction • Extraction and processing of petroleum and natural gas
75.180.10	Extraction • Exploratory, drilling and extraction equipment
25.120.20	Extruding • Rolling, extruding and drawing equipment
21.080	Eyelets • Hinges, eyelets and other articulated joints

F

29.035.60	Fabrics • Varnished fabrics
59.080.30	Fabrics • Textile fabrics
59.080.40	Fabrics • Coated fabrics
13.340.60	Falling • Protection against falling and slipping
23.120	Fans • Ventilators. Fans. Air-conditioners
65.040	Farm • Farm buildings, structures and installations
65.040.01	Farm • Farm buildings and installations in general
65.040.99	Farm • Other standards related to farm buildings and installations
65.020	Farming • Farming and forestry

65.020.01	Farming • Farming and forestry in general
65.020.99	Farming • Other standards related to farming and forestry
21.060	Fasteners • Fasteners
21.060.01	Fasteners • Fasteners in general
21.060.99	Fasteners • Other fasteners
49.030	Fasteners • Fasteners for aerospace construction
49.030.01	Fasteners • Fasteners in general
49.030.99	Fasteners • Other fasteners
61.040	Fastening • Headgear. Clothing accessories. Fastening of clothing
67.200	Fats • Edible oils and fats. Oilseeds
67.200.10	Fats • Animal and vegetable fats and oils
91.060.10	Façades • Walls. Partitions. Façades
65.120	Feeding • Animal feeding stuffs
77.100	Ferroalloys • Ferroalloys
49.025.05	Ferrous • Ferrous alloys in general
77.080	Ferrous • Ferrous metals
77.080.01	Ferrous • Ferrous metals in general
65.060.25	Fertilizers • Equipment for storage, preparation and distribution of fertilizers
65.080	Fertilizers • Fertilizers
33.180	Fibre • Fibre optic communications
33.180.01	Fibre • Fibre optic systems in general
33.180.20	Fibre • Fibre optic interconnecting devices
33.180.99	Fibre • Other fibre optic equipment
79.060.20	Fibre • Fibre and particle boards
91.100.40	Fibre-reinforced • Products in fibre-reinforced cement
33.180.10	Fibres • Fibres and cables
59.060	Fibres • Textile fibres
59.060.01	Fibres • Textile fibres in general
59.060.10	Fibres • Natural fibres
59.060.20	Fibres • Man-made fibres
59.060.30	Fibres • Mineral and metal fibres
59.060.99	Fibres • Other textile fibres
25.100.60	Files • Files
37.040.20	Films • Photographic paper, films and plates. Cartridges
37.040.25	Films • Radiographic films
37.060.20	Films • Motion picture films. Cartridges
83.140.10	Films • Films and sheets
23.100.60	Filters • Filters, seals and contamination of fluids
31.160	Filters • Electric filters
03.060	Finances • Finances. Banking. Monetary systems. Insurance
59.120.50	Finishing • Dyeing and finishing equipment
91.180	Finishing • Interior finishing
13.220	Fire • Protection against fire
13.220.01	Fire • Protection against fire in general
13.220.20	Fire • Fire protection
13.220.99	Fire • Other standards related to protection against fire
13.220.10	Fire-fighting • Fire-fighting
13.220.50	Fire-resistance • Fire-resistance of building materials and elements
71.100.30	Fireworks • Explosives. Pyrotechnics and fireworks

11.160	First • First aid
65.150	Fish • Fishing and fish breeding
67.120.30	Fish • Fish and fishery products
67.120.30	Fishery • Fish and fishery products
65.150	Fishing • Fishing and fish breeding
27.120.30	Fissile • Fissile materials and nuclear fuel technology
17.040.10	Fits • Limits and fits
23.040.40	Fittings • Metal fittings
23.040.45	Fittings • Plastics fittings
23.040.50	Fittings • Pipes and fittings of other materials
83.140.30	Fittings • Plastics pipes and fittings for non fluid use
97.130	Fittings • Shop fittings
97.130.01	Fittings • Shop fittings in general
97.130.99	Fittings • Other shop fittings
23.040.60	Flanges • Flanges, couplings and joints
97.040.60	Flatware • Cookware, cutlery and flatware
21.220	Flexible • Flexible drives and transmissions
21.220.01	Flexible • Flexible drives and transmissions in general
21.220.99	Flexible • Other flexible drives and transmissions
97.150	Floor • Floor coverings
91.060.30	Floors • Ceilings. Floors. Stairs
13.340.70	Flotation • Lifejackets, buoyancy aids and flotation devices
17.120	Flow • Measurement of fluid flow
17.120.01	Flow • Measurement of fluid flow in general
17.120.10	Flow • Flow in closed conduits
17.120.20	Flow • Flow in open channels
01.040.23	Fluid • Fluid systems and components for general use (Vocabularies)
17.120	Fluid • Measurement of fluid flow
17.120.01	Fluid • Measurement of fluid flow in general
23	Fluid • Fluid systems and components for general use
23.020	Fluid • Fluid storage devices
23.020.01	Fluid • Fluid storage devices in general
23.020.99	Fluid • Other fluid storage devices
23.100	Fluid • Fluid power systems
23.100.01	Fluid • Fluid power systems in general
23.100.99	Fluid • Other fluid power system components
49.080	Fluid • Aerospace fluid systems and components
83.140.30	Fluid • Plastics pipes and fittings for non fluid use
23.100.60	Fluids • Filters, seals and contamination of fluids
29.040	Fluids • Insulating fluids
29.040.01	Fluids • Insulating fluids in general
29.040.99	Fluids • Other insulating fluids
75.120	Fluids • Hydraulic fluids
29.140.30	Fluorescent • Fluorescent lamps. Discharge lamps
01.040.67	Food • Food technology (Vocabularies)
07.100.30	Food • Food microbiology
67	Food • Food technology
67.020	Food • Processes in the food industry
67.040	Food • Food products in general

67.050	Food • General methods of tests and analysis for food products
67.220	Food • Spices and condiments. Food additives
67.220.20	Food • Food additives
67.260	Food • Plants and equipment for the food industry
67.230	Foods • Prepackaged and prepared foods
67.250	Foodstuffs • Materials and articles in contact with foodstuffs
13.340.50	Foot • Leg and foot protection
61.060	Footwear • Footwear
17.100	Force • Measurement of force, weight and pressure
07.140	Forensic • Forensic science
65.020	Forestry • Farming and forestry
65.020.01	Forestry • Farming and forestry in general
65.020.99	Forestry • Other standards related to farming and forestry
65.060.80	Forestry • Forestry equipment
25.120.10	Forging • Forging equipment. Presses. Shears
77.140.85	Forgings • Iron and steel forgings
25.020	Forming • Manufacturing forming processes
03.220.99	Forms • Other forms of transport
93.020	Foundation • Earthworks. Excavations. Foundation construction. Underground works
55.180	Freight • Freight distribution of goods
55.180.01	Freight • Freight distribution of goods in general
55.180.99	Freight • Other standards related to freight distribution of goods
67.080	Fruits • Fruits. Vegetables
67.080.01	Fruits • Fruits, vegetables and derived products in general
67.080.10	Fruits • Fruits and derived products
25.180.20	Fuel • Fuel furnaces
27.060.10	Fuel • Liquid and solid fuel burners
27.060.20	Fuel • Gas fuel burners
27.070	Fuel • Fuel cells
27.120.30	Fuel • Fissile materials and nuclear fuel technology
43.060.40	Fuel • Fuel systems
97.100.30	Fuel • Solid fuel heaters
97.100.40	Fuel • Liquid fuel heaters
75.160	Fuels • Fuels
75.160.01	Fuels • Fuels in general
75.160.10	Fuels • Solid fuels
75.160.20	Fuels • Liquid fuels
75.160.30	Fuels • Gaseous fuels
03.100.20	Function • Trade. Commercial function. Marketing
65.100.30	Fungicides • Fungicides
59.140.40	Fur • Machines and equipment for leather and fur production
25.180	Furnaces • Industrial furnaces
25.180.01	Furnaces • Industrial furnaces in general
25.180.10	Furnaces • Electric furnaces
25.180.20	Furnaces • Fuel furnaces
97.040.10	Furniture • Kitchen furniture
97.140	Furniture • Furniture
59.140.30	Furs • Leather and furs
29.120.50	Fuses • Fuses and other overcurrent protection devices

G

29.220	Galvanic • Galvanic cells and batteries
29.220.01	Galvanic • Galvanic cells and batteries in general
23.020.35	Gas • Gas cylinders
27.040	Gas • Gas and steam turbines. Steam engines
27.060.20	Gas • Gas fuel burners
43.060.20	Gas • Pressure charging and air/exhaust gas ducting systems
75.020	Gas • Extraction and processing of petroleum and natural gas
75.060	Gas • Natural gas
75.180	Gas • Equipment for petroleum and natural gas industries
75.180.01	Gas • Equipment for petroleum and natural gas industries in general
75.180.99	Gas • Other equipment for petroleum and natural gas industries
75.200	Gas • Petroleum products and natural gas handling equipment
91.140.40	Gas • Gas supply systems
97.100.20	Gas • Gas heaters
75.160.30	Gaseous • Gaseous fuels
29.040.20	Gases • Insulating gases
71.100.20	Gases • Gases for industrial application
23.060.30	Gate • Gate valves
21.200	Gears • Gears
29.160.40	Generating • Generating sets
29.160.20	Generators • Generators
07.040	Geodesy • Astronomy. Geodesy. Geography
07.040	Geography • Astronomy. Geodesy. Geography
07.060	Geology • Geology. Meteorology. Hydrology
17.040.40	Geometrical • Geometrical Product Specification (GPS)
59.080.70	Geotextiles • Geotextiles
21.140	Glands • Seals, glands
01.040.81	Glass • Glass and ceramics industries (Vocabularies)
29.035.30	Glass • Glass and ceramic insulating materials
59.100.10	Glass • Textile glass materials
81	Glass • Glass and ceramics industries
81.020	Glass • Processes in the glass and ceramics industries
81.040	Glass • Glass
81.040.01	Glass • Glass in general
81.040.10	Glass • Raw materials and raw glass
81.040.20	Glass • Glass in building
81.040.30	Glass • Glass products
81.100	Glass • Equipment for the glass and ceramics industries
43.040.65	Glazing • Glazing and wiper systems
33.070.50	Global • Global System for Mobile Communication (GSM)
23.060.10	Globe • Globe valves
01.040.55	Goods • Packaging and distribution of goods (Vocabularies)

13.300	Goods • Protection against dangerous goods
55	Goods • Packaging and distribution of goods
55.020	Goods • Packaging and distribution of goods in general
55.180	Goods • Freight distribution of goods
55.180.01	Goods • Freight distribution of goods in general
55.180.99	Goods • Other standards related to freight distribution of goods
03.100.02	Governance • Governance and ethics
17.040.40	Gps • Geometrical Product Specification (GPS)
37.100	Graphic • Graphic technology
37.100.01	Graphic • Graphic technology in general
37.100.20	Graphic • Materials for graphic technology
37.100.99	Graphic • Other standards related to graphic technology
01.080	Graphical • Graphical symbols
01.080.01	Graphical • Graphical symbols in general
01.080.20	Graphical • Graphical symbols for use on specific equipment
01.080.30	Graphical • Graphical symbols for use on mechanical engineering and construction drawings, diagrams, plans, maps and in relevant technical product documentation
01.080.40	Graphical • Graphical symbols for use on electrical and electronics engineering drawings, diagrams, charts and in relevant technical product documentation
01.080.50	Graphical • Graphical symbols for use on information technology and telecommunications technical drawings and in relevant technical product documentation
01.080.99	Graphical • Other graphical symbols
35.040.30	Graphical • Coding of graphical and photographic information
35.140	Graphics • Computer graphics
65.040.30	Greenhouses • Greenhouses and other installations
25.080.50	Grinding • Grinding and polishing machines
49.100	Ground • Ground service and maintenance equipment
65.020.20	Growing • Plant growing
33.070.50	Gsm • Global System for Mobile Communication (GSM)
91.100.10	Gypsum • Cement. Gypsum. Lime. Mortar

H

71.080.20	Halogenated • Halogenated hydrocarbons
13.340.40	Hand • Hand and arm protection
25.140	Hand-held • Hand-held tools
25.140.01	Hand-held • Hand-held tools in general
25.140.99	Hand-held • Other hand-held tools
25.140.30	Hand-operated • Hand-operated tools
11.180	Handicapped • Aids for disabled or handicapped persons
11.180.01	Handicapped • Aids for disabled and handicapped persons in general
11.180.99	Handicapped • Other standards related to aids for disabled and handicapped people
97.195	Handicrafts • Items of art and handicrafts. Cultural property and heritage
01.040.53	Handling • Materials handling equipment (Vocabularies)
47.020.40	Handling • Lifting and cargo handling equipment

53	Handling • Materials handling equipment
53.040	Handling • Continuous handling equipment
53.040.01	Handling • Continuous handling equipment in general
53.040.99	Handling • Other continuous handling equipment
53.120	Handling • Equipment for manual handling
75.200	Handling • Petroleum products and natural gas handling equipment
65.060.50	Harvesting • Harvesting equipment
73.100.40	Haulage • Haulage and hoisting equipment
13.340.20	Head • Head protective equipment
61.040	Headgear • Headgear. Clothing accessories. Fastening of clothing
01.040.11	Health • Health care technology (Vocabularies)
01.040.13	Health • Environment. Health protection. Safety (Vocabularies)
11	Health • Health care technology
11.020	Health • Medical sciences and health care facilities in general
11.020.01	Health • Quality and environmental management in health care
11.020.10	Health • Health care services in general
11.020.99	Health • Other standards related to health care in general
13	Health • Environment. Health protection. Safety
35.240.80	Health • IT applications in health care technology
11.180.15	Hearing • Aids for deaf and hearing impaired people
01.040.27	Heat • Energy and heat transfer engineering (Vocabularies)
17.200.10	Heat • Heat. Calorimetry
23.040.07	Heat • Pipelines and its parts for district heat
25.200	Heat • Heat treatment
27	Heat • Energy and heat transfer engineering
27.010	Heat • Energy and heat transfer engineering in general
27.060.30	Heat • Boilers and heat exchangers
27.080	Heat • Heat pumps
27.220	Heat • Heat recovery. Thermal insulation
71.120.30	Heat • Heat exchangers
77.140.10	Heat-treatable • Heat-treatable steels
97.100.10	Heaters • Electric heaters
97.100.20	Heaters • Gas heaters
97.100.30	Heaters • Solid fuel heaters
97.100.40	Heaters • Liquid fuel heaters
97.100.99	Heaters • Heaters using other sources of energy
47.020.90	Heating • Marine ventilation, air conditioning and heating systems
91.140.10	Heating • Central heating systems
91.140.65	Heating • Water heating equipment
97.100	Heating • Domestic, commercial and industrial heating appliances
97.100.01	Heating • Heating appliances in general
65.100.20	Herbicides • Herbicides
97.195	Heritage • Items of art and handicrafts. Cultural property and heritage
59.140.20	Hides • Raw skins, hides and pelts
21.080	Hinges • Hinges, eyelets and other articulated joints
73.100.40	Hoisting • Haulage and hoisting equipment
29.140.10	Holders • Lamp caps and holders
97.020	Home • Home economics in general
97.160	Home • Home textiles. Linen

39.040	Horology • Horology
39.040.01	Horology • Horology in general
65.060.70	Horticultural • Horticultural equipment
23.040.70	Hose • Hoses and hose assemblies
23.040.80	Hose • Seals for pipe and hose assemblies
23.040.70	Hoses • Hoses and hose assemblies
83.140.40	Hoses • Hoses
11.140	Hospital • Hospital equipment
97.120	Household • Automatic controls for household use
21.180	Housings • Housings, enclosures, other machine parts
47.020.10	Hulls • Hulls and their structure elements
03.100.30	Human • Management of human resources
13.140	Human • Noise with respect to human beings
13.160	Human • Vibration and shock with respect to human beings
65.145	Hunting • Hunting
65.020.30	Husbandry • Animal husbandry and breeding
27.140	Hydraulic • Hydraulic energy engineering
75.120	Hydraulic • Hydraulic fluids
93.160	Hydraulic • Hydraulic construction
71.080.10	Hydrocarbons • Aliphatic hydrocarbons
71.080.15	Hydrocarbons • Aromatic hydrocarbons
71.080.20	Hydrocarbons • Halogenated hydrocarbons
27.075	Hydrogen • Hydrogen technologies
13.080.40	Hydrological • Hydrological properties of soils
07.060	Hydrology • Geology. Meteorology. Hydrology
13.100	Hygiene • Occupational safety. Industrial hygiene
35.040.40	Hypermedia • Coding of audio, video, multimedia and hypermedia information



