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(JTIA/JSA)

**Man made mineral fibre thermal  
insulation materials**

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## Foreword

This translation has been made based on the original Japanese Industrial Standard 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 the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently **JIS A 9504:2011** is replaced with this Standard.

However, **JIS A 9504:2011** may be applied in the **JIS** mark certification based on the relevant provisions of Article 19 Clause 1, etc. of the Industrial Standardization Law until March 20, 2018.

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Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, applications for a patent after opening to the public or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, applications for a patent after opening to the public or utility model rights.

# Man made mineral fibre thermal insulation materials

## 1 Scope

This Japanese Industrial Standard specifies the man-made mineral fibre thermal insulation materials (hereafter referred to as thermal insulation materials) used for the hot insulation or cold insulation of the equipment in industrial installation such as factories, power plants, incinerators, air-conditioning and plumbing unit of buildings.

The comparison table between previous and current editions of this Standard on technically significant revisions is given in Annex C.

## 2 Normative references

The following standards contain provisions which, 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 A 1412-3 *Test method for thermal resistance and related properties of thermal insulations—Part 3: Circular pipe apparatus*

JIS A 1901 *Determination of the emission of volatile organic compounds and aldehydes by building products—Small chamber method*

JIS A 1902-4 *Determination of the emission of volatile organic compounds and aldehydes by building products—Sampling, preparation of test specimens and testing condition—Part 4: Heat-Insulating material boards*

JIS B 7502 *Micrometers*

JIS B 7507 *Vernier, dial and digital callipers*

JIS B 7512 *Steel tape measures*

JIS B 7516 *Metal rules*

JIS B 7522 *Textile tape measures*

JIS B 7526 *Squares*

JIS C 1602 *Thermocouples*

JIS G 3452 *Carbon steel pipes for ordinary piping*

JIS H 3300 *Copper and copper alloy seamless pipes and tubes*

JIS H 4160 *Aluminium and aluminium alloy foils*

JIS R 3414 *Textile glass fabrics*

JIS Z 1520 *Laminated aluminium foils*

JIS Z 8703 *Standard atmospheric conditions for testing*

JIS Z 8801-1 *Test sieves—Part 1: Test sieves of metal wire cloth*

### 3 Terms and definitions

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

#### 3.1 man-made mineral fibre thermal insulation materials, thermal insulation materials

generic term of rock wool thermal insulation materials and glass wool thermal insulation materials

#### 3.2 rock wool thermal insulation materials

thermal insulation materials manufactured in such a way that blast-furnace slags, minerals, etc. consisting mainly of lime and silicic acid are melted and processed into fibres (hereafter referred to as rock wool)

#### 3.3 glass wool thermal insulation materials

thermal insulation materials manufactured in such a way that glass raw material or glass is melted and processed into fibres (hereafter referred to as glass wool)

#### 3.4 facing

material that covers thermal insulation material for the purpose of vapour barrier, reinforcement, surface protection, etc. like cloth or film material such as glass cloth, laminated aluminium foil and aluminium textile glass fabrics, and metal gauze material such as hexagonal metal mesh and metal lath

#### 3.5 compressed package

package of which the thickness is compressed by not less than 10 % relative to nominal thickness

### 4 Classification

Thermal insulation materials are classified as given in Table 1.

