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Inorganic porous thermal insulation
materials

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Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Thermal Insulation Association (JTIA)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS A 9510 : 2016**), which has been technically revised.

However, **JIS A 9510 : 2016** may be applied in the **JIS** mark certification based on the relevant provisions of Article 30, paragraph (1), etc. of the Industrial Standardization Act until 21 November 2022.

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Inorganic porous thermal insulation materials

1 Scope

This Japanese Industrial Standard specifies requirements for inorganic porous thermal insulation boards (hereafter referred to as board insulation) and inorganic porous thermal insulation pipes (hereafter referred to as pipe insulation), which are inorganic porous thermal insulation materials used as thermal insulation materials.

This Standard is applicable to board insulation and pipe insulation that do not use the materials emitting formaldehyde such as urea resin, melamine resin, phenol resin, resorcinol resin and formaldehyde system antiseptics.

A list of technically significant revisions from the previous edition with reasons is given in Annex A.

NOTE The symbol for the product that do not use the materials emitting formaldehyde is F☆☆☆☆.

2 Normative references

Part or all of the provisions of the following standards, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS A 0202 *Thermal insulation — Vocabulary*

JIS A 1412-1 *Test method for thermal resistance and related properties of thermal insulations — Part 1 : Guarded hot plate apparatus*

JIS A 1412-2 *Test method for thermal resistance and related properties of thermal insulations — Part 2 : Heat flow meter apparatus*

JIS C 1602 *Thermocouples*

JIS G 3452 *Carbon steel pipes for ordinary piping*

JIS Z 8401 *Rounding of numbers*

JIS Z 8703 *Standard atmospheric conditions for testing*

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions, and those given in **JIS A 0202** apply.

3.1

inorganic porous thermal insulation material

generic term for calcium silicate thermal insulation and water repellent perlite thermal insulation

3.2

calcium silicate thermal insulation

insulation material comprised of siliceous material, calcareous material and calcium silicate hydrate mixed with fibre as reinforced material, and insulation material obtaining water repellent performance by adding water repellent agent

3.3

water repellent perlite thermal insulation

insulation material comprised of perlite, binder, reinforced fibre and water repellent agent

4 Classification

4.1 Division by shape

The inorganic porous thermal insulation materials shall be divided by shape as given in Table 1.

Table 1 Division by shape

Shape	Explanation
Board insulation	Inorganic porous thermal insulation material moulded into board shape
Pipe insulation	Inorganic porous thermal insulation material moulded into lengthwise-split shaped cylinder and composed of two or more pieces

4.2 Division by material, grade, density and service temperature

The inorganic porous thermal insulation materials shall be divided by material, grade, density and service temperature as given in Table 2.

Table 2 Division by material, grade, density and service temperature

Material	Grade	Density kg/m ³	Service temperature °C	Explanation
Calcium silicate thermal insulation	Board insulation No. 1-15	155 max.	1 000 max.	Product having high heat resistance, which is manufactured principally by using xonotlite as calcium silicate hydrate
	Pipe insulation No. 1-15			
	Board insulation No. 1-22	220 max.	650 max.	Product which is manufactured principally by using tobermorite as calcium silicate hydrate
	Pipe insulation No. 1-22			
	Board insulation No. 2-17	170 max.		
	Pipe insulation No. 2-17			
Water repellent perlite thermal insulation	Board insulation No. 3-25	250 max.	900 max.	Product having high heat resistance, which is manufactured by using silicate binder
	Pipe insulation No. 3-25			
	Board insulation No. 4-18	185 max.	650 max.	Product which is manufactured by using sodium silicate binder
	Pipe insulation No. 4-18			

4.3 Division by water repellency

The calcium silicate thermal insulation shall be divided by water repellency as given in Table 3.

Table 3 Division by water repellency

Material	Water repellency	Symbol
Calcium silicate thermal insulation	Present	WP
	Absent	—

5 Quality

5.1 Appearance

The appearance of inorganic porous thermal insulation materials shall be inspected visually or by other means and shall conform to requirements given in Table 4.

Table 4 Classification and judgement of defect of appearance

Classification of defect	Judgement
Cracks, breakage, warpage	No detriment to use

5.2 Characteristics

5.2.1 Characteristics of calcium silicate thermal insulation

The calcium silicate thermal insulation shall satisfy the requirements in Table 5 when tested in accordance with 6.5 to 6.10.

Table 5 Characteristics of calcium silicate thermal insulation

Quality		Grade			
Item		Unit	Board insulation No. 1-15 Pipe insulation No. 1-15	Board insulation No. 1-22 Pipe insulation No. 1-22	Board insulation No. 2-17 Pipe insulation No. 2-17
Density		kg/m ³	155 max.	220 max.	170 max.
Flexural strength		N/cm ²	20 min.	30 min.	20 min.
Compressive strength		N/cm ²	30 min.	45 min.	30 min.
Linear shrinkage		%	2.0 max.		
Water repellency ^{a)}		%	98 min.		
Thermal conductivity	200 °C	W/(m·K)	0.066 max.	0.077 max.	0.070 max.
	300 °C		0.079 max.	0.088 max.	0.088 max.
	400 °C		0.095 max.	0.106 max.	0.113 max.
	500 °C		0.114 max.	0.127 max.	0.146 max.
	600 °C		0.137 max.	0.152 max.	—
Note ^{a)} Not applicable to those without water repellency.					

5.2.2 Characteristics of water repellent perlite thermal insulation

The water repellent perlite thermal insulation shall satisfy the requirements in Table 6 when tested in accordance with 6.5, 6.6 and 6.8 to 6.10.

Table 6 Characteristics of water repellent perlite thermal insulation

Quality		Grade	
Item	Unit	Board insulation No. 3-25 Pipe insulation No. 3-25	Board insulation No. 4-18 Pipe insulation No. 4-18
Density	kg/m ³	250 max.	185 max.
Flexural strength	N/cm ²	25 min.	20 min.
Linear shrinkage	%	2.0 max.	
Water repellency	%	98 min.	
Thermal conductivity (at the mean temperature of 70 °C)	W/(m·K)	0.072 max.	0.056 max.

5.3 Dimensions

5.3.1 Dimensions of board insulation

The dimensions and tolerances of board insulation shall satisfy the requirements in Table 7 when measured in accordance with 6.4.1.

The dimensions of the products other than the specified dimensions may be agreed between the interested parties, and the tolerances in this case shall be as given in Table 7.

Table 7 Dimensions and tolerances of board insulation

Unit: mm

Material and grade	Thickness		Width		Length	
	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance
Calcium silicate thermal insulation	30	+3	150	+3	610	+5
Board insulation No. 1-15	40	-1	303	-3	910	-2
Board insulation No. 1-22	50					
Board insulation No. 2-17	65					
	75					
Water repellent perlite thermal insulation	30	+3	150	+3	610	+10
	40	-1	303	-3		0
Board insulation No. 3-25	50					
Board insulation No. 4-18	65					
	75					