67.100.40	Ice • Ice cream and ice confectionery
35.040.50	Identification • Automatic identification and data capture techniques
35.240.15	Identification • Identification cards. Chip cards. Biometrics
13.220.40	Ignitability • Ignitability and burning behaviour of materials and products
73.100.20	Illumination • Ventilation, air-conditioning and illumination equipment
01.040.37	Image • Image technology (Vocabularies)
37	Image • Image technology
37.080	Imaging • Document imaging applications
33.100.20	Immunity • Immunity
13.020.30	Impact • Environmental impact assessment
11.180.15	Impaired • Aids for deaf and hearing impaired people
11.040.40	Implants • Implants for surgery, prosthetics and orthotics
11.060.15	Implants • Dental implants
65.060	Implements • Agricultural machines, implements and equipment
29.140.20	Incandescent • Incandescent lamps

21.040.20	Inch • Inch screw threads
11.180.20	Incontinence • Aids for incontinence and ostomy
43.040.30	Indicating • Indicating and control devices
97.220.30	Indoor • Indoor sports equipment
13.060.25	Industrial • Water for industrial use
13.100	Industrial • Occupational safety. Industrial hygiene
25.040	Industrial • Industrial automation systems
25.040.01	Industrial • Industrial automation systems in general
25.040.30	Industrial • Industrial robots. Manipulators
25.040.40	Industrial • Industrial process measurement and control
25.040.99	Industrial • Other industrial automation systems
25.180	Industrial • Industrial furnaces
25.180.01	Industrial • Industrial furnaces in general
53.060	Industrial • Industrial trucks
71.100.20	Industrial • Gases for industrial application
71.100.35	Industrial • Chemicals for industrial and domestic disinfection purposes
75.100	Industrial • Lubricants, industrial oils and related products
97.100	Industrial • Domestic, commercial and industrial heating appliances
43.040.15	Informatics • Car informatics. On board computer systems
01.040.35	Information • Information technology (Vocabularies)
01.080.10	Information • Public information symbols. Signs. Plates. Labels
01.080.50	Information • Graphical symbols for use on information technology and telecommunications technical drawings and in relevant technical product documentation
01.100.27	Information • Technical drawings for telecommunications and information technology fields
01.140	Information • Information sciences. Publishing
01.140.20	Information • Information sciences
35	Information • Information technology
35.020	Information • Information technology (IT) in general
35.040	Information • Information coding
35.040.01	Information • Information coding in general
35.040.30	Information • Coding of graphical and photographic information
35.040.40	Information • Coding of audio, video, multimedia and hypermedia information
35.040.99	Information • Other standards related to information coding
35.060	Information • Languages used in information technology
35.240	Information • Applications of information technology
35.240.01	Information • Application of information technology in general
35.240.30	Information • IT applications in information, documentation and publishing
11.040.20	Infusion • Transfusion, infusion and injection equipment
11.040.20	Injection • Transfusion, infusion and injection equipment
87.080	Inks • Inks. Printing inks
47.060	Inland • Inland navigation vessels
71.060	Inorganic • Inorganic chemicals
71.060.01	Inorganic • Inorganic chemicals in general
71.060.99	Inorganic • Other inorganic chemicals
65.100.10	Insecticides • Insecticides
29.140.50	Installation • Lighting installation systems
11.040.30	Instruments • Surgical instruments and materials
11.060.25	Instruments • Dental instruments
17.040.30	Instruments • Measuring instruments

17.180.30	Instruments • Optical measuring instruments
17.200.20	Instruments • Temperature-measuring instruments
39.040.99	Instruments • Other time-measuring instruments
49.090	Instruments • On-board equipment and instruments
97.200.20	Instruments • Musical instruments
29.035	Insulating • Insulating materials
29.035.01	Insulating • Insulating materials in general
29.035.10	Insulating • Paper and board insulating materials
29.035.20	Insulating • Plastics and rubber insulating materials
29.035.30	Insulating • Glass and ceramic insulating materials
29.035.99	Insulating • Other insulating materials
29.040	Insulating • Insulating fluids
29.040.01	Insulating • Insulating fluids in general
29.040.10	Insulating • Insulating oils
29.040.20	Insulating • Insulating gases
29.040.99	Insulating • Other insulating fluids
91.100.60	Insulating • Thermal and sound insulating materials
27.220	Insulation • Heat recovery. Thermal insulation
29.080	Insulation • Insulation
29.080.01	Insulation • Electrical insulation in general
29.080.30	Insulation • Insulation systems
29.080.99	Insulation • Other standards related to insulation
91.120.10	Insulation • Thermal insulation of buildings
91.120.20	Insulation • Acoustics in building. Sound insulation
29.080.10	Insulators • Insulators
03.060	Insurance • Finances. Banking. Monetary systems. Insurance
31.200	Integrated • Integrated circuits. Microelectronics
33.080	Integrated • Integrated Services Digital Network (ISDN)
03.140	Intellectual • Patents. Intellectual property
33.180.20	Interconnecting • Fibre optic interconnecting devices
35.100	Interconnection • Open systems interconnection (OSI)
35.100.01	Interconnection • Open systems interconnection in general
35.200	Interconnection • Interface and interconnection equipment
35.200	Interface • Interface and interconnection equipment
91.160.10	Interior • Interior lighting
91.180	Interior • Interior finishing
35.240.95	Internet • Internet applications
23.040.10	Iron • Iron and steel pipes
73.060.10	Iron • Iron ores
77.140	Iron • Iron and steel products
77.140.01	Iron • Iron and steel products in general
77.140.80	Iron • Iron and steel castings
77.140.85	Iron • Iron and steel forgings
77.140.99	Iron • Other iron and steel products
77.080.10	Irons • Irons
65.060.35	Irrigation • Irrigation and drainage equipment
33.080	Isdn • Integrated Services Digital Network (ISDN)

J

55.100	Jars • Bottles. Pots. Jars
01.040.39	Jewellery • Precision mechanics. Jewellery (Vocabularies)
39	Jewellery • Precision mechanics. Jewellery
39.060	Jewellery • Jewellery
21.080	Joints • Hinges, eyelets and other articulated joints
23.040.60	Joints • Flanges, couplings and joints
25.160.40	Joints • Welded joints and welds

K

71.080.80	Ketones • Aldehydes and ketones
21.120.30	Keys • Keys and keyways, splines
21.120.30	Keyways • Keys and keyways, splines
97.040	Kitchen • Kitchen equipment
97.040.01	Kitchen • Kitchen equipment in general
97.040.10	Kitchen • Kitchen furniture
97.040.50	Kitchen • Small kitchen appliances
97.040.99	Kitchen • Other kitchen equipment
59.120.40	Knitting • Knitting machines

L

01.080.10	Labels • Public information symbols. Signs. Plates. Labels
71.040.10	Laboratories • Chemical laboratories. Laboratory equipment
11.100	Laboratory • Laboratory medicine
11.100.01	Laboratory • Laboratory medicine in general
11.100.99	Laboratory • Other standards related to laboratory medicine
71.040.10	Laboratory • Chemical laboratories. Laboratory equipment
71.040.20	Laboratory • Laboratory ware and related apparatus
03.040	Labour • Labour. Employment
97.145	Ladders • Ladders
83.140.20	Laminated • Laminated sheets
29.140.10	Lamp • Lamp caps and holders
29.140	Lamps • Lamps and related equipment

29.140.01	Lamps • Lamps in general
29.140.20	Lamps • Incandescent lamps
29.140.30	Lamps • Fluorescent lamps. Discharge lamps
29.140.99	Lamps • Other standards related to lamps
65.020.40	Landscaping • Landscaping and silviculture
35.060	Languages • Languages used in information technology
31.260	Laser • Optoelectronics. Laser equipment
83.040.10	Latex • Latex and raw rubber
25.080.10	Lathes • Lathes
97.060	Laundry • Laundry appliances
03.160	Law • Law. Administration
35.100.10	Layer • Physical layer
35.100.20	Layer • Data link layer
35.100.30	Layer • Network layer
35.100.40	Layer • Transport layer
35.100.50	Layer • Session layer
35.100.60	Layer • Presentation layer
35.100.70	Layer • Application layer
77.120.60	Lead • Lead, zinc, tin and their alloys
77.150.60	Lead • Lead, zinc and tin products
01.040.59	Leather • Textile and leather technology (Vocabularies)
59	Leather • Textile and leather technology
59.140	Leather • Leather technology
59.140.01	Leather • Leather technology in general
59.140.30	Leather • Leather and furs
59.140.35	Leather • Leather products
59.140.40	Leather • Machines and equipment for leather and fur production
59.140.99	Leather • Other standards related to leather technology
13.340.50	Leg • Leg and foot protection
91.010.10	Legal • Legal aspects
03.200	Leisure • Leisure. Tourism
03.200.01	Leisure • Leisure and tourism in general
03.200.99	Leisure • Other standards relating to leisure and tourism
13.020.60	Life-cycles • Product life-cycles
13.340.70	Lifejackets • Lifejackets, buoyancy aids and flotation devices
47.020.40	Lifting • Lifting and cargo handling equipment
53.020	Lifting • Lifting equipment
53.020.01	Lifting • Lifting appliances in general
53.020.30	Lifting • Accessories for lifting equipment
53.020.99	Lifting • Other lifting equipment
91.140.90	Lifts • Lifts. Escalators
17.180.20	Light • Colours and measurement of light
43.100	Light • Passenger cars. Caravans and light trailers
45.140	Light • Metro, tram and light rail equipment
29.140.50	Lighting • Lighting installation systems
43.040.20	Lighting • Lighting, signalling and warning devices
91.160	Lighting • Lighting
91.160.01	Lighting • Lighting in general
91.160.10	Lighting • Interior lighting

91.160.20	Lighting • Exterior building lighting
93.080.40	Lighting • Street lighting and related equipment
91.120.40	Lightning • Lightning protection
91.100.10	Lime • Cement. Gypsum. Lime. Mortar
17.040.10	Limits • Limits and fits
17.040	Linear • Linear and angular measurements
17.040.01	Linear • Linear and angular measurements in general
17.040.99	Linear • Other standards related to linear and angular measurements
97.160	Linen • Home textiles. Linen
29.240.20	Lines • Power transmission and distribution lines
33.040.50	Lines • Lines, connections and circuits
35.100.20	Link • Data link layer
77.140.65	Link • Steel wire, wire ropes and link chains
13.030.20	Liquid • Liquid wastes. Sludge
27.060.10	Liquid • Liquid and solid fuel burners
75.160.20	Liquid • Liquid fuels
97.100.40	Liquid • Liquid fuel heaters
13.260	Live • Protection against electric shock. Live working
65.040.10	Livestock • Livestock buildings, installations and equipment
21.060.30	Locking • Washers, locking elements
49.030.50	Locking • Washers and other locking elements
03.100.10	Logistics • Purchasing. Procurement. Logistics
59.120.30	Looms • Looms. Weaving machines
75.100	Lubricants • Lubricants, industrial oils and related products
43.060.30	Lubricating • Cooling systems. Lubricating systems
21.260	Lubrication • Lubrication systems
29.140.40	Luminaires • Luminaires

M

21.180	Machine • Housings, enclosures, other machine parts
25.060	Machine • Machine tool systems
25.060.01	Machine • Machine tool systems in general
25.060.99	Machine • Other machine tool systems
25.080	Machine • Machine tools
25.080.01	Machine • Machine tools in general
25.080.99	Machine • Other machine tools
17.140.20	Machines • Noise emitted by machines and equipment
21.020	Machines • Characteristics and design of machines, apparatus, equipment
21.120.40	Machines • Balancing and balancing machines
23.140	Machines • Compressors and pneumatic machines
25.040.20	Machines • Numerically controlled machines
25.080.20	Machines • Boring and milling machines
25.080.25	Machines • Planing machines
25.080.30	Machines • Broaching machines

25.080.40	Machines • Drilling machines
25.080.50	Machines • Grinding and polishing machines
25.080.60	Machines • Sawing machines
25.100.25	Machines • Tools for planing and broaching machines
25.120.40	Machines • Electrochemical machines
29.160.10	Machines • Components for rotating machines
35.260	Machines • Office machines
55.230	Machines • Distribution and vending machines
59.120.10	Machines • Spinning, twisting and texturing machines
59.120.20	Machines • Winding machines and equipment
59.120.30	Machines • Looms. Weaving machines
59.120.40	Machines • Knitting machines
59.140.40	Machines • Machines and equipment for leather and fur production
61.080	Machines • Sewing machines and other equipment for the clothing industry
65.060	Machines • Agricultural machines, implements and equipment
65.060.01	Machines • Agricultural machines and equipment in general
65.060.99	Machines • Other agricultural machines and equipment
79.120.10	Machines • Woodworking machines
25.040.10	Machining • Machining centres
77.120.20	Magnesium • Magnesium and magnesium alloys
77.150.20	Magnesium • Magnesium products
17.220	Magnetic • Electricity. Magnetism. Electrical and magnetic measurements
17.220.20	Magnetic • Measurement of electrical and magnetic quantities
29.030	Magnetic • Magnetic materials
29.100.10	Magnetic • Magnetic components
35.220.20	Magnetic • Magnetic storage devices in general
35.220.21	Magnetic • Magnetic disks
35.220.22	Magnetic • Magnetic tapes
35.220.23	Magnetic • Cassettes and cartridges for magnetic tapes
77.140.40	Magnetic • Steels with special magnetic properties
17.220	Magnetism • Electricity. Magnetism. Electrical and magnetic measurements
17.220.01	Magnetism • Electricity. Magnetism. General aspects
17.220.99	Magnetism • Other standards related to electricity and magnetism
03.080.10	Maintenance • Maintenance services. Facilities management
43.180	Maintenance • Diagnostic, maintenance and test equipment
45.120	Maintenance • Equipment for railway/cableway construction and maintenance
49.100	Maintenance • Ground service and maintenance equipment
59.060.20	Man-made • Man-made fibres
01.040.03	Management • Services. Company organization, management and quality. Administration. Transport. Sociology. (Vocabularies)
03	Management • Services. Company organization, management and quality. Administration. Transport. Sociology
03.080.10	Management • Maintenance services. Facilities management
03.100	Management • Company organization and management. Management systems
03.100.01	Management • Company organization and management in general
03.100.30	Management • Management of human resources
03.100.50	Management • Production. Production management
03.100.70	Management • Management systems
03.100.99	Management • Other standards related to company organization and management

03.120.10	Management • Quality management and quality assurance
11.020.01	Management • Quality and environmental management in health care
13.020.10	Management • Environmental management
73.060.20	Manganese • Manganese ores
25.040.30	Manipulators • Industrial robots. Manipulators
53.120	Manual • Equipment for manual handling
01.040.25	Manufacturing • Manufacturing engineering (Vocabularies)
25	Manufacturing • Manufacturing engineering
25.020	Manufacturing • Manufacturing forming processes
25.030	Manufacturing • Additive manufacturing
83.020	Manufacturing • Manufacturing processes in the rubber and plastics industries
01.080.30	Maps • Graphical symbols for use on mechanical engineering and construction drawings, diagrams, plans, maps and in relevant technical product documentation
01.040.47	Marine • Shipbuilding and marine structures (Vocabularies)
47	Marine • Shipbuilding and marine structures
47.020	Marine • Shipbuilding and marine structures in general
47.020.01	Marine • General standards related to shipbuilding and marine structures
47.020.20	Marine • Marine engines and propulsion systems
47.020.60	Marine • Electrical equipment of ships and of marine structures
47.020.90	Marine • Marine ventilation, air conditioning and heating systems
47.020.99	Marine • Other standards related to shipbuilding and marine structures
03.100.20	Marketing • Trade. Commercial function. Marketing
91.080.30	Masonry • Masonry
17.060	Mass • Measurement of volume, mass, density, viscosity
01.040.53	Materials • Materials handling equipment (Vocabularies)
01.040.91	Materials • Construction materials and building (Vocabularies)
11.040.30	Materials • Surgical instruments and materials
11.060.10	Materials • Dental materials
13.220.40	Materials • Ignitability and burning behaviour of materials and products
13.220.50	Materials • Fire-resistance of building materials and elements
23.040.50	Materials • Pipes and fittings of other materials
27.120.30	Materials • Fissile materials and nuclear fuel technology
29.030	Materials • Magnetic materials
29.035	Materials • Insulating materials
29.035.01	Materials • Insulating materials in general
29.035.10	Materials • Paper and board insulating materials
29.035.20	Materials • Plastics and rubber insulating materials
29.035.30	Materials • Glass and ceramic insulating materials
29.035.50	Materials • Mica based materials
29.035.99	Materials • Other insulating materials
29.045	Materials • Semiconducting materials
29.050	Materials • Superconductivity and conducting materials
37.100.20	Materials • Materials for graphic technology
45.040	Materials • Materials and components for railway engineering
47.020.05	Materials • Materials and components for shipbuilding
49.025	Materials • Materials for aerospace construction
49.025.01	Materials • Materials for aerospace construction in general
49.025.99	Materials • Other materials
53	Materials • Materials handling equipment