**Table 1 Classification**

| Classification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |                                                                                                                                                                                                                 | Description                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rock wool thermal insulation material                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Wool             |                                                                                                                                                                                                                 | Rock wool processed into fibrous form to appear like cotton.                                                                                                                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Board insulation | No. 1                                                                                                                                                                                                           | Rock wool moulded into board using binder. The surface is covered with facing of cloth or film according to the application, or the whole surface is covered with facing of cloth or film. Divided into No. 1 to No. 3 by the density.                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | No. 2                                                                                                                                                                                                           |                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | No. 3                                                                                                                                                                                                           |                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Felt             |                                                                                                                                                                                                                 | Rock wool moulded into elastic felt using binder. The surface is covered with facing of cloth or film according to the application.                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Lamella product  | No. 1                                                                                                                                                                                                           | Rock wool board insulation cut into a definite width, aligned in lengthwise direction and finished into board by adhering facing of cloth or film on one side. Divided into No. 1 and No. 2 by the density.                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | No. 2                                                                                                                                                                                                           |                                                                                                                                                                                                                                                         |
| Blanket                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | No. 1            | Rock wool board insulation covered with metal gauze facing. Divided into No. 1 and No. 2 by the density.                                                                                                        |                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | No. 2            |                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                         |
| Pipe insulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | Rock wool moulded into cylinder using binder, which is covered with facing of cloth or film according to the application.<br>That provided with a cut or cut into segments in lengthwise direction is allowed.  |                                                                                                                                                                                                                                                         |
| Glass wool thermal insulation material                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Wool             |                                                                                                                                                                                                                 | Glass wool processed into a fibrous form to appear like cotton.                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Board insulation | 24K                                                                                                                                                                                                             | Glass wool moulded into board using binder. The surface is covered with facing of cloth or film according to the application, or the whole surface is covered with facing of cloth or film. Divided into 7 classes by the density of the base material. |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | 32K                                                                                                                                                                                                             |                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | 40K                                                                                                                                                                                                             |                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | 48K                                                                                                                                                                                                             |                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | 64K                                                                                                                                                                                                             |                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | 80K                                                                                                                                                                                                             |                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | 96K                                                                                                                                                                                                             |                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Wave insulation  |                                                                                                                                                                                                                 | Glass wool moulded so as to fit to curved surface by bending in wave shape using a binder and finished by adhering facing of cloth or film on one side.                                                                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Lamella product  | A                                                                                                                                                                                                               | Glass wool board insulation cut into a definite width, aligned in lengthwise direction and finished into board by adhering facing of cloth or film on one side. Divided into A to C by the density.                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | B                                                                                                                                                                                                               |                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | C                                                                                                                                                                                                               |                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Blanket          | A                                                                                                                                                                                                               | Glass wool or glass wool board insulation covered with metal gauze facing. Divided into A and B by the density.                                                                                                                                         |
| B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                         |
| Pipe insulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | Glass wool moulded into cylinder using binder, which is covered with facing of cloth or film according to the application.<br>That provided with a cut or cut into segments in lengthwise direction is allowed. |                                                                                                                                                                                                                                                         |
| <div>— Base material of glass cloth used for facing shall be as specified in <b>JIS R 3414</b>, or that having performance at least equal thereto.</div> <div>— Laminated aluminium foil used for facing shall be as specified in <b>JIS Z 1520</b>, or that having performance at least equal thereto.</div> <div>— Aluminium foil used for facing shall be as specified in <b>JIS H 4160</b>, or that having performance at least equal thereto.</div> <div>— Facing with tensile strength not less than 20 N/cm shall be used for lamella product and wave insulation.</div> <div>— Rock wool may be marked as “RW” and glass wool “GW”, respectively.</div> |                  |                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                         |

## 5 Quality

### 5.1 Characteristics

The characteristics of thermal insulation materials shall satisfy the requirements given in Table 2 and Table 3 when tested in accordance with 6.2 to 6.9. The formaldehyde emission characteristics shall be marked by the grade as given in Table 3.

Regarding the products not containing formaldehyde-emitting materials such as urea resin, melamine resin, phenol resin, resorcinol resin, formaldehyde system antiseptics, monomer containing methylol group and rongalite system catalyst, F☆☆☆☆ may be marked without performing the test specified in 6.8.

