Public Input No. 5-NFPA 288-2020 [Section No. 4.3.1]

4.3.1* Measurements.

Temperatures of unexposed surfaces shall be measured with thermocouples or with thermometers placed under thermocouple pads.

4.3.1.1

Thermocouple pads shall meet the following requirements or shall be otherwise demonstrated to be equivalent by comparative tests in accordance with ASTM E119, Standard Test

Method for Fire Tests of Building Construction and Materials, or UL 263, Fire Tests of Building Construction and Materials :

(1) Length and width — 152 mm ± 3.2 mm (6 in. ± 1/8 in.)

(2) Thickness — 10.2 mm ± 1.3 mm (0.40 in. ± 0.05 in.)

(3) Thermal conductivity [at 65°C (150°F)]— 0.55 ± 0.039 W/m·K (0.38 ± 0.027 Btu·in./hr·ft2 ·°F)

4.3.1.2 – 2

The wire leads of the thermocouple or the stem of the thermometer shall have an immersion under the pad and shall be in contact with the unexposed surface for not less than 90 mm (3 **1**/**2** in.).

4.3.1.3

The hot junction of the thermocouple, or the bulb of the thermometer, shall be placed under the approximate center of the pad.

4.3.1.4

The outside diameter of protecting or insulating tubes and of thermometer stems shall not exceed 8 mm (**5**/**16** in.).

4.3.1.5

The pad shall be held firmly against the surface and shall fit closely about the thermocouples or thermometer stems.

4.3.1.6

Thermometers shall be of the partial-immersion type, with a length of stem, between the end of the bulb and the immersion mark, of 76 mm (3 in.).

4.3.1.7

The wires for the thermocouple in the length covered by the pad shall be not heavier than No. 18 B & S gauge [1.02 mm (0.04 in.)] and shall be electrically insulated with heat-resistant and moisture-resistant coatings.

(Also add references to ASTM E119, Standard Test Methods for Fire Tests of Building Construction and Materials , 2019 and to UL 263, , Fire Tests of Building Construction and Materials, into section 2 on referenced standards)

Statement of Problem and Substantiation for Public Input

The revised language in 4.3.1 is being taken out of NFPA 252 for further clarity.
The other revisions simply add section numbers for compliance with the Manual of Style

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The other revisions simply add section numbers for compliance with the Manual of Style

Public Input No. 4-NFPA 288-2020 [Section No. A.4.3.1]

A.4.3.1

Under certain conditions, it is unsafe or impracticable to use thermometers.

The unexposed surface is the surface that is exposed to ambient air.

~~Additional information on refractory pads can be found in Annex B .~~

Statement of Problem and Substantiation for Public Input

Annex B is proposed to be deleted as obsolete.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3-NFPA 288-2020 [Chapter B]	

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Committee Statement

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Statement: Annex B is proposed to be deleted as obsolete.

Public Input No. 3-NFPA 288-2020 [Chapter B]

Annex B – Recommendations for Thermocouple Pads

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

B.1 – Refractory Fiber Pads.

Specific product information is being provided for informational purposes only. This product information has not been independently verified, certified, or endorsed by NFPA or any of its Technical Committees.

B.2 – Ceraform 126 ® .

Ceraform 126 ® is a registered trade name of Manville Specialty Products Group, P.O. Box 5108, Denver, CO 80217.

Comparative fire tests have demonstrated that a refractory fiber material, designated Ceraform 126 ® , placed with the softer surfaces in contact with the thermocouple, can be substituted for the previously specified asbestos pad where the distortion of the unexposed face of the specimen is minimal. The pads are relatively rigid and should not be used on surfaces that are subject to sharp distortions or discontinuities during the test.

The properties of Ceraform 126 ® material are as follows:

(1) Length and width — 152 mm ± 3 mm (6 in. ± 1 ⁄ 8 in.)

(2) Thickness — 9.5 mm ± 1.6 mm (0.375 in. ± 0.063 in.). The thickness measurement is made under the light load of a 13 mm (1 ⁄ 2 in.) diameter pad of a dial micrometer gauge.

(3) Dry weight — 67 g ± 24 g (0.147 lb ± 0.053 lb)

(4) Thermal conductivity [at 65°C (150°F)] — 0.053 W/m ·K ± 0.004 W/m·K (0.37 Btu·in./hr·ft 2 ·°F ± 0.03 Btu·in./hr·ft 2 ·°F)

(5) Hardness indentation on soft face should be 1.9 mm ± 0.6 mm (0.075 in. ± 0.025 in.). Indentation is determined in accordance with ASTM C569, *Test for Indentation Hardness of Preformed Thermal Insulations* . Modified Brinell values of hardness are obtained from the following equation:

$$\text{Hardness} = \frac{2.24}{y} \qquad \text{[B.2]}$$

where:

y = measured indentation in inches

(6) The pads are shaped by wetting, forming, and then drying to constant weight to provide complete contact on sharply contoured surfaces.

Supporting data are available from ASTM International.

Statement of Problem and Substantiation for Public Input

This annex is being proposed to be deleted for the following reasons:
1. Section 4.3.1 contains adequate requirements for the thermocouple pads.
2. ceraform 126 is now made by Morgan and not Mansville
3. ASTM C569 has been withdrawn many years ago without replacement and there are many commercial methods for assessing indentation hardness.
4. NFPA 252 contains adequate wording to improve on the existing language.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4-NFPA 288-2020 [Section No. A.4.3.1]	
Public Input No. 6-NFPA 288-2020 [Section No. C.1.2.1]	

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Resolution: FR-4-NFPA 288-2020
Statement: This annex is being deleted for the following reasons:

1. Section 4.3.1 contains adequate requirements for the thermocouple pads.

2. ceraform 126 is now made by Morgan and not Mansville

3. ASTM C569 has been withdrawn many years ago without replacement and there are many commercial methods for assessing indentation hardness.

4. NFPA 252 contains adequate wording to improve on the existing language.

Public Input No. 2-NFPA 288-2020 [Section No. C.1.2.1]

C.1.2.1 ASTM Publications.

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

ASTM C569, ~~*Test*~~ *Method of Test for Indentation Hardness of Preformed Thermal Insulations*, ~~1989~~ 1983 (~~discontinued~~ withdrawn 1988).

Menzel, C. A., *A Method for Determining the Moisture Condition of Hardened Concrete in Terms of Relative Humidity*, Proceedings, American Society for Testing and Materials, Vol. 55, Appendix I, 1955.

Statement of Problem and Substantiation for Public Input

clarification

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Statement: Annex B has been removed and this reference is no longer needed.

Public Input No. 6-NFPA 288-2020 [Section No. C.1.2.1]

C.1.2.1 ASTM Publications.

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

~~ASTM C569, *Test for Indentation Hardness of Preformed Thermal Insulations* , 1989 (discontinued).~~

Menzel, C. A., *A Method for Determining the Moisture Condition of Hardened Concrete in Terms of Relative Humidity* , Proceedings, American Society for Testing and Materials, Vol. 55, Appendix I, 1955.

Statement of Problem and Substantiation for Public Input

Annex B which is where this standard is referenced is proposed to be deleted.

Related Public Inputs for This Document

Related Input	Relationship
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