55.040	Materials • Packaging materials and accessories
59.040	Materials • Textile auxiliary materials
59.100	Materials • Materials for the reinforcement of composites
59.100.01	Materials • Materials for the reinforcement of composites in general
59.100.10	Materials • Textile glass materials
59.100.20	Materials • Carbon materials
59.100.30	Materials • Aramide materials
59.100.99	Materials • Other materials for the reinforcement of composites
59.140.10	Materials • Processes and auxiliary materials
67.250	Materials • Materials and articles in contact with foodstuffs
71.100.10	Materials • Materials for aluminium production
75.140	Materials • Waxes, bituminous materials and other petroleum products
81.040.10	Materials • Raw materials and raw glass
81.060.10	Materials • Raw materials
83.040	Materials • Raw materials for rubber and plastics
83.040.01	Materials • Raw materials for rubber and plastics in general
83.040.30	Materials • Auxiliary materials and additives for plastics
83.080.10	Materials • Thermosetting materials
83.080.20	Materials • Thermoplastic materials
83.100	Materials • Cellular materials
91	Materials • Construction materials and building
91.100	Materials • Construction materials
91.100.01	Materials • Construction materials in general
91.100.15	Materials • Mineral materials and products
91.100.50	Materials • Binders. Sealing materials
91.100.60	Materials • Thermal and sound insulating materials
91.100.99	Materials • Other construction materials
93.080.20	Materials • Road construction materials
07.020	Mathematics • Mathematics
01.040.17	Measurement • Metrology and measurement. Physical phenomena (Vocabularies)
17	Measurement • Metrology and measurement. Physical phenomena
17.020	Measurement • Metrology and measurement in general
17.060	Measurement • Measurement of volume, mass, density, viscosity
17.080	Measurement • Measurement of time, velocity, acceleration, angular velocity
17.100	Measurement • Measurement of force, weight and pressure
17.120	Measurement • Measurement of fluid flow
17.120.01	Measurement • Measurement of fluid flow in general
17.180.20	Measurement • Colours and measurement of light
17.220.20	Measurement • Measurement of electrical and magnetic quantities
25.040.40	Measurement • Industrial process measurement and control
17.040	Measurements • Linear and angular measurements
17.040.01	Measurements • Linear and angular measurements in general
17.040.99	Measurements • Other standards related to linear and angular measurements
17.140	Measurements • Acoustics and acoustic measurements
17.140.01	Measurements • Acoustic measurements and noise abatement in general
17.160	Measurements • Vibrations, shock and vibration measurements
17.180	Measurements • Optics and optical measurements
17.180.01	Measurements • Optics and optical measurements in general
17.180.99	Measurements • Other standards related to optics and optical measurements

17.200	Measurements • Thermodynamics and temperature measurements
17.220	Measurements • Electricity. Magnetism. Electrical and magnetic measurements
17.240	Measurements • Radiation measurements
75.180.30	Measurements • Volumetric equipment and measurements
67.120	Meat • Meat, meat products and other animal produce
67.120.10	Meat • Meat and meat products
01.040.21	Mechanical • Mechanical systems and components for general use (Vocabularies)
01.080.30	Mechanical • Graphical symbols for use on mechanical engineering and construction drawings, diagrams, plans, maps and in relevant technical product documentation
01.100.20	Mechanical • Mechanical engineering drawings
11.200	Mechanical • Birth control. Mechanical contraceptives
19.060	Mechanical • Mechanical testing
21	Mechanical • Mechanical systems and components for general use
31.240	Mechanical • Mechanical structures for electronic equipment
77.040.10	Mechanical • Mechanical testing of metals
01.040.39	Mechanics • Precision mechanics. Jewellery (Vocabularies)
39	Mechanics • Precision mechanics. Jewellery
39.020	Mechanics • Precision mechanics
21.240	Mechanisms • Rotary-reciprocating mechanisms and their parts
07.100.10	Medical • Medical microbiology
11.020	Medical • Medical sciences and health care facilities in general
11.020.20	Medical • Medical science
11.040	Medical • Medical equipment
11.040.01	Medical • Medical equipment in general
11.040.99	Medical • Other medical equipment
11.100.20	Medical • Biological evaluation of medical devices
11.120.10	Medicaments • Medicaments
11.100	Medicine • Laboratory medicine
11.100.01	Medicine • Laboratory medicine in general
11.100.99	Medicine • Other standards related to laboratory medicine
11.220	Medicine • Veterinary medicine
23.040.15	Metal • Non-ferrous metal pipes
23.040.40	Metal • Metal fittings
59.060.30	Metal • Mineral and metal fibres
91.080.10	Metal • Metal structures
25.220.40	Metallic • Metallic coatings
73.060	Metalliferous • Metalliferous minerals and their concentrates
73.060.01	Metalliferous • Metalliferous minerals in general
73.060.99	Metalliferous • Other metalliferous minerals
77.180	Metallurgical • Equipment for the metallurgical industry
01.040.77	Metallurgy • Metallurgy (Vocabularies)
77	Metallurgy • Metallurgy
77.160	Metallurgy • Powder metallurgy
77.020	Metals • Production of metals
77.040	Metals • Testing of metals
77.040.01	Metals • Testing of metals in general
77.040.10	Metals • Mechanical testing of metals
77.040.20	Metals • Non-destructive testing of metals
77.040.30	Metals • Chemical analysis of metals

77.040.99	Metals • Other methods of testing of metals
77.060	Metals • Corrosion of metals
77.080	Metals • Ferrous metals
77.080.01	Metals • Ferrous metals in general
77.120	Metals • Non-ferrous metals
77.120.01	Metals • Non-ferrous metals in general
77.120.99	Metals • Other non-ferrous metals and their alloys
77.150	Metals • Products of non-ferrous metals
77.150.01	Metals • Products of non-ferrous metals in general
77.150.99	Metals • Other products of non-ferrous metals
07.060	Meteorology • Geology. Meteorology. Hydrology
21.040.10	Metric • Metric screw threads
45.140	Metro • Metro, tram and light rail equipment
01.040.17	Metrology • Metrology and measurement. Physical phenomena (Vocabularies)
17	Metrology • Metrology and measurement. Physical phenomena
17.020	Metrology • Metrology and measurement in general
29.035.50	Mica • Mica based materials
31.060.20	Mica • Ceramic and mica capacitors
07.100	Microbiology • Microbiology
07.100.01	Microbiology • Microbiology in general
07.100.10	Microbiology • Medical microbiology
07.100.20	Microbiology • Microbiology of water
07.100.30	Microbiology • Food microbiology
07.100.40	Microbiology • Cosmetics microbiology
07.100.99	Microbiology • Other standards related to microbiology
31.200	Microelectronics • Integrated circuits. Microelectronics
35.160	Microprocessor • Microprocessor systems
01.040.95	Military • Military Affairs. Military engineering. Weapons (Vocabularies)
95	Military • Military affairs. Military engineering. Weapons
95.020	Military • Military in general
95.040	Military • Military engineering
67.100	Milk • Milk and milk products
67.100.01	Milk • Milk and milk products in general
67.100.10	Milk • Milk and processed milk products
67.100.99	Milk • Other milk products
25.080.20	Milling • Boring and milling machines
25.100.20	Milling • Milling tools
73.100.30	Mine • Equipment for drilling and mine excavation
59.060.30	Mineral • Mineral and metal fibres
91.100.15	Mineral • Mineral materials and products
01.040.73	Minerals • Mining and minerals (Vocabularies)
73	Minerals • Mining and minerals
73.060	Minerals • Metalliferous minerals and their concentrates
73.060.01	Minerals • Metalliferous minerals in general
73.060.99	Minerals • Other metalliferous minerals
73.080	Minerals • Non-metalliferous minerals
73.120	Minerals • Equipment for processing of minerals
01.040.73	Mining • Mining and minerals (Vocabularies)
73	Mining • Mining and minerals

73.020	Mining • Mining and quarrying
73.100	Mining • Mining equipment
73.100.01	Mining • Mining equipment in general
73.100.99	Mining • Other mining equipment
25.060.10	Modular • Modular units and other devices
03.060	Monetary • Finances. Banking. Monetary systems. Insurance
43.140	Mopeds • Motorcycles and mopeds
91.100.10	Mortar • Cement. Gypsum. Lime. Mortar
37.060.10	Motion • Motion picture equipment
37.060.20	Motion • Motion picture films. Cartridges
43.140	Motorcycles • Motorcycles and mopeds
23.100.10	Motors • Pumps and motors
29.160.30	Motors • Motors
25.120.30	Moulding • Moulding equipment
11.180.10	Moving • Aids and adaptation for moving
35.100.05	Multilayer • Multilayer applications
33.160.60	Multimedia • Multimedia systems and teleconferencing equipment
35.040.40	Multimedia • Coding of audio, video, multimedia and hypermedia information
97.200.20	Musical • Musical instruments

N

21.060.50	Nails • Pins, nails
49.030.40	Nails • Pins, nails
07.120	Nanotechnologies • Nanotechnologies
47.020.70	Navigation • Navigation and control equipment
47.060	Navigation • Inland navigation vessels
11.040.25	Needles • Syringes, needles and catheters
55.180.30	Nets • Air mode containers, pallets and nets
33.080	Network • Integrated Services Digital Network (ISDN)
35.100.30	Network • Network layer
35.110	Networking • Networking
29.240	Networks • Power transmission and distribution networks
29.240.01	Networks • Power transmission and distribution networks in general
29.240.99	Networks • Other equipment related to power transmission and distribution networks
33.040.35	Networks • Telephone networks
33.040.40	Networks • Data communication networks
77.120.40	Nickel • Nickel, chromium and their alloys
77.150.40	Nickel • Nickel and chromium products
71.080.30	Nitrogen • Organic nitrogen compounds
13.140	Noise • Noise with respect to human beings
17.140.01	Noise • Acoustic measurements and noise abatement in general
17.140.20	Noise • Noise emitted by machines and equipment
17.140.30	Noise • Noise emitted by means of transport
83.140.30	Non • Plastics pipes and fittings for non fluid use

67.160.20	Non-alcoholic • Non-alcoholic beverages
77.140.45	Non-alloyed • Non-alloyed steels
19.100	Non-destructive • Non-destructive testing
77.040.20	Non-destructive • Non-destructive testing of metals
23.040.15	Non-ferrous • Non-ferrous metal pipes
49.025.15	Non-ferrous • Non-ferrous alloys in general
77.120	Non-ferrous • Non-ferrous metals
77.120.01	Non-ferrous • Non-ferrous metals in general
77.120.99	Non-ferrous • Other non-ferrous metals and their alloys
77.150	Non-ferrous • Products of non-ferrous metals
77.150.01	Non-ferrous • Products of non-ferrous metals in general
77.150.99	Non-ferrous • Other products of non-ferrous metals
73.080	Non-metalliferous • Non-metalliferous minerals
27.120	Nuclear • Nuclear energy engineering
27.120.01	Nuclear • Nuclear energy in general
27.120.20	Nuclear • Nuclear power plants. Safety
27.120.30	Nuclear • Fissile materials and nuclear fuel technology
27.120.99	Nuclear • Other standards related to nuclear energy
25.040.20	Numerically • Numerically controlled machines
21.060.20	Nuts • Nuts
49.030.30	Nuts • Nuts

O

13.100	Occupational • Occupational safety. Industrial hygiene
35.240.20	Office • IT applications in office work
35.260	Office • Office machines
85.080.10	Office • Office paper
29.040.10	Oils • Insulating oils
67.200	Oils • Edible oils and fats. Oilseeds
67.200.10	Oils • Animal and vegetable fats and oils
71.100.60	Oils • Essential oils
75.100	Oils • Lubricants, industrial oils and related products
67.200	Oilseeds • Edible oils and fats. Oilseeds
67.200.20	Oilseeds • Oilseeds
49.090	On-board • On-board equipment and instruments
17.120.20	Open • Flow in open channels
35.100	Open • Open systems interconnection (OSI)
35.100.01	Open • Open systems interconnection in general
49.140	Operations • Space systems and operations
11.040.70	Ophthalmic • Ophthalmic equipment
33.180	Optic • Fibre optic communications
33.180.01	Optic • Fibre optic systems in general
33.180.20	Optic • Fibre optic interconnecting devices
33.180.30	Optic • Optic amplifiers

33.180.99	Optic • Other fibre optic equipment
17.180	Optical • Optics and optical measurements
17.180.01	Optical • Optics and optical measurements in general
17.180.30	Optical • Optical measuring instruments
17.180.99	Optical • Other standards related to optics and optical measurements
35.220.30	Optical • Optical storage devices
37.020	Optical • Optical equipment
17.180	Optics • Optics and optical measurements
17.180.01	Optics • Optics and optical measurements in general
17.180.99	Optics • Other standards related to optics and optical measurements
31.260	Optoelectronics • Optoelectronics. Laser equipment
73.060.10	Ores • Iron ores
73.060.20	Ores • Manganese ores
73.060.30	Ores • Chromium ores
73.060.40	Ores • Aluminium ores
25.220.60	Organic • Organic coatings
71.080	Organic • Organic chemicals
71.080.01	Organic • Organic chemicals in general
71.080.30	Organic • Organic nitrogen compounds
71.080.40	Organic • Organic acids
71.080.99	Organic • Other organic chemicals
01.040.03	Organization • Services. Company organization, management and quality. Administration. Transport. Sociology. (Vocabularies)
03	Organization • Services. Company organization, management and quality. Administration. Transport. Sociology
03.100	Organization • Company organization and management. Management systems
03.100.01	Organization • Company organization and management in general
03.100.99	Organization • Other standards related to company organization and management
11.040.40	Orthotics • Implants for surgery, prosthetics and orthotics
35.100	Osi • Open systems interconnection (OSI)
11.180.20	Ostomy • Aids for incontinence and ostomy
29.260.10	Outdoor • Electrical installations for outdoor use
97.220.40	Outdoor • Outdoor and water sports equipment
97.040.20	Ovens • Cooking ranges, working tables, ovens and similar appliances
29.120.50	Overcurrent • Fuses and other overcurrent protection devices
71.060.20	Oxides • Oxides

P

55.180.40	Packages • Complete, filled transport packages
01.040.55	Packaging • Packaging and distribution of goods (Vocabularies)
11.080.30	Packaging • Sterilized packaging
55	Packaging • Packaging and distribution of goods
55.020	Packaging • Packaging and distribution of goods in general
55.040	Packaging • Packaging materials and accessories

