NFPA®

703

Standard for Fire-Retardant-Treated Wood and Fire-Retardant Coatings for Building Materials

2021

NFPA®

NFPA® 703

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Fire-Retardant-Treated Wood and Fire-Retardant Coatings for Building Materials

2021 Edition

This edition of NFPA 703, *Standard for Fire-Retardant-Treated Wood and Fire-Retardant Coatings for Building Materials*, was prepared by the Technical Committee on Structures, Construction, and Materials. It was issued by the Standards Council on March 15, 2020, with an effective date of April 4, 2020, and supersedes all previous editions.

This edition of NFPA 703 was approved as an American National Standard on April 4, 2020.

Origin and Development of NFPA 703

In 1957, the Committee on Flameproofing and Preservative Treatments began to develop a standard for the flameproofing of wood. It soon became clear to the committee that the fire retardant–coating industry was expanding considerably and that fire-retardant admixtures of plastics and other building materials required coverage in the standard. Thus, in its many subsequent meetings, the committee re-examined its approach and expanded the standard to cover all fire-retardant treatments.

The standard was tentatively adopted at the 1960 Annual Meeting and was submitted for final adoption at the 1961 Annual Meeting.

The 1979 edition of NFPA 703, *Fire Retardant Impregnated Wood and Fire Retardant Coatings for Building Materials*, superseded the 1961 edition. The change in title was necessary to cover the subjects included in the text of the standard more comprehensively. The principal changes in the 1979 edition included improved definitions for fire-retardant coatings.

The 1985 edition included the addition of a chapter that listed referenced publications whose use was mandated in the standard.

In the 1992 edition, the committee provided clarification in several areas defining *fire resistance*.

The 1995 edition was a reconfirmation with some editorial changes.

The 2000 edition reflected changes in the methods by which treated wood products are evaluated. Other changes were format driven to reflect the *Manual of Style for NFPA Technical Committee Documents*.

In the 2006 edition, technical modifications brought the document into agreement with the 2003 and 2006 editions of *NFPA 5000®, Building Construction and Safety Code®*, on the topic of fire retardant–treated wood. Additional changes were made to the format in compliance with the latest edition of the *Manual of Style for NFPA Technical Committee Documents*.

The changes in the 2009 edition were editorial in nature.

The 2012 edition clarified the use of common terms in the document, including the definition of *fire-retardant--treated wood*.

The 2015 edition revised requirements for fire-retardant-treated wood and updated referenced documents.

The 2018 edition clarified requirements for fire-retardant-treated wood. Requirements that appeared in definitions were moved to other locations for compliance with the *Manual of Style for NFPA Technical Committee Documents*, and reference documents were updated.

The 2021 edition revises the testing requirements for fire-retardant-treated wood to better coordinate the requirements with common industry practice. Additional changes include new explanatory material to clarify the difference between coating and impregnating, and updates to reference documents.

Technical Committee on Structures, Construction, and Materials

Moriel E. Kaplan, *Chair*
JENSEN HUGHES, IL [SE]
Rep. JENSEN HUGHES

Nasser Ahmed Al Zeyara, Qatar Civil Defense, Qatar [E]
David G. Bueche, Hoover Treated Wood Products, CO [M]
Benjamin H. Caldwell, Bjarke Ingels Group (BIG), NY [SE]
Paul D. Coats, American Wood Council, SC [M]
David S. Collins, The Preview Group, Inc., OH [SE]
Rep. American Institute of Architects
Jeffrey Feid, State Farm Insurance Company, IL [I]
William E. Fitch, Phyrefish.com, FL [SE]
Steve Garis, Newport Real Estate Services, CA [U]
Mark S. Graham, National Roofing Contractors Association, IL [IM]
William J. Hall, Portland Cement Association, VA [M]
John C. Harrington, FM Global, MA [I]
Marcelo M. Hirschler, GBH International, CA [SE]
Tin Htway, Town of Westborough, MA [E]
Xianxu (Sherri) Hu, Verisk Analytics/Insurance Services Office, Inc., NJ [I]
Bonnie E. Manley, American Iron and Steel Institute, MA [M]
Scott Nesvold, Crane Engineering, MN [SE]
Jason D. Rotondo, CODEpliance Inc., MA [M]
Michael L. Savage, Sr., Marion County Building Safety, FL [E]
Michael Schmeida, Gypsum Association, OH [M]
Joseph H. Versteeg, Versteeg Associates, CT [E]
Rep. International Fire Marshals Association
Peter J. Willse, AXA XL/Global Asset Protection Services, LLC, CT [I]
Felix I. Zemel, Town Of Dover, MA [SE]

Alternates

Farid Alfawakhiri, American Iron and Steel Institute, IL [M]
(Alt. to Bonnie E. Manley)
Richard J. Davis, FM Global, MA [I]
(Alt. to John C. Harrington)
Timothy Earl, GBH International, MI [M]
(Alt. to Michael Schmeida)
Joseph T. Holland, Hoover Treated Wood Products, FL [M]
(Alt. to David G. Bueche)
Kenneth Lowery, Verisk Analytics/Insurance Services Office, Inc., GA [I]
(Alt. to Xianxu (Sherri) Hu)
David P. Tyree, American Wood Council, CO [M]
(Alt. to Paul D. Coats)

Valerie Ziavras, NFPA Staff Liaison

This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.

NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This committee shall have primary responsibility for documents on the protection of human life and property from fire and environmental loads through the selection and design of structural elements and assemblies; construction techniques and methodologies; and on the application of building materials used in the construction of buildings, structures, and related facilities.

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NFPA 703

Standard for

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NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced and extracted publications can be found in Chapter 2 and Annex B.

Chapter 1 Administration

1.1* Scope. This standard provides criteria for defining and identifying fire-retardant-treated wood and fire-retardant-coated building materials.

1.2 Purpose. (Reserved)

1.3 Application. (Reserved)

1.4 Retroactivity. Unless otherwise specified, the provisions of this standard shall not apply to facilities, equipment, structures, or installations that existed or were approved for construction or installation prior to the effective date of the standard. Where specified, the provisions of this standard shall be retroactive.

1.5 Equivalency.

1.5.1 Nothing in this standard is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this standard.

1.5.2 Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency. The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

1.6 Units.

1.6.1 SI Units. Metric units in this standard are in accordance with the modernized metric system known as the International System of Units (SI).

1.6.2 Primary and Equivalent Values. If a value for a measurement as given in this standard is followed by an equivalent value in other units, the first stated value shall be regarded as the requirement. A given equivalent value might be approximate.

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications. (Reserved)

2.3 Other Publications.

2.3.1 ASTM Publications. ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM D2898, *Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing*, 2010 (2017).

ASTM D3201/D3201M, *Standard Test Method for Hygroscopic Properties of Fire-Retardant Wood and Wood-Based Products*, 2013.

ASTM D5516, *Standard Test Method for Evaluating the Flexural Properties of Fire-Retardant Treated Softwood Plywood Exposed to Elevated Temperatures*, 2018.

ASTM D5664, *Standard Test Method for Evaluating the Effects of Fire-Retardant Treatments and Elevated Temperatures on Strength Properties of Fire-Retardant Treated Lumber*, 2017.

ASTM D6305, *Standard Practice for Calculating Bending Strength Design Adjustment Factors for Fire-Retardant-Treated Plywood Roof Sheathing*, 2008(2015)e1.

ASTM D6841, *Standard Practice for Calculating Design Value Treatment Adjustment Factors for Fire-Retardant-Treated Lumber*, 2016.

ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, 2019a.

ASTM E2768, *Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)*, 2011 (2018).

2.3.2 UL Publications. Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

ANSI/UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials*, 2018.

2.3.3 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Mandatory Sections. (Reserved)

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3 Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

3.2.4* Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction 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 that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

3.2.5 Shall. Indicates a mandatory requirement.

3.2.6 Should. Indicates a recommendation or that which is advised but not required.

3.2.7 Standard. An NFPA Standard, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the NFPA Manuals of Style. When used in a generic sense, such as in the phrase "standards development process" or "standards development activities," the term "standards" includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

3.3 General Definitions.

3.3.1* Fire-Retardant Coating. A coating that reduces the flame spread index of Douglas fir, or of any other tested combustible surface to which it is applied, when tested in accordance with a test for assessing surface burning characteristics.

3.3.2 Fire-Retardant-Treated Wood. A wood product impregnated with chemical by a pressure process or other means during manufacture, treated to exhibit reduced surface-burning characteristics and resist propagation of fire.

Chapter 4 Fire-Retardant-Treated Wood

4.1 Application. These requirements shall apply to fire-retardant-treated wood.

4.1.1* Fire-Retardant-Treated Wood. Fire-retardant-treated wood shall be a wood product impregnated with chemical by a pressure process or other means during manufacture meeting the requirements in 4.1.1.2 through 4.1.1.2.4.

4.1.1.1 Materials treated by means other than those specified in 4.1.1 shall be considered a fire-retardant-coated material and shall meet the requirements of fire-retardant coatings in Chapter 5.

4.1.1.2* Fire-retardant-treated wood shall be tested in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or ANSI/UL 723, *Test for Surface Burning Characteristics of Building Materials*.

4.1.1.2.1 Fire-retardant-treated wood shall have a listed flame spread index of 25 or less.

4.1.1.2.2 The flame front shall not progress more than 10.5 ft (3.2 m) beyond the centerline of the burners at any time during the test, when the test is continued for an additional 20-minute period.