**Table 2 Characteristics**

| Classification                         |                  | Density<br>kg/m <sup>3</sup> | Thermal<br>conductivity<br>(70 °C)<br>W/(m · K) | Temperature for<br>10 % thermal<br>contraction<br>°C | Average<br>thickness<br>of fibre<br>µm | Particle<br>content<br>rate<br>% |
|----------------------------------------|------------------|------------------------------|-------------------------------------------------|------------------------------------------------------|----------------------------------------|----------------------------------|
| Rock wool thermal insulation material  | Wool             | —                            | 0.044 max.                                      | 650 min.                                             | 7 max.                                 | 4 max.                           |
|                                        | Board insulation | No. 1                        | 40 to 100                                       | 0.044 max.                                           | —                                      |                                  |
|                                        |                  | No. 2                        | 101 to 160                                      | 0.043 max.                                           |                                        |                                  |
|                                        |                  | No. 3                        | 161 to 300                                      | 0.044 max.                                           |                                        |                                  |
|                                        | Felt             | 20 to 70                     | 0.049 max.                                      | 400 min.                                             |                                        |                                  |
|                                        | Lamella product  | No. 1                        | 40 to 100                                       | 0.052 max.                                           |                                        |                                  |
|                                        |                  | No. 2                        | 101 to 160                                      | 0.049 max.                                           |                                        |                                  |
|                                        | Blanket          | No. 1                        | 40 to 100                                       | 0.044 max.                                           |                                        |                                  |
|                                        |                  | No. 2                        | 101 to 160                                      | 0.043 max.                                           |                                        |                                  |
|                                        | Pipe insulation  | 40 to 200                    | 0.044 max.                                      |                                                      |                                        |                                  |
| Glass wool thermal insulation material | Wool             | —                            | 0.042 max.                                      | 400 min.                                             | —                                      |                                  |
|                                        | Board insulation | 24K                          | 22 to 26                                        | 0.049 max.                                           |                                        |                                  |
|                                        |                  | 32K                          | 28 to 36                                        | 0.046 max.                                           |                                        |                                  |
|                                        |                  | 40K                          | 37 to 44                                        | 0.044 max.                                           |                                        |                                  |
|                                        |                  | 48K                          | 45 to 52                                        | 0.043 max.                                           |                                        |                                  |
|                                        |                  | 64K                          | 58 to 70                                        | 0.042 max.                                           |                                        |                                  |
|                                        |                  | 80K                          | 73 to 87                                        |                                                      |                                        |                                  |
|                                        |                  | 96K                          | 88 to 105                                       |                                                      |                                        |                                  |
|                                        | Wave insulation  | 37 to 105                    | 0.050 max.                                      | 350 min.                                             |                                        |                                  |
|                                        | Lamella product  | A                            | 22 to 36                                        | 0.052 max.                                           |                                        |                                  |
|                                        |                  | B                            | 37 to 52                                        |                                                      |                                        |                                  |
|                                        |                  | C                            | 58 to 105                                       |                                                      |                                        |                                  |
|                                        | Blanket          | A                            | 24 to 40                                        | 0.048 max.                                           |                                        |                                  |
|                                        |                  | B                            | 41 to 120                                       | 0.043 max.                                           |                                        |                                  |
|                                        | Pipe insulation  | 45 to 90                     | 0.043 max.                                      | 350 min.                                             |                                        |                                  |

**Table 3 Formaldehyde emission characteristics**

| Classification                         | Grade       | Symbol | Characteristics                                         |
|----------------------------------------|-------------|--------|---------------------------------------------------------|
| Rock wool thermal insulation material  | F☆☆☆☆ class | F☆☆☆☆  | 5 µg/(m <sup>2</sup> · h) or under in emission factor   |
|                                        | F☆☆☆ class  | F☆☆☆   | 20 µg/(m <sup>2</sup> · h) or under in emission factor  |
| Glass wool thermal insulation material | F☆☆ class   | F☆☆    | 120 µg/(m <sup>2</sup> · h) or under in emission factor |

## 5.2 Dimensions

### 5.2.1 Dimensions of board insulation, felt, wave insulation, lamella product and blanket

#### 5.2.1.1 Thickness

The thickness of board insulation, felt, wave insulation, lamella product and blanket, when tested in accordance with **6.1**, shall satisfy the requirements given in Table 4. The manufacturer shall select a product thickness from the thickness range specified in Table 4 to present it as the nominal thickness.

Dimensions over those given in Table 4 may be determined as agreed between the parties concerned with delivery, however, the tolerances on the nominal thickness given in Table 4 shall also apply.

**Table 4 Thickness**

Unit: mm

| Classification                         |                                      |                    | Compressed package | Thickness range                 | Tolerances on nominal thickness |
|----------------------------------------|--------------------------------------|--------------------|--------------------|---------------------------------|---------------------------------|
| Rock wool thermal insulation material  | Board insulation No. 1, No. 2, No. 3 |                    | No                 | 25 or over to and excl. 50      | +5, -2                          |
|                                        |                                      |                    |                    | 50 or over up to and incl. 100  | +5, -3                          |
|                                        | Felt                                 |                    | No                 | 25 or over to and excl. 50      | +5, -2                          |
|                                        |                                      |                    |                    | 50 or over up to and incl. 100  | +5, -3                          |
|                                        |                                      |                    | Yes                | 25 or over to and excl. 50      | +Not specified, -2              |
|                                        |                                      |                    |                    | 50 or over up to and incl. 100  | +Not specified, -3              |
|                                        | Lamella product No. 1, No. 2         |                    | No                 | 25 or over up to and incl. 75   | +4, -2                          |
|                                        | Blanket No. 1, No. 2                 |                    | No                 | 25 or over to and excl. 50      | +5, -2                          |
|                                        |                                      |                    |                    | 50 or over up to and incl. 100  | +5, -3                          |
|                                        |                                      |                    | Yes                | 25 or over to and excl. 50      | +Not specified, -2              |
|                                        |                                      |                    |                    | 50 or over up to and incl. 100  | +Not specified, -3              |
| Glass wool thermal insulation material | Board insulation                     | 24K                | No                 | 25 or over to and excl. 50      | +5, 0                           |
|                                        |                                      |                    |                    | 50 or over to and excl. 100     | +8, 0                           |
|                                        |                                      |                    |                    | 100 or over up to and incl. 150 | +10, 0                          |
|                                        |                                      | 32K, 40K, 48K, 64K |                    | 15 or over up to and incl. 100  | +3, -2                          |
|                                        |                                      | 80K, 96K           |                    | 12 or over up to and incl. 50   | ± 2                             |
|                                        |                                      | 24K, 32K, 40K      | Yes                | 25 or over up to and incl. 100  | +Not specified, 0               |
|                                        | Wave insulation                      |                    | No                 | 25 or over up to and incl. 75   | +4, -2                          |
|                                        | Lamella product A, B, C              |                    | No                 | 25 or over up to and incl. 100  | +4, -2                          |
|                                        | Blanket A, B                         |                    | No                 | 25 or over up to and incl. 100  | +Not specified, 0               |