55.200	Packaging • Packaging machinery
33.050.20	Paging • Paging equipment
33.070.20	Paging • Paging systems
01.040.87	Paint • Paint and colour industries (Vocabularies)
87	Paint • Paint and colour industries
87.020	Paint • Paint coating processes
87.060	Paint • Paint ingredients
87.060.01	Paint • Paint ingredients in general
87.060.99	Paint • Other paint ingredients
87.100	Paint • Paint coating equipment
87.040	Paints • Paints and varnishes
55.180.20	Pallets • General purpose pallets
55.180.30	Pallets • Air mode containers, pallets and nets
79.060	Panels • Wood-based panels
79.060.01	Panels • Wood-based panels in general
79.060.99	Panels • Other wood-based panels
01.040.85	Paper • Paper technology (Vocabularies)
29.035.10	Paper • Paper and board insulating materials
31.060.30	Paper • Paper and plastics capacitors
35.220.10	Paper • Paper cards and tapes
37.040.20	Paper • Photographic paper, films and plates. Cartridges
85	Paper • Paper technology
85.020	Paper • Paper production processes
85.060	Paper • Paper and board
85.080	Paper • Paper products
85.080.01	Paper • Paper products in general
85.080.10	Paper • Office paper
85.080.20	Paper • Tissue paper
85.080.99	Paper • Other paper products
85.100	Paper • Equipment for the paper industry
11.180.30	Partially • Aids for blind or partially sighted people
19.120	Particle • Particle size analysis. Sieving
79.060.20	Particle • Fibre and particle boards
91.060.10	Partitions • Walls. Partitions. Façades
43.100	Passenger • Passenger cars. Caravans and light trailers
49.095	Passenger • Passenger and cabin equipment
03.140	Patents • Patents. Intellectual property
13.080	Pedology • Soil quality. Pedology
13.080.01	Pedology • Soil quality and pedology in general
59.140.20	Pelts • Raw skins, hides and pelts
11.180.15	People • Aids for deaf and hearing impaired people
11.180.30	People • Aids for blind or partially sighted people
11.180.99	People • Other standards related to aids for disabled and handicapped people
35.180	Peripheral • IT terminal and other peripheral equipment
11.180	Persons • Aids for disabled or handicapped persons
11.180.01	Persons • Aids for disabled and handicapped persons in general
65.100	Pesticides • Pesticides and other agrochemicals
65.100.01	Pesticides • Pesticides and other agrochemicals in general
65.100.99	Pesticides • Other pesticides and agrochemicals

01.040.75	Petroleum • Petroleum and related technologies (Vocabularies)
75	Petroleum • Petroleum and related technologies
75.020	Petroleum • Extraction and processing of petroleum and natural gas
75.040	Petroleum • Crude petroleum
75.080	Petroleum • Petroleum products in general
75.140	Petroleum • Waxes, bituminous materials and other petroleum products
75.180	Petroleum • Equipment for petroleum and natural gas industries
75.180.01	Petroleum • Equipment for petroleum and natural gas industries in general
75.180.99	Petroleum • Other equipment for petroleum and natural gas industries
75.200	Petroleum • Petroleum products and natural gas handling equipment
11.120	Pharmaceutics • Pharmaceutics
11.120.01	Pharmaceutics • Pharmaceutics in general
11.120.99	Pharmaceutics • Other standards related to pharmaceutics
71.080.90	Phenols • Phenols
01.040.17	Phenomena • Metrology and measurement. Physical phenomena (Vocabularies)
17	Phenomena • Metrology and measurement. Physical phenomena
37.040.10	Photographic • Photographic equipment. Projectors
37.040.20	Photographic • Photographic paper, films and plates. Cartridges
37.040.30	Photographic • Photographic chemicals
35.040.30	Photographical • Coding of graphical and photographical information
37.040	Photography • Photography
37.040.01	Photography • Photography in general
37.040.99	Photography • Other standards related to photography
07.030	Physics • Physics. Chemistry
37.060.10	Picture • Motion picture equipment
37.060.20	Picture • Motion picture films. Cartridges
31.140	Piezoelectric • Piezoelectric devices
87.060.10	Pigments • Pigments and extenders
21.060.50	Pins • Pins, nails
49.030.40	Pins • Pins, nails
23.040.80	Pipe • Seals for pipe and hose assemblies
23.040	Pipeline • Pipeline components and pipelines
23.040.01	Pipeline • Pipeline components and pipelines in general
23.040.99	Pipeline • Other pipeline components
23.040	Pipelines • Pipeline components and pipelines
23.040.01	Pipelines • Pipeline components and pipelines in general
23.040.03	Pipelines • Pipelines and its parts for external water conveyance systems
23.040.05	Pipelines • Pipelines and its parts for external sewage systems
23.040.07	Pipelines • Pipelines and its parts for district heat
23.040.10	Pipes • Iron and steel pipes
23.040.15	Pipes • Non-ferrous metal pipes
23.040.20	Pipes • Plastics pipes
23.040.50	Pipes • Pipes and fittings of other materials
77.140.75	Pipes • Steel pipes and tubes for specific use
83.140.30	Pipes • Plastics pipes and fittings for non fluid use
23.100.40	Piping • Piping and couplings
47.020.30	Piping • Piping systems
21.100.10	Plain • Plain bearings
25.080.25	Planing • Planing machines

25.100.25	Planing • Tools for planing and broaching machines
91.020	Planning • Physical planning. Town planning
01.080.30	Plans • Graphical symbols for use on mechanical engineering and construction drawings, diagrams, plans, maps and in relevant technical product documentation
65.020.20	Plant • Plant growing
65.060.40	Plant • Plant care equipment
65.060.30	Planting • Sowing and planting equipment
27.120.20	Plants • Nuclear power plants. Safety
67.260	Plants • Plants and equipment for the food industry
83	Plastic • Rubber and plastic industries
01.040.83	Plastics • Rubber and plastics industries (Vocabularies)
23.040.20	Plastics • Plastics pipes
23.040.45	Plastics • Plastics fittings
29.035.20	Plastics • Plastics and rubber insulating materials
31.060.30	Plastics • Paper and plastics capacitors
49.025.40	Plastics • Rubber and plastics
83.020	Plastics • Manufacturing processes in the rubber and plastics industries
83.040	Plastics • Raw materials for rubber and plastics
83.040.01	Plastics • Raw materials for rubber and plastics in general
83.040.30	Plastics • Auxiliary materials and additives for plastics
83.080	Plastics • Plastics
83.080.01	Plastics • Plastics in general
83.120	Plastics • Reinforced plastics
83.140	Plastics • Rubber and plastics products
83.140.01	Plastics • Rubber and plastics products in general
83.140.30	Plastics • Plastics pipes and fittings for non fluid use
83.140.99	Plastics • Other rubber and plastics products
83.200	Plastics • Equipment for the rubber and plastics industries
01.080.10	Plates • Public information symbols. Signs. Plates. Labels
37.040.20	Plates • Photographic paper, films and plates. Cartridges
97.200.40	Playgrounds • Playgrounds
23.060.20	Plug • Ball and plug valves
31.220.10	Plug-and-socket • Plug-and-socket devices. Connectors
29.120.30	Plugs • Plugs, socket-outlets, couplers
79.060.10	Plywood • Plywood
23.140	Pneumatic • Compressors and pneumatic machines
25.140.10	Pneumatic • Pneumatic tools
53.040.30	Pneumatic • Pneumatic transport and its components
25.080.50	Polishing • Grinding and polishing machines
13.020.40	Pollution • Pollution, pollution control and conservation
93.140	Ports • Construction of waterways, ports and dykes
03.240	Postal • Postal services
35.240.69	Postal • IT applications in postal services
31.040.20	Potentiometers • Potentiometers, variable resistors
55.100	Pots • Bottles. Pots. Jars
67.120.20	Poultry • Poultry and eggs
77.160	Powder • Powder metallurgy
23.100	Power • Fluid power systems
23.100.01	Power • Fluid power systems in general

23.100.99	Power • Other fluid power system components
27.100	Power • Power stations in general
27.120.20	Power • Nuclear power plants. Safety
29.200	Power • Rectifiers. Converters. Stabilized power supply
29.240	Power • Power transmission and distribution networks
29.240.01	Power • Power transmission and distribution networks in general
29.240.20	Power • Power transmission and distribution lines
29.240.30	Power • Control equipment for electric power systems
29.240.99	Power • Other equipment related to power transmission and distribution networks
31.060.70	Power • Power capacitors
33.040.60	Powerline • Powerline telecommunications
01.040.39	Precision • Precision mechanics. Jewellery (Vocabularies)
39	Precision • Precision mechanics. Jewellery
39.020	Precision • Precision mechanics
67.230	Prepackaged • Prepackaged and prepared foods
25.220.10	Preparation • Surface preparation
65.060.25	Preparation • Equipment for storage, preparation and distribution of fertilizers
67.230	Prepared • Prepackaged and prepared foods
35.100.60	Presentation • Presentation layer
25.120.10	Presses • Forging equipment. Presses. Shears
13.240	Pressure • Protection against excessive pressure
17.100	Pressure • Measurement of force, weight and pressure
23.020.30	Pressure • Pressure vessels
23.060.40	Pressure • Pressure regulators
43.060.20	Pressure • Pressure charging and air/exhaust gas ducting systems
77.140.30	Pressure • Steels for pressure purposes
29.220.10	Primary • Primary cells and batteries
31.180	Printed • Printed circuits and boards
87.080	Printing • Inks. Printing inks
19.020	Procedures • Test conditions and procedures in general
25.040.40	Process • Industrial process measurement and control
25.020	Processes • Manufacturing forming processes
25.160.10	Processes • Welding processes
49.040	Processes • Coatings and related processes used in aerospace industry
59.020	Processes • Processes of the textile industry
59.140.10	Processes • Processes and auxiliary materials
67.020	Processes • Processes in the food industry
79.020	Processes • Wood technology processes
81.020	Processes • Processes in the glass and ceramics industries
83.020	Processes • Manufacturing processes in the rubber and plastics industries
85.020	Processes • Paper production processes
87.020	Processes • Paint coating processes
65.040.20	Processing • Buildings and installations for processing and storage of agricultural produce
73.120	Processing • Equipment for processing of minerals
75.020	Processing • Extraction and processing of petroleum and natural gas
75.180.20	Processing • Processing equipment
03.100.10	Procurement • Purchasing. Procurement. Logistics
03.100.50	Production • Production. Production management
59.140.40	Production • Machines and equipment for leather and fur production

71.020	Production • Production in the chemical industry
71.100.10	Production • Materials for aluminium production
77.020	Production • Production of metals
85.020	Production • Paper production processes
77.140.70	Profiles • Steel profiles
37.040.10	Projectors • Photographic equipment. Projectors
13.020.70	Projects • Environmental projects
03.140	Property • Patents. Intellectual property
97.195	Property • Items of art and handicrafts. Cultural property and heritage
47.020.20	Propulsion • Marine engines and propulsion systems
49.050	Propulsion • Aerospace engines and propulsion systems
11.040.40	Prosthetics • Implants for surgery, prosthetics and orthotics
01.040.13	Protection • Environment. Health protection. Safety (Vocabularies)
13	Protection • Environment. Health protection. Safety
13.020	Protection • Environmental protection
13.020.01	Protection • Environment and environmental protection in general
13.020.99	Protection • Other standards related to environmental protection
13.220	Protection • Protection against fire
13.220.01	Protection • Protection against fire in general
13.220.20	Protection • Fire protection
13.220.99	Protection • Other standards related to protection against fire
13.230	Protection • Explosion protection
13.240	Protection • Protection against excessive pressure
13.260	Protection • Protection against electric shock. Live working
13.280	Protection • Radiation protection
13.300	Protection • Protection against dangerous goods
13.310	Protection • Protection against crime
13.340.40	Protection • Hand and arm protection
13.340.50	Protection • Leg and foot protection
13.340.60	Protection • Protection against falling and slipping
29.120.50	Protection • Fuses and other overcurrent protection devices
43.040.80	Protection • Crash protection and restraint systems
91.120	Protection • Protection of and in buildings
91.120.01	Protection • Protection of and in buildings in general
91.120.25	Protection • Seismic and vibration protection
91.120.40	Protection • Lightning protection
91.120.99	Protection • Other standards related to protection of and in buildings
13.340	Protective • Protective equipment
13.340.01	Protective • Protective equipment in general
13.340.10	Protective • Protective clothing
13.340.20	Protective • Head protective equipment
13.340.30	Protective • Respiratory protective devices
13.340.99	Protective • Other protective equipment
01.140	Publishing • Information sciences. Publishing
01.140.40	Publishing • Publishing
35.240.30	Publishing • IT applications in information, documentation and publishing
85.040	Pulps • Pulps
67.060	Pulses • Cereals, pulses and derived products
23.080	Pumps • Pumps

- 23.100.10** Pumps • Pumps and motors
- 27.080** Pumps • Heat pumps
- 03.100.10** Purchasing • Purchasing. Procurement. Logistics
- 71.100.80** Purification • Chemicals for purification of water
- 71.100.30** Pyrotechnics • Explosives. Pyrotechnics and fireworks

Q

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- 01.040.03** Quality • Services. Company organization, management and quality. Administration. Transport. Sociology. (Vocabularies)
 - 03** Quality • Services. Company organization, management and quality. Administration. Transport. Sociology
 - 03.120** Quality • Quality
 - 03.120.01** Quality • Quality in general
 - 03.120.10** Quality • Quality management and quality assurance
 - 03.120.99** Quality • Other standards related to quality
 - 11.020.01** Quality • Quality and environmental management in health care
 - 13.040** Quality • Air quality
 - 13.040.01** Quality • Air quality in general
 - 13.040.99** Quality • Other standards related to air quality
 - 13.060** Quality • Water quality
 - 13.060.01** Quality • Water quality in general
 - 13.060.99** Quality • Other standards related to water quality
 - 13.080** Quality • Soil quality. Pedology
 - 13.080.01** Quality • Soil quality and pedology in general
 - 13.080.99** Quality • Other standards related to soil quality
 - 01.060** Quantities • Quantities and units
 - 17.220.20** Quantities • Measurement of electrical and magnetic quantities
 - 73.020** Quarrying • Mining and quarrying

R

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- 13.280** Radiation • Radiation protection
 - 17.240** Radiation • Radiation measurements
 - 33.060.30** Radio • Radio relay and fixed satellite communications systems
 - 33.070.10** Radio • Terrestrial Trunked Radio (TETRA)
 - 33.160.20** Radio • Radio receivers
 - 33.170** Radio • Television and radio broadcasting
 - 33.060** Radiocommunications • Radiocommunications
 - 33.060.01** Radiocommunications • Radiocommunications in general
 - 33.060.99** Radiocommunications • Other equipment for radiocommunications
 - 11.040.50** Radiographic • Radiographic equipment

37.040.25	Radiographic • Radiographic films
03.220.30	Rail • Transport by rail
45.140	Rail • Metro, tram and light rail equipment
45.080	Rails • Rails and railway components
01.040.45	Railway • Railway engineering (Vocabularies)
45	Railway • Railway engineering
45.020	Railway • Railway engineering in general
45.040	Railway • Materials and components for railway engineering
45.060	Railway • Railway rolling stock
45.060.01	Railway • Railway rolling stock in general
45.080	Railway • Rails and railway components
45.120	Railway/cableway • Equipment for railway/cableway construction and maintenance
93.100	Railways • Construction of railways
97.040.20	Ranges • Cooking ranges, working tables, ovens and similar appliances
59.140.20	Raw • Raw skins, hides and pelts
81.040.10	Raw • Raw materials and raw glass
81.060.10	Raw • Raw materials
83.040	Raw • Raw materials for rubber and plastics
83.040.01	Raw • Raw materials for rubber and plastics in general
83.040.10	Raw • Latex and raw rubber
71.120.10	Reaction • Reaction vessels and their components
27.120.10	Reactor • Reactor engineering
29.180	Reactors • Transformers. Reactors
71.040.30	Reagents • Chemical reagents
25.100.30	Reamers • Drills, countersinks, reamers
11.040.10	Reanimation • Anaesthetic, respiratory and reanimation equipment
33.160.20	Receivers • Radio receivers
33.160.25	Receivers • Television receivers
33.060.20	Receiving • Receiving and transmitting equipment
27.220	Recovery • Heat recovery. Thermal insulation
29.200	Rectifiers • Rectifiers. Converters. Stabilized power supply
13.030.50	Recycling • Recycling
81.080	Refractories • Refractories
71.100.45	Refrigerants • Refrigerants and antifreezes
27.200	Refrigerating • Refrigerating technology
97.040.30	Refrigerating • Domestic refrigerating appliances
97.130.20	Refrigerating • Commercial refrigerating appliances
23.060.40	Regulators • Pressure regulators
83.120	Reinforced • Reinforced plastics
59.100	Reinforcement • Materials for the reinforcement of composites
59.100.01	Reinforcement • Materials for the reinforcement of composites in general
59.100.99	Reinforcement • Other materials for the reinforcement of composites
77.140.15	Reinforcement • Steels for reinforcement of concrete
03.200.99	Relating • Other standards relating to leisure and tourism
33.060.30	Relay • Radio relay and fixed satellite communications systems
29.120.70	Relays • Relays
37.100.10	Reproduction • Reproduction equipment
03.100.40	Research • Research and development
91.040.30	Residential • Residential buildings