4.1.1.2.3 Wood structural panels shall be permitted to be tested only on the front and back faces.

4.1.1.2.4 Wood structural panels that meet all of the following conditions shall be considered fire-retardant-treated wood:

(1) They have been impregnated with chemicals.
(2) They have been tested on the front and back faces in accordance with ASTM E2768, *Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)*, with a ripped or cut longitudinal gap of ⅛ in. (3.2 mm).
(3) They are listed to meet the requirements of 4.1.1.2.1 and 4.1.1.2.2.

4.1.2 Fire-Retardant-Treated Wood Treatment.

4.1.2.1 Pressure Process. For wood products impregnated with chemicals by a pressure process, the process shall be performed in closed vessels under gauge pressures not less than 50 psi (345 kPa).The treatment shall provide permanent protection to all surfaces of the wood product.

4.1.2.2 Other Means During Manufacture.

4.1.2.2.1 For wood products impregnated with chemical by other means during manufacture, the treatment shall be an integral part of the manufacturing process of the wood product.

4.1.2.2.2 The treatment shall provide permanent protection to all surfaces of the wood product.

4.2 Interior Applications. Interior fire-retardant-treated wood shall have a moisture content of not over 28 percent when tested in accordance with the procedures of ASTM D3201/D3201M at 92 percent relative humidity. Interior fire-retardant-treated wood shall be tested in accordance with 4.2.1 or 4.2.2.

4.2.1 Wood Structural Panels. Adjustment to design values for wood structural panels shall be in accordance with the following:

(1) The effect of the treatment, the method of redrying after treatment, and the exposure to high temperatures and high humidities on the flexure properties of fire-retardant-treated softwood plywood shall be determined in accordance with ASTM D5516.
(2) The test data developed by ASTM D5516 shall be used to develop adjustment factors or maximum loads and spans, or both, for untreated plywood design values in accordance with ASTM D6305.
(3) Each manufacturer shall publish the allowable maximum loads and spans for service as floor and roof sheathing for their treatment.

4.2.2 Lumber. Adjustment to design values for lumber shall be in accordance with the following:

(1) For each species of wood treated, the effect of the treatment, the method of redrying after treatment, and the exposure to high temperatures and high humidities on the allowable design properties of fire-retardant-treated lumber shall be determined in accordance with ASTM D5664.
(2) The test data developed by ASTM D5664 shall be used to develop modification factors for use at or near room temperature and at elevated temperatures and humidity in accordance with ASTM D6841.
(3) Each manufacturer shall publish the modification factors for service at ambient temperatures of up to 100°F (37.8°C) and for service as roof framing.
(4) The roof framing modification factors shall take into consideration the climatological location.

4.3 Exposure to Weather or Damp or Wet Locations. Where fire-retardant-treated wood is exposed to weather or damp or wet locations, it shall be identified as "exterior" to indicate that there is no increase in the listed flame spread index when subjected to ASTM D2898, *Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing,* (Method A). *(See 3.3.2, Fire-Retardant-Treated Wood.)*

4.4 Moisture Content.

4.4.1 Fire-retardant-treated wood shall have a moisture content of 19 percent or less for lumber and 15 percent or less for wood structural panels before use.

4.4.2 For fire-retardant-treated wood dried after treatment, the temperatures shall not exceed the temperatures used in drying the lumber and plywood submitted for the testing described in 4.2.1 or 4.2.2.

4.4.3 Fire-retardant-treated wood that is air-dried after treatment (ADAT) shall be protected from the weather.

4.5 Labeling. Fire-retardant-treated lumber and wood structural panels shall be labeled and listed with the following information:

(1) Identification mark of an approved agency that lists materials in accordance with Chapter 3 *(see 3.2.4, Listed)*
(2) Identification of the treating manufacturer
(3) Name of the fire-retardant treatment
(4) Species of wood treated
(5) End use of the product
(6) Flame spread index and smoke developed index
(7) Method of drying after treatment
(8) Verification of conformance with appropriate standards in accordance with Sections 4.2 through 4.4
(9) The words "No increase in the listed classification when subjected to the Standard Rain Test [ASTM D2898 (Method A)]," for fire-retardant-treated wood exposed to weather or to damp or wet locations

Chapter 5 Fire-Retardant Coatings for Building Materials

5.1* Application. These requirements shall apply to fire-retardant paints and other surface coatings applied to building materials to reduce flame spread or smoke development or both.

5.2 General.

5.2.1* Fire-retardant coatings shall remain stable and adhere to the material under all atmospheric conditions to which the material is exposed.

5.2.2 A fire-retardant coating shall not be used for unprotected outdoor installations unless labeled for such installations.