### 5.2.1.2 Width and length

The width and length of board insulation, felt, wave insulation, lamella product and blanket, when tested in accordance with 6.1, shall satisfy the requirements given in Table 5. The manufacturer shall select product dimensions (width and length) from the ranges specified in Table 5.

Widths and lengths over those given in Table 5 may be determined as agreed between the parties concerned with delivery, however, the tolerances on the width or length given in Table 5 shall also apply.

**Table 5 Width and length of board insulation, felt, wave insulation, lamella product and blanket**

Unit: mm

| Classification                         |                                                          | Width                               |                                      | Length                                                                |                    |
|----------------------------------------|----------------------------------------------------------|-------------------------------------|--------------------------------------|-----------------------------------------------------------------------|--------------------|
|                                        |                                                          | Dimension                           | Tolerance                            | Dimension                                                             | Tolerance          |
| Rock wool thermal insulation material  | Board insulation<br>No. 1, No. 2, No. 3                  | 455 or over up to<br>and incl. 605  | +5<br>−3                             | 910 or over up to and<br>incl. 1 210                                  | +15<br>−3          |
|                                        | Felt                                                     | 455 or over up to<br>and incl. 910  | +10<br>0                             | 910 or over to and<br>excl. 5 500                                     | +30<br>0           |
|                                        |                                                          |                                     |                                      | 5 500 or over up to and<br>incl. 16 500                               | + Not specified, 0 |
|                                        | Lamella product<br>No. 1, No. 2                          | 500 or over up to<br>and incl. 605  | +10<br>−5                            | 1 000 or over to and<br>excl. 2 500                                   | +30<br>0           |
|                                        |                                                          |                                     |                                      | 2 500 or over up to and<br>incl. 3 650                                | + Not specified, 0 |
|                                        | Blanket<br>No. 1, No. 2                                  | 500 or over up to<br>and incl. 605  | +5<br>−3                             | 910 or over to and<br>excl. 2 000                                     | +15<br>−3          |
| 2 000 or over up to and<br>incl. 5 000 |                                                          |                                     |                                      | + Not specified, 0                                                    |                    |
| Glass wool thermal insulation material | Board insulation<br>24K, 32K, 40K, 48K,<br>64K, 80K, 96K | 40 or over up to<br>and incl. 1 000 | +10<br>−3                            | Without compressed<br>package<br>300 or over up to and<br>incl. 3 000 | +10<br>−3          |
|                                        |                                                          |                                     |                                      | With compressed<br>package<br>300 or over up to and<br>incl. 33 000   | + Not specified, 0 |
|                                        | Wave insulation                                          | 500 or over up to<br>and incl. 910  | ± 15                                 | 910 or over to and<br>excl. 1 000                                     | ± 20               |
|                                        |                                                          |                                     |                                      | 1 000 or over up to and<br>incl. 10 000                               | + Not specified, 0 |
|                                        | Lamella product<br>A, B, C                               | 500 or over up to<br>and incl. 910  | ± 15                                 | 910 or over to and<br>excl. 1 000                                     | ± 20               |
|                                        |                                                          |                                     |                                      | 1 000 or over up to and<br>incl. 10 000                               | + Not specified, 0 |
| Blanket<br>A, B                        | 500 or over up to<br>and incl. 910                       | +10<br>−3                           | 910 or over up to and<br>incl. 1 000 | +10<br>−3                                                             |                    |