31.040	Resistors • Resistors
31.040.01	Resistors • Resistors in general
31.040.10	Resistors • Fixed resistors
31.040.20	Resistors • Potentiometers, variable resistors
31.040.99	Resistors • Other resistors
03.100.30	Resources • Management of human resources
13.060.10	Resources • Water of natural resources
11.040.10	Respiratory • Anaesthetic, respiratory and reanimation equipment
13.340.30	Respiratory • Respiratory protective devices
43.040.80	Restraint • Crash protection and restraint systems
33.120.30	Rf • RF connectors
21.060.60	Rings • Rings, bushes, sleeves, collars
21.060.40	Rivets • Rivets
49.030.60	Rivets • Rivets
01.040.43	Road • Road vehicle engineering (Vocabularies)
03.220.20	Road • Road transport
43	Road • Road vehicles engineering
43.020	Road • Road vehicles in general
43.040	Road • Road vehicle systems
43.040.01	Road • Road vehicle systems in general
43.040.99	Road • Other road vehicle systems
43.060	Road • Internal combustion engines for road vehicles
43.060.01	Road • Internal combustion engines for road vehicles in general
43.120	Road • Electric road vehicles
83.160.10	Road • Road vehicle tyres
93.080	Road • Road engineering
93.080.01	Road • Road engineering in general
93.080.10	Road • Road construction
93.080.20	Road • Road construction materials
93.080.30	Road • Road equipment and installations
93.080.99	Road • Other standards related to road engineering
25.040.30	Robots • Industrial robots. Manipulators
77.140.60	Rods • Steel bars and rods
21.100.20	Rolling • Rolling bearings
25.120.20	Rolling • Rolling, extruding and drawing equipment
45.060	Rolling • Railway rolling stock
45.060.01	Rolling • Railway rolling stock in general
91.060.20	Roofs • Roofs
21.220.20	Rope • Cable or rope drives and their components
59.080.50	Ropes • Ropes
77.140.65	Ropes • Steel wire, wire ropes and link chains
93.110	Ropeways • Construction of ropeways
21.240	Rotary-reciprocating • Rotary-reciprocating mechanisms and their parts
29.160	Rotating • Rotating machinery
29.160.01	Rotating • Rotating machinery in general
29.160.10	Rotating • Components for rotating machines
29.160.99	Rotating • Other standards related to rotating machinery
01.040.83	Rubber • Rubber and plastics industries (Vocabularies)
29.035.20	Rubber • Plastics and rubber insulating materials

49.025.40	Rubber • Rubber and plastics
83	Rubber • Rubber and plastic industries
83.020	Rubber • Manufacturing processes in the rubber and plastics industries
83.040	Rubber • Raw materials for rubber and plastics
83.040.01	Rubber • Raw materials for rubber and plastics in general
83.040.10	Rubber • Latex and raw rubber
83.040.20	Rubber • Rubber compounding ingredients
83.060	Rubber • Rubber
83.140	Rubber • Rubber and plastics products
83.140.01	Rubber • Rubber and plastics products in general
83.140.99	Rubber • Other rubber and plastics products
83.200	Rubber • Equipment for the rubber and plastics industries

S

55.080	Sacks • Sacks. Bags
01.040.13	Safety • Environment. Health protection. Safety (Vocabularies)
13	Safety • Environment. Health protection. Safety
13.100	Safety • Occupational safety. Industrial hygiene
13.110	Safety • Safety of machinery
13.120	Safety • Domestic safety
27.120.20	Safety • Nuclear power plants. Safety
71.060.50	Salts • Salts
91.140.70	Sanitary • Sanitary installations
33.060.30	Satellite • Radio relay and fixed satellite communications systems
33.070.40	Satellite • Satellite
25.080.60	Sawing • Sawing machines
79.040	Sawlogs • Wood, sawlogs and sawn timber
79.040	Sawn • Wood, sawlogs and sawn timber
25.100.40	Saws • Saws
07.140	Science • Forensic science
11.020.20	Science • Medical science
35.240.70	Science • IT applications in science
01.040.07	Sciences • Natural and applied sciences (Vocabularies)
01.140	Sciences • Information sciences. Publishing
01.140.20	Sciences • Information sciences
07	Sciences • Natural and applied sciences
11.020	Sciences • Medical sciences and health care facilities in general
21.040	Screw • Screw threads
21.040.01	Screw • Screw threads in general
21.040.10	Screw • Metric screw threads
21.040.20	Screw • Inch screw threads
21.040.30	Screw • Special screw threads
49.030.10	Screw • Screw threads
21.060.10	Screws • Bolts, screws, studs

49.030.20	Screws • Bolts, screws, studs
47.040	Seagoing • Seagoing vessels
91.100.50	Sealing • Binders. Sealing materials
21.140	Seals • Seals, glands
23.040.80	Seals • Seals for pipe and hose assemblies
23.100.60	Seals • Filters, seals and contamination of fluids
83.140.50	Seals • Seals
29.220.20	Secondary • Acid secondary cells and batteries
29.220.30	Secondary • Alkaline secondary cells and batteries
35.030	Security • IT Security
91.120.25	Seismic • Seismic and vibration protection
79.080	Semi-manufactures • Semi-manufactures of timber
77.140.50	Semi-products • Flat steel products and semi-products
29.045	Semiconducting • Semiconducting materials
31.080	Semiconductor • Semiconductor devices
31.080.01	Semiconductor • Semiconductor devices in general
31.080.99	Semiconductor • Other semiconductor devices
67.240	Sensory • Sensory analysis
49.100	Service • Ground service and maintenance equipment
01.040.03	Services • Services. Company organization, management and quality. Administration. Transport. Sociology. (Vocabularies)
03	Services • Services. Company organization, management and quality. Administration. Transport. Sociology
03.080	Services • Services
03.080.01	Services • Services in general
03.080.10	Services • Maintenance services. Facilities management
03.080.20	Services • Services for companies
03.080.30	Services • Services for consumers
03.080.99	Services • Other services
03.240	Services • Postal services
11.020.10	Services • Health care services in general
33.030	Services • Telecommunication services. Applications
33.070	Services • Mobile services
33.070.01	Services • Mobile services in general
33.070.99	Services • Other mobile services
33.080	Services • Integrated Services Digital Network (ISDN)
35.240.69	Services • IT applications in postal services
35.100.50	Session • Session layer
29.160.40	Sets • Generating sets
35.040.10	Sets • Coding of character sets
13.060.30	Sewage • Sewage water
23.040.05	Sewage • Pipelines and its parts for external sewage systems
93.030	Sewage • External sewage systems
61.080	Sewing • Sewing machines and other equipment for the clothing industry
21.120	Shafts • Shafts and couplings
21.120.01	Shafts • Shafts and couplings in general
21.120.10	Shafts • Shafts
21.120.99	Shafts • Other standards related to shafts and couplings
91.060.40	Shafts • Chimneys, shafts, ducts

25.120.10	Shears • Forging equipment. Presses. Shears
83.140.10	Sheets • Films and sheets
83.140.20	Sheets • Laminated sheets
97.130.10	Shelving • Shelving
01.040.47	Shipbuilding • Shipbuilding and marine structures (Vocabularies)
47	Shipbuilding • Shipbuilding and marine structures
47.020	Shipbuilding • Shipbuilding and marine structures in general
47.020.01	Shipbuilding • General standards related to shipbuilding and marine structures
47.020.05	Shipbuilding • Materials and components for shipbuilding
47.020.99	Shipbuilding • Other standards related to shipbuilding and marine structures
47.020.60	Ships • Electrical equipment of ships and of marine structures
13.160	Shock • Vibration and shock with respect to human beings
13.260	Shock • Protection against electric shock. Live working
17.160	Shock • Vibrations, shock and vibration measurements
97.130	Shop • Shop fittings
97.130.01	Shop • Shop fittings in general
97.130.99	Shop • Other shop fittings
19.120	Sieving • Particle size analysis. Sieving
11.180.30	Sighted • Aids for blind or partially sighted people
33.040.30	Signalling • Switching and signalling systems
43.040.20	Signalling • Lighting, signalling and warning devices
01.080.10	Signs • Public information symbols. Signs. Plates. Labels
71.100.55	Silicones • Silicones
65.020.40	Silviculture • Landscaping and silviculture
19.120	Size • Particle size analysis. Sieving
59.140.20	Skins • Raw skins, hides and pelts
21.060.60	Sleeves • Rings, bushes, sleeves, collars
13.340.60	Slipping • Protection against falling and slipping
13.030.20	Sludge • Liquid wastes. Sludge
59.080.80	Smart • Smart textiles
01.040.03	Sociology • Services. Company organization, management and quality. Administration. Transport. Sociology. (Vocabularies)
03	Sociology • Services. Company organization, management and quality. Administration. Transport. Sociology
03.020	Sociology • Sociology. Demography
29.120.30	Socket-outlets • Plugs, socket-outlets, couplers
35.080	Software • Software
13.080	Soil • Soil quality. Pedology
13.080.01	Soil • Soil quality and pedology in general
13.080.99	Soil • Other standards related to soil quality
65.060.20	Soil-working • Soil-working equipment
13.080.05	Soils • Examination of soils in general
13.080.10	Soils • Chemical characteristics of soils
13.080.20	Soils • Physical properties of soils
13.080.30	Soils • Biological properties of soils
13.080.40	Soils • Hydrological properties of soils
27.160	Solar • Solar energy engineering
25.160	Soldering • Welding, brazing and soldering
25.160.01	Soldering • Welding, brazing and soldering in general

25.160.50	Soldering • Brazing and soldering
13.030.10	Solid • Solid wastes
27.060.10	Solid • Liquid and solid fuel burners
75.160.10	Solid • Solid fuels
97.100.30	Solid • Solid fuel heaters
87.060.30	Solvents • Solvents
91.100.60	Sound • Thermal and sound insulating materials
91.120.20	Sound • Acoustics in building. Sound insulation
13.040.40	Source • Stationary source emissions
27.190	Sources • Biological sources and alternative sources of energy
97.100.99	Sources • Heaters using other sources of energy
65.060.30	Sowing • Sowing and planting equipment
01.040.49	Space • Aircraft and space vehicle engineering (Vocabularies)
49	Space • Aircraft and space vehicle engineering
49.020	Space • Aircraft and space vehicles in general
49.140	Space • Space systems and operations
47.020.80	Spaces • Accommodation spaces
47.020.85	Spaces • Cargo spaces
67.220	Spices • Spices and condiments. Food additives
67.220.10	Spices • Spices and condiments
59.120.10	Spinning • Spinning, twisting and texturing machines
21.120.30	Splines • Keys and keyways, splines
55.060	Spools • Spools. Bobbins
01.040.97	Sports • Domestic and commercial equipment. Entertainment. Sports (Vocabularies)
97	Sports • Domestic and commercial equipment. Entertainment. Sports
97.220	Sports • Sports equipment and facilities
97.220.01	Sports • Sports equipment and facilities in general
97.220.10	Sports • Sports facilities
97.220.20	Sports • Winter sports equipment
97.220.30	Sports • Indoor sports equipment
97.220.40	Sports • Outdoor and water sports equipment
97.220.99	Sports • Other sports equipment and facilities
77.140.25	Spring • Spring steels
21.160	Springs • Springs
97.200.10	Stage • Theatre, stage and studio equipment
77.140.20	Stainless • Stainless steels
91.060.30	Stairs • Ceilings. Floors. Stairs
01	Standardization • Generalities. Terminology. Standardization. Documentation
01.040.01	Standardization • Generalities. Terminology. Standardization. Documentation (Vocabularies)
01.120	Standardization • Standardization. General rules
21.060.70	Staples • Clamps and staples
67.180	Starch • Sugar. Sugar products. Starch
67.180.20	Starch • Starch and derived products
13.040.40	Stationary • Stationary source emissions
23.020.10	Stationary • Stationary containers and tanks
27.100	Stations • Power stations in general
03.120.30	Statistical • Application of statistical methods
27.040	Steam • Gas and steam turbines. Steam engines
23.040.10	Steel • Iron and steel pipes

77.140	Steel • Iron and steel products
77.140.01	Steel • Iron and steel products in general
77.140.50	Steel • Flat steel products and semi-products
77.140.60	Steel • Steel bars and rods
77.140.65	Steel • Steel wire, wire ropes and link chains
77.140.70	Steel • Steel profiles
77.140.75	Steel • Steel pipes and tubes for specific use
77.140.80	Steel • Iron and steel castings
77.140.85	Steel • Iron and steel forgings
77.140.99	Steel • Other iron and steel products
91.080.13	Steel • Steel structures
49.025.10	Steels • Steels
77.080.20	Steels • Steels
77.140.10	Steels • Heat-treatable steels
77.140.15	Steels • Steels for reinforcement of concrete
77.140.20	Steels • Stainless steels
77.140.25	Steels • Spring steels
77.140.30	Steels • Steels for pressure purposes
77.140.35	Steels • Tool steels
77.140.40	Steels • Steels with special magnetic properties
77.140.45	Steels • Non-alloyed steels
11.080	Sterilization • Sterilization and disinfection
11.080.01	Sterilization • Sterilization and disinfection in general
11.080.99	Sterilization • Other standards related to sterilization and disinfection
11.080.30	Sterilized • Sterilized packaging
11.080.10	Sterilizing • Sterilizing equipment
45.060	Stock • Railway rolling stock
45.060.01	Stock • Railway rolling stock in general
45.060.10	Stock • Tractive stock
45.060.20	Stock • Trailing stock
23.020	Storage • Fluid storage devices
23.020.01	Storage • Fluid storage devices in general
23.020.99	Storage • Other fluid storage devices
35.220	Storage • Data storage devices
35.220.01	Storage • Data storage devices in general
35.220.20	Storage • Magnetic storage devices in general
35.220.30	Storage • Optical storage devices
35.220.99	Storage • Other data storage devices
53.080	Storage • Storage equipment
65.040.20	Storage • Buildings and installations for processing and storage of agricultural produce
65.060.25	Storage • Equipment for storage, preparation and distribution of fertilizers
55.220	Storing • Storing. Warehousing
93.080.40	Street • Street lighting and related equipment
47.020.10	Structure • Hulls and their structure elements
49.045	Structure • Structure and structure elements
01.040.47	Structures • Shipbuilding and marine structures (Vocabularies)
31.240	Structures • Mechanical structures for electronic equipment
47	Structures • Shipbuilding and marine structures
47.020	Structures • Shipbuilding and marine structures in general

47.020.01	Structures • General standards related to shipbuilding and marine structures
47.020.60	Structures • Electrical equipment of ships and of marine structures
47.020.99	Structures • Other standards related to shipbuilding and marine structures
65.040	Structures • Farm buildings, structures and installations
91.080	Structures • Structures of buildings
91.080.01	Structures • Structures of buildings in general
91.080.10	Structures • Metal structures
91.080.13	Structures • Steel structures
91.080.17	Structures • Aluminium structures
91.080.20	Structures • Timber structures
91.080.40	Structures • Concrete structures
91.080.99	Structures • Other structures
91.090	Structures • External structures
97.200.10	Studio • Theatre, stage and studio equipment
21.060.10	Studs • Bolts, screws, studs
49.030.20	Studs • Bolts, screws, studs
65.120	Stuffs • Animal feeding stuffs
13.060.50	Substances • Examination of water for chemical substances
29.240.10	Substations • Substations. Surge arresters
67.140.20	Substitutes • Coffee and coffee substitutes
67.180	Sugar • Sugar. Sugar products. Starch
67.180.10	Sugar • Sugar and sugar products
29.050	Superconductivity • Superconductivity and conducting materials
97.130.30	Supermarket • Trolleys for supermarket purposes
29.200	Supply • Rectifiers. Converters. Stabilized power supply
91.140.40	Supply • Gas supply systems
91.140.50	Supply • Electricity supply systems
91.140.60	Supply • Water supply systems
25.220	Surface • Surface treatment and coating
25.220.01	Surface • Surface treatment and coating in general
25.220.10	Surface • Surface preparation
25.220.20	Surface • Surface treatment
71.100.40	Surface • Surface active agents
17.040.20	Surfaces • Properties of surfaces
29.240.10	Surge • Substations. Surge arresters
11.040.40	Surgery • Implants for surgery, prosthetics and orthotics
11.040.30	Surgical • Surgical instruments and materials
43.040.50	Suspensions • Transmissions, suspensions
13.020.20	Sustainability • Environmental economics. Sustainability
29.120.40	Switches • Switches
31.220.20	Switches • Switches
29.130	Switchgear • Switchgear and controlgear
29.130.01	Switchgear • Switchgear and controlgear in general
29.130.10	Switchgear • High voltage switchgear and controlgear
29.130.20	Switchgear • Low voltage switchgear and controlgear
29.130.99	Switchgear • Other switchgear and controlgear
33.040.30	Switching • Switching and signalling systems
01.075	Symbols • Character symbols
01.080	Symbols • Graphical symbols