5.2.3 The classification of fire-retardant coatings shall apply only when the coating is applied at the rates of coverage and to the applicable substrate, building material, or species of wood indicated on the test report when the coating is applied in accordance with the manufacturer's directions supplied with the container.

5.2.4 Fire-retardant coatings shall be applied in accordance with the manufacturer's directions.

5.2.5 The application shall be certified by the applicator as being in conformance with the manufacturer's directions for application.

5.2.6 A fire-retardant coating shall not be coated over with any material unless both the fire-retardant coating and the overcoat have been tested as a system and are found to meet the requirements of a fire-retardant coating.

5.3 Tests.

5.3.1* Fire-retardant coatings shall be tested in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials,* or ANSI/UL 723, *Standard for Safety for Test for Surface Burning Characteristics of Building Materials.*

5.3.1.1 Class A fire-retardant coatings shall reduce the flame spread index to 25 or less and have a smoke developed index

not exceeding 200 where applied to the applicable substrate, building material, or species of wood when tested in accordance with ASTM E84 or ANSI/UL 723.

5.3.1.2 Class B fire-retardant coatings shall reduce the flame spread index to greater than 25 but not more than 75 and have a smoke developed index not exceeding 200 where applied to the applicable substrate, building material, or species of wood when tested in accordance with ASTM E84 or ANSI/UL 723.

5.3.2 Where fire-retardant coatings are to be subjected to sustained humidity of 80 percent or more or exposure to the weather, certification by a testing laboratory shall be required to indicate that there is no increase in listed classification when subjected to the "Standard Rain Test" described in ASTM D2898, *Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing*, (Method A).

5.4 Maintenance of Protection. Fire-retardant coatings shall possess the desired degree of permanency and shall be maintained to retain the effectiveness of the treatment under the service conditions encountered in actual use.

5.5 Labeled.

5.5.1 The fire-retardant-coating material shall be listed and labeled to indicate conformance with the requirements in Sections 5.2 through 5.4.

5.5.2 The manufacturers' instructions for application shall be affixed to each container of the fire-retardant-coating material.

Annex A Explanatory Material

Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.1.1 Fire resistance ratings measured on an hourly basis are not covered in this standard. To establish such ratings, tests should be made in accordance with ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or ANSI/UL 263, *Standard for Safety for Fire Tests of Building Construction and Materials*.

A.3.2.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction (AHJ). The phrase "authority having jurisdiction," or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A.3.2.4 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

A.3.3.1 Fire-Retardant Coating. The efficacy of fire-retardant coatings to decrease flame spread index is normally assessed by testing in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or ANSI/UL 723, *Standard for Surface Burning Characteristics of Building Materials*.

A.4.1.1 A wood product that has been impregnated with a fire-retardant chemical by a pressure process or other means during manufacture is different than one that has been coated with such a chemical. Impregnation is a process whereby the treatment permeates beyond the surface, while coating is a surface treatment.

A.4.1.1.2 ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, and UL 723, Standard for Test for Surface Burning Characteristics of Building Materials, are 10-minute tests, not 30-minute tests. The scope of ASTM E84 states that materials required to meet an extended 30-minute duration test are to be tested in accordance with ASTM E2768, *Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)*. There are no other instructions in ASTM E84 or UL 723 for conducting a test for longer than 10 minutes.

A.5.1 Section 5.1 does not address the use of fire-retardant coatings as a thermal barrier. Thermal barriers are not addressed in NFPA 703; they are materials that comply with the requirements of NFPA 275 and not with the requirements of ASTM E84.

A.5.2.1 Certain coatings might not be suitable for high-humidity occupancies or for other occupancies where combustible dust or oily residue deposits might accumulate, affecting the ability of the coating to adhere to the substrate material.

A.5.3.1 The flame spread index is expressed numerically on a scale for which the zero point is fixed by the performance of inorganic-reinforced cement board and the 100 point (approximately) is fixed by the performance of red oak flooring.

Annex B Informational References

B.1 Referenced Publications. The documents or portions thereof listed in this annex are referenced within the informational sections of this standard and are not part of the requirements of this document unless also listed in Chapter 2 for other reasons.

B.1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 275, *Standard Method of Fire Tests for the Evaluation of Thermal Barriers*, 2017 edition.

B.1.2 Other Publications.

B.1.2.1 ASTM Publications. ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, 2019a.

ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, 2018ce1.

ASTM E2768, *Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)*, 2011 (2018).

B.1.2.2 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

ANSI/UL 263, *Standard for Fire Tests of Building Construction and Materials*, 2011.

ANSI/UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials*, 2019.

B.2 Informational References. (Reserved)

B.3 References for Extracts in Informational Sections. (Reserved)

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