01.080.01	Symbols • Graphical symbols in general
01.080.10	Symbols • Public information symbols. Signs. Plates. Labels
01.080.20	Symbols • Graphical symbols for use on specific equipment
01.080.30	Symbols • Graphical symbols for use on mechanical engineering and construction drawings, diagrams, plans, maps and in relevant technical product documentation
01.080.40	Symbols • Graphical symbols for use on electrical and electronics engineering drawings, diagrams, charts and in relevant technical product documentation
01.080.50	Symbols • Graphical symbols for use on information technology and telecommunications technical drawings and in relevant technical product documentation
01.080.99	Symbols • Other graphical symbols
33.120.20	Symmetrical • Wires and symmetrical cables
11.040.25	Syringes • Syringes, needles and catheters
23.100.99	System • Other fluid power system components
33.070.50	System • Global System for Mobile Communication (GSM)

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97.040.20	Tables • Cooking ranges, working tables, ovens and similar appliances
23.020.10	Tanks • Stationary containers and tanks
31.060.40	Tantalum • Tantalum electrolytic capacitors
35.220.10	Tapes • Paper cards and tapes
35.220.22	Tapes • Magnetic tapes
35.220.23	Tapes • Cassettes and cartridges for magnetic tapes
25.100.50	Taps • Taps and threading dies
67.140	Tea • Tea. Coffee. Cocoa
67.140.10	Tea • Tea
01.080.30	Technical • Graphical symbols for use on mechanical engineering and construction drawings, diagrams, plans, maps and in relevant technical product documentation
01.080.40	Technical • Graphical symbols for use on electrical and electronics engineering drawings, diagrams, charts and in relevant technical product documentation
01.080.50	Technical • Graphical symbols for use on information technology and telecommunications technical drawings and in relevant technical product documentation
01.100	Technical • Technical drawings
01.100.01	Technical • Technical drawings in general
01.100.27	Technical • Technical drawings for telecommunications and information technology fields
01.100.99	Technical • Other standards related to technical drawings
01.110	Technical • Technical product documentation
91.010.30	Technical • Technical aspects
33.030	Telecommunication • Telecommunication services. Applications
33.040	Telecommunication • Telecommunication systems
33.040.01	Telecommunication • Telecommunication systems in general
33.040.99	Telecommunication • Other equipment for telecommunication systems
33.050	Telecommunication • Telecommunication terminal equipment
33.050.01	Telecommunication • Telecommunication terminal equipment in general
33.050.99	Telecommunication • Other telecommunication terminal equipment

01.040.33	Telecommunications • Telecommunications. Audio and video engineering (Vocabularies)
01.080.50	Telecommunications • Graphical symbols for use on information technology and telecommunications technical drawings and in relevant technical product documentation
01.100.27	Telecommunications • Technical drawings for telecommunications and information technology fields
31.220	Telecommunications • Electromechanical components for electronic and telecommunications equipment
33	Telecommunications • Telecommunications. Audio and video engineering
33.020	Telecommunications • Telecommunications in general
33.040.60	Telecommunications • Powerline telecommunications
33.070.30	Telecommunications • Digital Enhanced Cordless Telecommunications (DECT)
33.120	Telecommunications • Components and accessories for telecommunications equipment
33.140	Telecommunications • Special measuring equipment for use in telecommunications
33.160.60	Teleconferencing • Multimedia systems and teleconferencing equipment
33.200	Telecontrol • Telecontrol. Telemetry
33.050.30	Telefax • Equipment for telex, teletext, telefax
33.200	Telemetry • Telecontrol. Telemetry
33.040.35	Telephone • Telephone networks
33.050.10	Telephone • Telephone equipment
33.050.30	Teletext • Equipment for telex, teletext, telefax
33.160.25	Television • Television receivers
33.170	Television • Television and radio broadcasting
33.050.30	Telex • Equipment for telex, teletext, telefax
17.200	Temperature • Thermodynamics and temperature measurements
17.200.20	Temperature-measuring • Temperature-measuring instruments
33.050	Terminal • Telecommunication terminal equipment
33.050.01	Terminal • Telecommunication terminal equipment in general
33.050.99	Terminal • Other telecommunication terminal equipment
35.180	Terminal • IT terminal and other peripheral equipment
01	Terminology • Generalities. Terminology. Standardization. Documentation
01.020	Terminology • Terminology (principles and coordination)
01.040.01	Terminology • Generalities. Terminology. Standardization. Documentation (Vocabularies)
91.100.25	Terracotta • Terracotta building products
33.070.10	Terrestrial • Terrestrial Trunked Radio (TETRA)
01.040.19	Testing • Testing (Vocabularies)
19	Testing • Testing
19.040	Testing • Environmental testing
19.060	Testing • Mechanical testing
19.080	Testing • Electrical and electronic testing
19.100	Testing • Non-destructive testing
77.040	Testing • Testing of metals
77.040.01	Testing • Testing of metals in general
77.040.10	Testing • Mechanical testing of metals
77.040.20	Testing • Non-destructive testing of metals
77.040.99	Testing • Other methods of testing of metals
33.070.10	Tetra • Terrestrial Trunked Radio (TETRA)
01.040.59	Textile • Textile and leather technology (Vocabularies)
59	Textile • Textile and leather technology
59.020	Textile • Processes of the textile industry
59.040	Textile • Textile auxiliary materials
59.060	Textile • Textile fibres

59.060.01	Textile • Textile fibres in general
59.060.99	Textile • Other textile fibres
59.080	Textile • Products of the textile industry
59.080.30	Textile • Textile fabrics
59.080.99	Textile • Other products of the textile industry
59.100.10	Textile • Textile glass materials
59.120	Textile • Textile machinery
59.120.01	Textile • Textile machinery in general
59.120.99	Textile • Other textile machinery
49.025.60	Textiles • Textiles
59.080.01	Textiles • Textiles in general
59.080.80	Textiles • Smart textiles
97.160	Textiles • Home textiles. Linen
59.120.10	Texturing • Spinning, twisting and texturing machines
97.200.10	Theatre • Theatre, stage and studio equipment
11.040.60	Therapy • Therapy equipment
27.220	Thermal • Heat recovery. Thermal insulation
91.100.60	Thermal • Thermal and sound insulating materials
91.120.10	Thermal • Thermal insulation of buildings
31.040.30	Thermistors • Thermistors
17.200	Thermodynamics • Thermodynamics and temperature measurements
17.200.01	Thermodynamics • Thermodynamics in general
17.200.99	Thermodynamics • Other standards related to thermodynamics
83.080.20	Thermoplastic • Thermoplastic materials
83.080.10	Thermosetting • Thermosetting materials
25.100.50	Threading • Taps and threading dies
21.040	Threads • Screw threads
21.040.01	Threads • Screw threads in general
21.040.10	Threads • Metric screw threads
21.040.20	Threads • Inch screw threads
21.040.30	Threads • Special screw threads
49.030.10	Threads • Screw threads
31.080.20	Thyristors • Thyristors
91.100.23	Tiles • Ceramic tiles
79.040	Timber • Wood, sawlogs and sawn timber
79.080	Timber • Semi-manufactures of timber
91.080.20	Timber • Timber structures
17.080	Time • Measurement of time, velocity, acceleration, angular velocity
39.040.99	Time-measuring • Other time-measuring instruments
77.120.60	Tin • Lead, zinc, tin and their alloys
77.150.60	Tin • Lead, zinc and tin products
55.120	Tins • Cans. Tins. Tubes
85.080.20	Tissue • Tissue paper
49.025.30	Titanium • Titanium
77.120.50	Titanium • Titanium and titanium alloys
77.150.50	Titanium • Titanium products
65.160	Tobacco • Tobacco, tobacco products and related equipment
71.100.70	Toiletries • Cosmetics. Toiletries
25.060	Tool • Machine tool systems

25.060.01	Tool • Machine tool systems in general
25.060.99	Tool • Other machine tool systems
77.140.35	Tool • Tool steels
25.060.20	Tool-workpiece • Dividing and tool-workpiece holding devices
25.080	Tools • Machine tools
25.080.01	Tools • Machine tools in general
25.080.99	Tools • Other machine tools
25.100	Tools • Cutting tools
25.100.01	Tools • Cutting tools in general
25.100.10	Tools • Turning tools
25.100.20	Tools • Milling tools
25.100.25	Tools • Tools for planing and broaching machines
25.100.99	Tools • Other cutting tools
25.140	Tools • Hand-held tools
25.140.01	Tools • Hand-held tools in general
25.140.10	Tools • Pneumatic tools
25.140.20	Tools • Electric tools
25.140.30	Tools • Hand-operated tools
25.140.99	Tools • Other hand-held tools
79.120.20	Tools • Woodworking tools
03.200	Tourism • Leisure. Tourism
03.200.01	Tourism • Leisure and tourism in general
03.200.10	Tourism • Adventure tourism
03.200.99	Tourism • Other standards relating to leisure and tourism
91.020	Town • Physical planning. Town planning
97.200.50	Toys • Toys
29.280	Traction • Electric traction equipment
45.060.10	Tractive • Tractive stock
65.060.10	Tractors • Agricultural tractors and trailed vehicles
03.100.20	Trade • Trade. Commercial function. Marketing
35.240.63	Trade • IT applications in trade
65.060.10	Trailed • Agricultural tractors and trailed vehicles
43.080.10	Trailers • Trucks and trailers
43.100	Trailers • Passenger cars. Caravans and light trailers
45.060.20	Trailing • Trailing stock
45.140	Tram • Metro, tram and light rail equipment
01.040.27	Transfer • Energy and heat transfer engineering (Vocabularies)
27	Transfer • Energy and heat transfer engineering
27.010	Transfer • Energy and heat transfer engineering in general
29.180	Transformers • Transformers. Reactors
11.040.20	Transfusion • Transfusion, infusion and injection equipment
31.080.30	Transistors • Transistors
01.140.10	Transliteration • Writing and transliteration
29.240	Transmission • Power transmission and distribution networks
29.240.01	Transmission • Power transmission and distribution networks in general
29.240.20	Transmission • Power transmission and distribution lines
29.240.99	Transmission • Other equipment related to power transmission and distribution networks
33.040.20	Transmission • Transmission systems
21.220	Transmissions • Flexible drives and transmissions

21.220.01	Transmissions • Flexible drives and transmissions in general
21.220.99	Transmissions • Other flexible drives and transmissions
43.040.50	Transmissions • Transmissions, suspensions
33.060.20	Transmitting • Receiving and transmitting equipment
01.040.03	Transport • Services. Company organization, management and quality. Administration. Transport. Sociology. (Vocabularies)
03	Transport • Services. Company organization, management and quality. Administration. Transport. Sociology
03.220	Transport • Transport
03.220.01	Transport • Transport in general
03.220.20	Transport • Road transport
03.220.30	Transport • Transport by rail
03.220.40	Transport • Transport by water
03.220.50	Transport • Air transport
03.220.99	Transport • Other forms of transport
13.040.50	Transport • Transport exhaust emissions
17.140.30	Transport • Noise emitted by means of transport
35.100.40	Transport • Transport layer
35.240.60	Transport • IT applications in transport
53.040.30	Transport • Pneumatic transport and its components
55.180.40	Transport • Complete, filled transport packages
13.030.40	Treatment • Installations and equipment for waste disposal and treatment
25.200	Treatment • Heat treatment
25.220	Treatment • Surface treatment and coating
25.220.01	Treatment • Surface treatment and coating in general
25.220.20	Treatment • Surface treatment
25.220.99	Treatments • Other treatments and coatings
97.130.30	Trolleys • Trolleys for supermarket purposes
43.080.10	Trucks • Trucks and trailers
53.060	Trucks • Industrial trucks
33.070.10	Trunked • Terrestrial Trunked Radio (TETRA)
31.100	Tubes • Electronic tubes
55.120	Tubes • Cans. Tins. Tubes
77.140.75	Tubes • Steel pipes and tubes for specific use
73.100.10	Tubing • Tunnelling and tubing equipment
93.060	Tunnel • Tunnel construction
73.100.10	Tunnelling • Tunnelling and tubing equipment
27.180	Turbine • Wind turbine energy systems
27.040	Turbines • Gas and steam turbines. Steam engines
25.100.10	Turning • Turning tools
59.120.10	Twisting • Spinning, twisting and texturing machines
83.160	Tyres • Tyres
83.160.01	Tyres • Tyres in general
83.160.10	Tyres • Road vehicle tyres
83.160.20	Tyres • Aircraft tyres
83.160.30	Tyres • Tyres for agricultural machinery
83.160.99	Tyres • Other tyres

U

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- 93.020** Underground • Earthworks. Excavations. Foundation construction. Underground works
 - 01.060** Units • Quantities and units
 - 25.060.10** Units • Modular units and other devices
 - 11.100.30** Urine • Analysis of blood and urine

V

-
- 23.160** Vacuum • Vacuum technology
 - 23.060** Valves • Valves
 - 23.060.01** Valves • Valves in general
 - 23.060.10** Valves • Globe valves
 - 23.060.20** Valves • Ball and plug valves
 - 23.060.30** Valves • Gate valves
 - 23.060.50** Valves • Check valves
 - 23.060.99** Valves • Other valves
 - 29.035.60** Varnished • Varnished fabrics
 - 87.040** Varnishes • Paints and varnishes
 - 67.200.10** Vegetable • Animal and vegetable fats and oils
 - 67.080** Vegetables • Fruits. Vegetables
 - 67.080.01** Vegetables • Fruits, vegetables and derived products in general
 - 67.080.20** Vegetables • Vegetables and derived products
 - 01.040.43** Vehicle • Road vehicle engineering (Vocabularies)
 - 01.040.49** Vehicle • Aircraft and space vehicle engineering (Vocabularies)
 - 43.040** Vehicle • Road vehicle systems
 - 43.040.01** Vehicle • Road vehicle systems in general
 - 43.040.99** Vehicle • Other road vehicle systems
 - 49** Vehicle • Aircraft and space vehicle engineering
 - 83.160.10** Vehicle • Road vehicle tyres
 - 23.020.20** Vehicles • Vessels and containers mounted on vehicles
 - 43** Vehicles • Road vehicles engineering
 - 43.020** Vehicles • Road vehicles in general
 - 43.060** Vehicles • Internal combustion engines for road vehicles
 - 43.060.01** Vehicles • Internal combustion engines for road vehicles in general
 - 43.080** Vehicles • Commercial vehicles
 - 43.080.01** Vehicles • Commercial vehicles in general
 - 43.080.99** Vehicles • Other commercial vehicles
 - 43.120** Vehicles • Electric road vehicles
 - 43.160** Vehicles • Special purpose vehicles

49.020	Vehicles • Aircraft and space vehicles in general
65.060.10	Vehicles • Agricultural tractors and trailed vehicles
17.080	Velocity • Measurement of time, velocity, acceleration, angular velocity
55.230	Vending • Distribution and vending machines
47.020.90	Ventilation • Marine ventilation, air conditioning and heating systems
73.100.20	Ventilation • Ventilation, air-conditioning and illumination equipment
91.140.30	Ventilation • Ventilation and air-conditioning systems
23.120	Ventilators • Ventilators. Fans. Air-conditioners
23.020.20	Vessels • Vessels and containers mounted on vehicles
23.020.30	Vessels • Pressure vessels
23.020.40	Vessels • Cryogenic vessels
47.040	Vessels • Seagoing vessels
47.060	Vessels • Inland navigation vessels
71.120.10	Vessels • Reaction vessels and their components
11.220	Veterinary • Veterinary medicine
13.160	Vibration • Vibration and shock with respect to human beings
17.160	Vibration • Vibrations, shock and vibration measurements
91.120.25	Vibration • Seismic and vibration protection
17.160	Vibrations • Vibrations, shock and vibration measurements
01.040.33	Video • Telecommunications. Audio and video engineering (Vocabularies)
33	Video • Telecommunications. Audio and video engineering
33.160	Video • Audio, video and audiovisual engineering
33.160.01	Video • Audio, video and audiovisual systems in general
33.160.40	Video • Video systems
33.160.99	Video • Other audio, video and audiovisual equipment
35.040.40	Video • Coding of audio, video, multimedia and hypermedia information
17.060	Viscosity • Measurement of volume, mass, density, viscosity
65.060.60	Viticultural • Viticultural and wine-making equipment
11.100.10	Vitro • In vitro diagnostic test systems
01.040	Vocabularies • Vocabularies
01.040.01	Vocabularies • Generalities. Terminology. Standardization. Documentation (Vocabularies)
01.040.03	Vocabularies • Services. Company organization, management and quality. Administration. Transport. Sociology. (Vocabularies)
01.040.07	Vocabularies • Natural and applied sciences (Vocabularies)
01.040.11	Vocabularies • Health care technology (Vocabularies)
01.040.13	Vocabularies • Environment. Health protection. Safety (Vocabularies)
01.040.17	Vocabularies • Metrology and measurement. Physical phenomena (Vocabularies)
01.040.19	Vocabularies • Testing (Vocabularies)
01.040.21	Vocabularies • Mechanical systems and components for general use (Vocabularies)
01.040.23	Vocabularies • Fluid systems and components for general use (Vocabularies)
01.040.25	Vocabularies • Manufacturing engineering (Vocabularies)
01.040.27	Vocabularies • Energy and heat transfer engineering (Vocabularies)
01.040.29	Vocabularies • Electrical engineering (Vocabularies)
01.040.31	Vocabularies • Electronics (Vocabularies)
01.040.33	Vocabularies • Telecommunications. Audio and video engineering (Vocabularies)
01.040.35	Vocabularies • Information technology (Vocabularies)
01.040.37	Vocabularies • Image technology (Vocabularies)
01.040.39	Vocabularies • Precision mechanics. Jewellery (Vocabularies)
01.040.43	Vocabularies • Road vehicle engineering (Vocabularies)

01.040.45	Vocabularies • Railway engineering (Vocabularies)
01.040.47	Vocabularies • Shipbuilding and marine structures (Vocabularies)
01.040.49	Vocabularies • Aircraft and space vehicle engineering (Vocabularies)
01.040.53	Vocabularies • Materials handling equipment (Vocabularies)
01.040.55	Vocabularies • Packaging and distribution of goods (Vocabularies)
01.040.59	Vocabularies • Textile and leather technology (Vocabularies)
01.040.61	Vocabularies • Clothing industry (Vocabularies)
01.040.65	Vocabularies • Agriculture (Vocabularies)
01.040.67	Vocabularies • Food technology (Vocabularies)
01.040.71	Vocabularies • Chemical technology (Vocabularies)
01.040.73	Vocabularies • Mining and minerals (Vocabularies)
01.040.75	Vocabularies • Petroleum and related technologies (Vocabularies)
01.040.77	Vocabularies • Metallurgy (Vocabularies)
01.040.79	Vocabularies • Wood technology (Vocabularies)
01.040.81	Vocabularies • Glass and ceramics industries (Vocabularies)
01.040.83	Vocabularies • Rubber and plastics industries (Vocabularies)
01.040.85	Vocabularies • Paper technology (Vocabularies)
01.040.87	Vocabularies • Paint and colour industries (Vocabularies)
01.040.91	Vocabularies • Construction materials and building (Vocabularies)
01.040.93	Vocabularies • Civil engineering (Vocabularies)
01.040.95	Vocabularies • Military Affairs. Military engineering. Weapons (Vocabularies)
01.040.97	Vocabularies • Domestic and commercial equipment. Entertainment. Sports (Vocabularies)
29.130.10	Voltage • High voltage switchgear and controlgear
29.130.20	Voltage • Low voltage switchgear and controlgear
17.060	Volume • Measurement of volume, mass, density, viscosity
75.180.30	Volumetric • Volumetric equipment and measurements

W

91.060.10	Walls • Walls. Partitions. Façades
71.040.20	Ware • Laboratory ware and related apparatus
55.220	Warehousing • Storing. Warehousing
13.320	Warning • Alarm and warning systems
43.040.20	Warning • Lighting, signalling and warning devices
21.060.30	Washers • Washers, locking elements
49.030.50	Washers • Washers and other locking elements
13.030.40	Waste • Installations and equipment for waste disposal and treatment
13.030	Wastes • Wastes
13.030.01	Wastes • Wastes in general
13.030.10	Wastes • Solid wastes
13.030.20	Wastes • Liquid wastes. Sludge
13.030.30	Wastes • Special wastes
13.030.99	Wastes • Other standards related to wastes
39.040.10	Watches • Watches
03.220.40	Water • Transport by water

07.100.20	Water • Microbiology of water
13.060	Water • Water quality
13.060.01	Water • Water quality in general
13.060.10	Water • Water of natural resources
13.060.20	Water • Drinking water
13.060.25	Water • Water for industrial use
13.060.30	Water • Sewage water
13.060.45	Water • Examination of water in general
13.060.50	Water • Examination of water for chemical substances
13.060.60	Water • Examination of physical properties of water
13.060.70	Water • Examination of biological properties of water
13.060.99	Water • Other standards related to water quality
23.040.03	Water • Pipelines and its parts for external water conveyance systems
71.100.80	Water • Chemicals for purification of water
91.140.60	Water • Water supply systems
91.140.65	Water • Water heating equipment
93.025	Water • External water conveyance systems
97.220.40	Water • Outdoor and water sports equipment
91.120.30	Waterproofing • Waterproofing
93.140	Waterways • Construction of waterways, ports and dykes
33.120.10	Waveguides • Coaxial cables. Waveguides
75.140	Waxes • Waxes, bituminous materials and other petroleum products
01.040.95	Weapons • Military Affairs. Military engineering. Weapons (Vocabularies)
95	Weapons • Military affairs. Military engineering. Weapons
95.060	Weapons • Weapons
59.120.30	Weaving • Looms. Weaving machines
17.100	Weight • Measurement of force, weight and pressure
25.160.40	Welded • Welded joints and welds
25.160	Welding • Welding, brazing and soldering
25.160.01	Welding • Welding, brazing and soldering in general
25.160.10	Welding • Welding processes
25.160.20	Welding • Welding consumables
25.160.30	Welding • Welding equipment
25.160.40	Welds • Welded joints and welds
27.180	Wind • Wind turbine energy systems
59.120.20	Winding • Winding machines and equipment
91.060.50	Windows • Doors and windows
65.060.60	Wine-making • Viticultural and wine-making equipment
97.220.20	Winter • Winter sports equipment
43.040.65	Wiper • Glazing and wiper systems
77.140.65	Wire • Steel wire, wire ropes and link chains
29.060	Wires • Electrical wires and cables
29.060.01	Wires • Electrical wires and cables in general
29.060.10	Wires • Wires
33.120.20	Wires • Wires and symmetrical cables
01.040.79	Wood • Wood technology (Vocabularies)
79	Wood • Wood technology
79.020	Wood • Wood technology processes
79.040	Wood • Wood, sawlogs and sawn timber

79.060	Wood-based • Wood-based panels
79.060.01	Wood-based • Wood-based panels in general
79.060.99	Wood-based • Other wood-based panels
71.100.50	Wood-protecting • Wood-protecting chemicals
79.120	Woodworking • Woodworking equipment
79.120.01	Woodworking • Woodworking equipment in general
79.120.10	Woodworking • Woodworking machines
79.120.20	Woodworking • Woodworking tools
79.120.99	Woodworking • Other woodworking equipment
35.240.20	Work • IT applications in office work
13.040.30	Workplace • Workplace atmospheres
93.020	Works • Earthworks. Excavations. Foundation construction. Underground works
01.140.10	Writing • Writing and transliteration

Y

59.080.20	Yarns • Yarns
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Z

77.120.60	Zinc • Lead, zinc, tin and their alloys
77.150.60	Zinc • Lead, zinc and tin products
07.080	Zoology • Biology. Botany. Zoology



**International Organization
for Standardization**

ISO Central Secretariat
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CH - 1214 Vernier, Geneva
Switzerland

iso.org

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EXHIBIT O



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

DrJ Engineering, LLC

6300 Enterprise Lane, Madison, WI 53719 United States

ACCREDITATION ID# 1131

Fulfills the requirements of

**ISO/IEC 17065:2012 Conformity assessment - Requirements
for bodies certifying products, processes and services**

LIST OF CERTIFICATION SCHEME(S)

DrJ Engineering Certification Scheme

EPA ENERGY STAR® Program Version 1.0- EPA ENERGY STAR Program for Residential
Insulation

This certificate is valid only when accompanied by a current scope of accreditation.
The current scope of accreditation can be verified at www.anab.org.

Lori Gillespie, Vice President, MVP SBU
Expiry Date: 01 December 2024



Cert ID # KLAGBYXG

for programs within the following

SCOPE OF ACCREDITATION

GRANTED 2014-12-29:

91.040.01	Buildings in general
91.060.01	Elements of buildings in general
91.080.01	Structures of buildings in general
91.100.01	Construction materials in general
93.010	Civil engineering in general

GRANTED 2017-03-09:

13.220.01	Protection against fire in general
13.220.10	Fire-fighting
13.220.20	Fire protection
13220.40	Ignitability and burning behaviour of materials and products
13.220.50	Fire-resistance of building materials and elements
13.220.99	Other standards related to protection against fire
21.060.01	Fasteners in general
21.060.10	Bolts, screws, studs
21.060.20	Nuts
21.060.30	Washers, locking elements
21.060.40	Rivets
21.060.50	Pins, nails
21.060.60	Rings, bushes, sleeves, collars
21.060.70	Clamps and staple
21.060.99	Other fasteners
71.100.50	Wood-protecting chemicals
77.140.01	Iron and steel products in general



Cert ID # KLAGBYXG

GRANTED 2017-03-09:

77.140.10	Heat-treatable steels
77.140.15	Steels for reinforcement of concrete
77.140.20	Stainless steels
77.140.25	Spring steels
77.140.30	Steels for pressure purposes
77.140.35	Tool steels
77.140.40	Steels with special magnetic properties
77.140.45	Non-alloyed steels
77.140.50	Flat steel products and semi-products
77.140.60	Steel bars and rods
77.140.65	Steel wire, wire ropes, and semi-products
77.140.70	Steel profiles
77.140.75	Steel pipes and tubes for specific use
77.140.80	Iron and steel castings
77.140.85	Iron and steel forgings
77.140.99	Other iron and steel products
77.150.01	Products of non-ferrous metals in general

GRANTED 2017-03-09:

77.150.10	Aluminium products
77.150.20	Magnesium products
77.150.30	Copper products
77.150.40	Nickel and chromium products
77.150.50	Titanium products
77.150.60	Lead, zinc and tin products
77.150.70	Cadmium and cobalt products
77.150.99	Other products of non-ferrous metals
79.040	Wood, sawlogs and sawn timber
79.060.01	Wood-based panels in general
79.060.10	Plywood
79.060.20	Fiber and particle boards
79.060.99	Other wood-based panels



GRANTED 2017-03-09:

81.040.01	Glass in general
81.040.10	Raw materials and raw glass
81.040.20	Glass in building
81.040.30	Glass products
81.080.01	Plastics in general
81.080.10	Thermosetting materials
81.080.20	Thermoplastics materials
91.120.01	Protection of and in buildings in general
91.120.10	Thermal insulation of buildings
91.120.20	Acoustics in building. Sound insulation
91.120.25	Seismic and vibration protection
91.120.30	Waterproofing
91.120.40	Lightning Protection
91.120.99	Other standards related to protection of and in buildings

GRANTED 2020-12-21:

27.010	Energy and heat transfer in engineering in general
27.160	Solar energy engineering
29.035.01	Insulating materials in general
29.035.10	Paper and board insulating materials
29.035.20	Plastics and rubber insulating materials
29.035.30	Glass and ceramic insulating materials
29.035.99	Other insulating materials
77.060	Corrosion of metals
79.080	Semi-manufacturing of timber
83.100	Cellular materials
83.120	Reinforced plastics
83.140.01	Rubber and plastics in general
83.140.10	Films and sheets
83.140.20	Laminated sheets
83.140.99	Other rubber and plastics products
83.180	Adhesives



GRANTED 2020-12-21:

91.010	Construction history
91.010.01	Construction industry in general
91.010.10	Legal aspects
91.010.20	Contractual aspects
91.010.30	Technical aspects
91.010.99	Other aspects
91.040.10	Public buildings
91.040.20	Buildings for commerce and industry
91.040.30	Residential buildings
91.040.99	Other buildings
91.060.10	Walls. Partitions. Façades
91.060.20	Roofs
91.060.30	Ceilings. Floors. Stairs
91.060.40	Chimneys, shafts, ducts
91.060.50	Doors and windows
91.060.99	Other elements of buildings
91.080.10	Metal structures
91.080.17	Aluminum structures
91.080.20	Timber structures
91.080.30	Masonry
91.080.40	Concrete structures
91.080.99	Other structures
91.090	External structures
91.100.10	Cement. Gypsum. Lime. Mortar
91.100.15	Mineral materials and products
91.100.23	Ceramic tiles
91.100.25	Terracotta building products
91.100.30	Concrete and concrete products
91.100.40	Products in fibre-reinforced cement
91.100.50	Binders. Sealing materials
91.100.60	Thermal and sound insulating materials
91.100.99	Other construction materials



GRANTED 2020-12-21:

- 91.180 Interior finishing
- 91.190 Building accessories
- 91.200 Construction technology
- 93.020 Earthworks, excavations. Foundation construction

GRANTED 2023-11-30:

EPA ENERGY STAR® Program

- 91.120.10 Thermal insulation of buildings
- 91.100.60 Thermal and Sound insulating materials



Cert ID # KLAGBYXG

EXHIBIT P



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

ICC Evaluation Service, LLC

3060 Saturn Street, Suite 100, Brea, CA 92821, United States

ACCREDITATION ID# 1000

Fulfills the requirements of

ISO/IEC 17065:2012 Conformity assessment - Requirements for bodies certifying products, processes and services

LIST OF CERTIFICATION SCHEME(S)

ICC-ES Evaluation Reports Program

ICC-ES PMG Listing Program

ICC-ES Building Products Listing Program

EPA WaterSense - WaterSense® Product Certification System

ENERGY STAR® Conditions and Criteria for Recognition of Certification Bodies for the ENERGY STAR® Program Title 40, Part 770

Formaldehyde Standards for Composite Wood Products

LIST OF STANDARDS

SRCC Standard 100, "Minimum Standards for Certifying Solar Collectors"

SRCC Document OG-100 "Operating Guidelines For Certifying Solar Collectors"

SRCC Standard OG 300 "Minimum Standards for Certifying Solar Water Heating Systems"

for programs within the following

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 2024-12-01



Cert ID: YWHIDCBG

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

SCOPE OF ACCREDITATION

GRANTED 2015-03-10:

EPA ENERGY STAR®

Building Products

- Roofs

EPA WaterSense

- Commercial Pre-Rinse Spray Valve

- High-Efficiency Lavatory Faucets

- High-Efficiency Flushing Urinals

- Showerheads

- Tank-Type High-Efficiency Toilets

- Weather-Based Irrigation Controllers

GRANTED 2017-04-28:

EPA WaterSense

- Flushometer-Valve Toilets

- Spray Sprinkler Bodies

GRANTED 2015-03-10:

13.030.01 Wastes in general

13.030.10 Solid wastes

13.030.20 Liquid wastes, Sludge

13.030.30 Special wastes

13.060.01 Water quality in general

13.060.10 Water of natural resources

13.060.20 Drinking water

13.060.25 Water for industrial use

13.060.30 Sewage water

13.060.45 Examination of water in general

13.060.50 Examination of water for chemical substances

13.060.60 Examination of physical properties of water

13.060.70 Examination of biological properties of water

13.060.99 Other standards related to water quality

13.220.20 Fire Protection

13.220.40 Ignitability and burning behaviour of materials and products

13.220.50 Fire-resistance of building materials and elements

13.240 Protection against excessive pressure

21.060.01 Fasteners in general

21.060.10 Bolts, screws, studs

21.060.20 Nuts

21.060.40 Rivets

21.060.50 Pins, nails

21.060.70 Clamps and staples

21.060.99 Other fasteners

23.040.01 Pipeline components and pipelines in general

23.040.10 Iron and steel pipes

23.040.15 Non-ferrous metal pipes

23.040.20 Plastics pipes

23.040.40 Metal fittings

23.040.45 Plastics fittings

23.040.50 Pipes and fittings of other materials

23.040.60 Flanges, couplings and joints

23.040.70 Hoses and hose assemblies

23.040.80 Seals for pipe and hose assemblies

23.040.99 Other pipeline component

23.060.01 Valves in general

23.060.10 Globe valves

23.060.20 Ball and plug valves

23.060.30 Gate valves

23.060.50 Check valves

23.060.99 Other valves

23.120 Ventilators, Fans, Air-conditioners

GRANTED 2015-03-10:

25.220.01 Surface treatment and coating in general

25.220.10 Surface preparation

25.220.20 Surface treatment

25.220.40 Metallic coatings

25.220.50 Enamels

25.220.60 Organic coatings

25.220.99 Other treatments and coatings

27.010 Energy and heat transfer engineering in general

27.060.30 Boilers and heat exchangers

27.160 Solar energy engineering

59.100.10 Textile glass materials

59.100.20 Carbon materials

71.100.50 Wood-protecting chemicals

77.060 Corrosion of metals

77.140.15 Steels for reinforcement of concrete

77.140.50 Flat steel products and semi-products

77.140.60 Steel bars and rods

77.140.65 Steel wire, wire ropes and link chains

77.140.70 Steel profiles

77.150.01 Products of non-ferrous metals in general

77.150.10 Aluminum products

77.150.20 Magnesium products

77.150.30 Copper products

77.150.40 Nickel and chromium products

77.150.50 Titanium products

77.150.60 Lead, zinc and tin products

77.150.70 Cadmium and cobalt products

77.150.99 Other products of non-ferrous metals

79.020 Wood technology processes

79.040 Wood, sawlogs and sawn timber

79.060.01 Wood-based panels in general

79.060.10 Plywood

79.060.20 Fibre and particle boards

79.060.99 Other wood-based panels

79.080 Semi-manufactures of timber

81.040.20 Glass in buildings

81.040.30 Glass products

83.080.01 Plastics in general

83.080.20 Thermoplastic materials

83.100 Cellular materials

83.120 Reinforced plastics

83.140.10 Films and sheets

83.140.20 Laminated sheets

83.140.99 Other rubber and plastics products

83.180 Adhesives

91.010.01 Construction industry in general

91.010.10 Legal aspects

91.010.20 Contractual aspects

91.010.30 Technical aspects

91.010.99 Other aspects

91.060.01 Elements of buildings in general

91.060.10 Walls, Partitions, Facades

91.060.20 Roofs

91.060.30 Ceilings, Floors, Stairs

91.060.40 Chimneys, shafts, ducts

91.060.50 Doors and windows

91.060.99 Other elements of buildings

91.080.01 Structures of buildings in general

91.080.10 Metal structures

91.080.13 Steel structures



R. Douglas Leonard Jr., VP, PILR SBU



Cert ID: YWHIDCBG

SCOPE OF ACCREDITATION

GRANTED 2015-03-10:

91.080.17 Aluminum structures
91.080.20 Timber structures
91.080.30 Masonry
91.080.40 Concrete structures
91.080.99 Other structures
91.090 External structures
91.100.01 Construction materials in general
91.100.10 Cement, Gypsum, Lime, Mortar
91.100.15 Mineral materials and products
91.100.23 Ceramic tiles
91.100.25 Terracotta building products
91.100.30 Concrete and concrete products
91.100.40 Products in fibre-reinforced cement
91.100.50 Binders, Sealing materials
91.100.60 Thermal and sound insulating materials
91.100.99 Other construction materials
91.120.01 Protection of and in buildings in general
91.120.10 Thermal insulation of buildings
91.120.20 Acoustics in building, Sound insulation
91.120.25 Seismic and vibration protection
91.120.30 Waterproofing
91.120.40 Lightning protection
91.120.99 Other standards related to protection of and in buildings
91.140.40 Gas supply systems
91.140.65 Water Heating equipment
91.140.70 Sanitary installations
91.180 Interior finishing
91.190 Building accessories
93.020 Earthworks, Excavations, Foundation construction, Underground works
97.100.01 Heating appliances in general
97.100.10 Electric heaters
97.100.20 Gas heaters
97.100.30 Solid fuel heaters
97.100.40 Liquid fuel heaters
97.100.99 Heaters using other sources of energy

GRANTED 2017-04-28:

97.040.1 Kitchen furniture

GRANTED 2019-08-29:

EPA TSCA Title VI Third-Party Certification Program - Formaldehyde Standards for Composite Wood Products



R. Douglas Leonard Jr., VP, PILR SBU



Cert ID: YWHIDCBG

EXHIBIT Q



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

ICC Evaluation Service, LLC

3060 Saturn Street, Suite 100, Brea, CA 92821, United States

ACCREDITATION ID# 1000

Fulfills the requirements of

ISO/IEC 17065:2012 Conformity assessment - Requirements for bodies certifying products, processes and services

LIST OF CERTIFICATION SCHEME(S)

Criteria for SQF Certification Bodies - SQF Requirements on the Application of ISO/IEC 17065:2012, 9th Edition -
February 2021

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 2024-12-01



Cert ID: LEHIEAVZ

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

SCOPE OF ACCREDITATION

GRANTED 2022-03-22:

-SQF Code Edition 9 - October 2020

SQF Food Safety Code: Animal Feed Manufacturing Edition 9.0

SQF Food Safety Code: Animal Product Manufacturing Edition 9.0

SQF Food Safety Code: Dietary Supplement Manufacturing Edition 9.0

SQF Food Safety Code: Food Manufacturing Edition 9.0

SQF Food Safety Code: Manufacture of Food Packaging Edition 9.0

SQF Food Safety Code: Pet Food Manufacturing Edition 9.0

SQF Food Safety Code: Storage and Distribution Edition 9.0

SQF Quality Code Edition 9.0



R. Douglas Leonard Jr., VP, PILR SBU



Cert ID: LEHIEAVZ

EXHIBIT R



Approved. Sealed. Code Compliant.

IN MARKET TERMS, DrJ IS "ICC-APPROVED"

DrJ simplifies the code compliance process for innovators and is the only ANAB Accredited Certification Body to stand behind certifications with a PE seal.

VERIFICATION PROCESS: Acceptability of an approved agency, by a building official, is performed by verifying that the agency is **accredited** by a recognized accreditation body of the International Accreditation Forum (IAF). Examples include **DrJ**, ICC-ES, IAPMO, Intertek, and UL. Each accredited certification body, as a code-defined approved agency, **is qualified to practice** within their specified "accredited scopes."

CODE ACCEPTANCE FOR NEW PRODUCTS: Building codes require that the **building official shall accept duly authenticated reports or research reports** from approved agencies and/or approved sources, including licensed Registered Design Professionals (RDPS), with respect to the quality and manner of use of new products, materials, designs, services, assemblies, or methods of construction. **See DrJ's scope of expertise below.**

ICS No.	ICS Description	DrJ	ICC-ES	IAPMO	Intertek	UL
Section 13: ENVIRONMENT, HEALTH PROTECTION, SAFETY						
13.220	Protection Against Fire	✓	✓		✓	✓
13.220.01	Protection against fire in general	✓			✓	✓
13.220.10	Fire-fighting	✓			✓	✓
13.220.20	Fire protection	✓	✓		✓	✓
13.220.40	Ignitability & burning behaviour of materials & products	✓	✓		✓	✓
13.220.50	Fire-resistance of building materials & elements	✓	✓		✓	✓
13.220.99	Other standards related to protection against fire	✓			✓	
Section 21: MECHANICAL SYSTEMS & COMPONENTS FOR GENERAL USE						
21.060	Fasteners	✓	✓			
21.060.01	Fasteners in general	✓	✓			
21.060.10	Bolts, screws, studs	✓	✓			
21.060.20	Nuts	✓	✓			
21.060.30	Washers, locking elements	✓				
21.060.40	Rivets	✓	✓			
21.060.50	Pins, nails	✓	✓			
21.060.60	Rings, bushes, sleeves, collars	✓				
21.060.70	Clamps & staples	✓	✓			
21.060.99	Other fasteners	✓	✓			
Section 27: ENERGY & HEAT TRANSFER ENGINEERING						
27.010	Energy & Heat Transfer Engineering in General	✓	✓	✓		
27.160	Solar Energy Engineering	✓	✓	✓	✓	✓
Section 29: ELECTRICAL ENGINEERING						
29.035	Insulating Materials	✓		✓	✓	✓
29.035.01	Insulating materials in general	✓				✓
29.035.10	Paper & board insulating materials	✓			✓	✓
29.035.20	Plastics & rubber insulating materials	✓		✓	✓	✓
29.035.30	Glass & ceramic insulating materials	✓			✓	✓
29.035.99	Other insulating materials	✓				✓

ICS No.	ICS Description	DrJ	ICC-ES	IAPMO	Intertek	UL
Section 71: CHEMICAL TECHNOLOGY						
71.100	Products of the Chemical Industry	✓	✓	✓	✓	✓
71.100.50	Wood-protecting chemicals	✓	✓			
Section 77: METALLURGY						
77.060	Corrosion of Metals	✓	✓			✓
77.140	Iron & Steel Products	✓	✓	✓		
77.140.01	Iron & steel products in general	✓		✓		
77.140.10	Heat-treatable steels	✓				
77.140.15	Steels for reinforcement of concrete	✓	✓			
77.140.20	Stainless steels	✓				
77.140.25	Spring steels	✓				
77.140.30	Steels for pressure purposes	✓				
77.140.35	Tool steels	✓				
77.140.40	Steels w/ special magnetic properties	✓				
77.140.45	Non-alloyed steels	✓				
77.140.50	Flat steel products & semi-products	✓	✓			
77.140.60	Steel bars & rods	✓	✓			
77.140.65	Steel wire, wire ropes & link chains	✓	✓			
77.140.70	Steel profiles	✓	✓			
77.140.75	Steel pipes & tubes for specific use	✓		✓		
77.140.80	Iron & steel castings	✓				
77.140.85	Iron & steel forgings	✓				
77.140.99	Other iron & steel products	✓		✓		
77.150	Products of Non-Ferrous Metals	✓	✓	✓		
77.150.01	Products of non-ferrous metals in general	✓	✓	✓		
77.150.10	Aluminum products	✓	✓	✓		
77.150.20	Magnesium products	✓	✓			
77.150.30	Copper products	✓	✓	✓		
77.150.40	Nickel & chromium products	✓	✓			
77.150.50	Titanium products	✓	✓			
77.150.60	Lead, zinc & tin products	✓	✓			
77.150.70	Cadmium & cobalt products	✓	✓			
77.150.99	Other products of non-ferrous metals	✓	✓	✓		

ICS No.	ICS Description	DrJ	ICC-ES	IAPMO	Intertek	UL
Section 79: WOOD TECHNOLOGY						
79.040	Wood, Sawlogs & Sawn Timber	✓	✓		✓	
79.060	Wood-Based Panels	✓	✓		✓	✓
79.060.01	Wood-based panels in general	✓	✓			
79.060.10	Plywood	✓	✓		✓	✓
79.060.20	Fibre & particle boards	✓	✓		✓	✓
79.060.99	Other wood-based panels	✓	✓			
79.080	Semi-Manufactures of Timber	✓	✓			
Section 81: GLASS & CERAMICS INDUSTRIES						
81.040	Glass	✓	✓		✓	
81.040.01	Glass in general	✓				
81.040.10	Raw materials & raw glass	✓				
81.040.20	Glass in building	✓	✓		✓	
81.040.30	Glass products	✓	✓			
Section 83: RUBBER & PLASTIC INDUSTRIES						
83.080	Plastics	✓	✓	✓	✓	✓
83.080.01	Plastics in general	✓	✓	✓		✓
83.080.10	Thermosetting materials	✓		✓	✓	✓
83.080.20	Thermoplastic materials	✓	✓	✓	✓	✓
83.100	Cellular Materials	✓	✓	✓	✓	✓
83.120	Reinforced Plastics	✓	✓		✓	✓
83.140	Rubber & Plastics Products	✓	✓	✓	✓	✓
83.140.01	Rubber & plastics in general	✓		✓		✓
83.140.10	Films & sheets	✓	✓	✓		✓
83.140.20	Laminated sheets	✓	✓			✓
83.140.99	Other rubber & plastics products	✓	✓	✓		✓
83.180	Adhesives	✓	✓	✓	✓	✓
Section 91: CONSTRUCTION MATERIALS & BUILDING						
91.010	Construction Industry	✓	✓	✓		
91.010.01	Construction industry in general	✓	✓	✓		
91.010.10	Legal aspects	✓	✓	✓		
91.010.20	Contractual aspects	✓	✓	✓		
91.010.30	Technical aspects	✓	✓	✓		
91.010.99	Other aspects	✓	✓	✓		
91.040	Buildings	✓			✓	
91.040.01	Buildings in general	✓				
91.040.10	Public buildings	✓				
91.040.20	Buildings for commerce & industry	✓				
91.040.30	Residential buildings	✓				
91.040.99	Other buildings	✓			✓	
91.060	Elements of Buildings	✓	✓	✓	✓	✓
91.060.01	Elements of buildings in general	✓	✓	✓		
91.060.10	Walls, Partitions, Façades	✓	✓	✓	✓	✓

ICS No.	ICS Description	DrJ	ICC-ES	IAPMO	Intertek	UL
91.060.20	Roofs	✓	✓	✓	✓	✓
91.060.30	Ceilings, Floors, Stairs	✓	✓	✓	✓	✓
91.060.40	Chimneys, shafts, ducts	✓	✓	✓	✓	✓
91.060.50	Doors & windows	✓	✓	✓	✓	✓
91.060.99	Other elements of buildings	✓	✓	✓	✓	
91.080	Structures of Buildings	✓	✓	✓	✓	
91.080.01	Structures of buildings in general	✓	✓	✓		
91.080.10	Metal structures	✓	✓	✓	✓	
91.080.17	Aluminum structures	✓	✓			
91.080.20	Timber structures	✓	✓	✓	✓	
91.080.30	Masonry	✓	✓	✓		
91.080.40	Concrete structures	✓	✓	✓		
91.080.99	Other structures	✓	✓	✓		
91.090	External Structures	✓	✓	✓	✓	✓
91.100	Construction Materials	✓	✓	✓	✓	✓
91.100.01	Construction materials in general	✓	✓	✓		
91.100.10	Cement, Gypsum, Lime, Mortar	✓	✓	✓	✓	
91.100.15	Mineral materials & products	✓	✓	✓		
91.100.23	Ceramic tiles	✓	✓	✓		
91.100.25	Terrecotta building products	✓	✓	✓	✓	
91.100.30	Concrete & concrete products	✓	✓	✓	✓	
91.100.40	Products in fibre-reinforced cement	✓	✓	✓	✓	
91.100.50	Binders, Sealing materials	✓	✓	✓	✓	✓
91.100.60	Thermal & sound insulating materials	✓	✓	✓	✓	✓
91.100.99	Other construction materials	✓	✓	✓		
91.120	Protection of & in Buildings	✓	✓	✓	✓	✓
91.120.01	Protection of & in buildings in general	✓	✓	✓		
91.120.10	Thermal insulation of buildings	✓	✓	✓	✓	✓
91.120.20	Acoustics in building, Sound insulation	✓	✓	✓	✓	✓
91.120.25	Seismic & vibration protection	✓	✓	✓		
91.120.30	Waterproofing	✓	✓	✓	✓	
91.120.40	Lightning protection	✓	✓	✓		✓
91.120.99	Other standards related to protection of & in buildings	✓	✓	✓		
91.180	Interior Finishing	✓	✓	✓		
91.190	Building Accessories	✓	✓	✓	✓	✓
91.200	Construction Technology	✓				
Section 93: CIVIL ENGINEERING						
93.010	Civil Engineering in General	✓				
93.020	Earthworks, Excavations, Foundation Construction, Underground Works.	✓	✓		✓	
EPA ENERGY STAR® Residential Insulation		✓				

*ICC's approval procedure is called the ICC Product Approval Checklist for Code Officials. "ICC Approved" can also be termed ICC Accepted, ICC Report, ICC Evaluation, HUD Approved, OSHA Approved, NY Approved, Title 24 Approved, CA Approved, FL Approved, Los Angeles Approved, NYC Approved, DCA Approved, Chicago Approved, San Francisco Approved, Miami Dade Approved, as well as other terms specific to given markets. **These market-specific terms all refer to the acceptance of accredited agencies.**

For additional information, please call 608-310-6748 or visit drjcertification.org.