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Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

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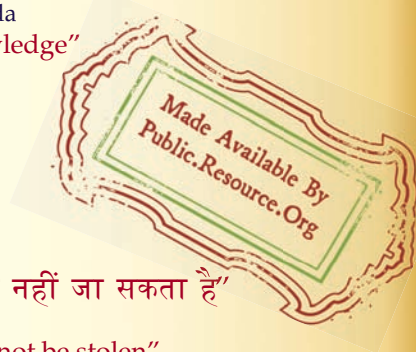
IS 9742 (1993): Sprayed mineral wool thermal insulation  
[CHD 27: Thermal Insulation]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

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“Knowledge is such a treasure which cannot be stolen”



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भारतीय मानक

छिड़की हुई तापरोधी खनिज ऊन – विशिष्ट

( पहला पुनरीक्षण )

*Indian Standard*

**SPRAYED MINERAL WOOL THERMAL  
INSULATION — SPECIFICATION**

*(First Revision)*

UDC 666.198 : 662.998

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**BUREAU OF INDIAN STANDARDS**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

## FOREWORD

This Indian Standard ( First Revision ) was adopted by the Bureau of Indian Standards, after the draft finalized by the Thermal Insulation Materials Sectional Committee had been approved by the Chemical Division Council.

Spraying the insulation material is a modern technique adopted for thermal insulation of steam/gas turbine cylinder, valves/chest and other components of irregular shape, ceilings and walls, railway coaches and for fire protection of structures, acoustical treatment, etc. This method of application of thermal insulation ensures uniform coating on the surfaces to be treated.

The sprayable fibres shall be composed of mineral wool fibres and suitable self-setting type inorganic, heat resistant binder.

Mineral wool fibres are processed in a specially designed polyspray machine in modular form, blended with suitable binder and are blown on to the surface to be treated by using spray gun containing adequate number of nozzles to atomise the bonding agent. The mixture strikes the surface and adheres, forming a monolithic, jointless and seamless shape.

This standard was originally published in 1981. Based on the experience gained since its publication, in this first revision of the standard, compressive strength of the material has been modified and a definition for the term 'sprayable wool' has been added. The optional requirement for 'fire protection' has been made obligatory and in addition, requirement for 'corrosive attack' alongwith a recommendatory note has been specified in this revision.

In preparation of this revision, considerable assistance has been derived from ASTM C 720-72 'Spray-applied fibrous thermal insulation for elevated temperature', issued by the American Society for Testing and Materials ( ASTM ), USA.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values ( revised )'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 2 MAY 2002  
TO  
IS 9742 : 1993 SPRAYED MINERAL WOOL THERMAL  
INSULATION — SPECIFICATION  
( First Revision )

( Page 1, clause 5.2 ) — Substitute the following for the existing:

**5.2 Compressive Strength**

Compressive strength of the material (see A-2.2.1) shall be as given below when tested in accordance with the method prescribed in 7 of IS 5724:1970:

| <i>Deformation<br/>Percent</i> | <i>Compressive Strength, Pa (N/m<sup>2</sup>)<br/>Min</i> |
|--------------------------------|-----------------------------------------------------------|
| 10                             | 4 550                                                     |
| 15                             | 6 460                                                     |

( Page 2, clause 5.4 ) — Delete and renumber the subsequent clauses.

( CHD 27 )

**AMENDMENT NO. 1 JULY 1993  
TO  
IS 9742 : 1993 SPRAYED MINERAL WOOL THERMAL  
INSULATION — SPECIFICATION**

*(First Revision)*

*( Page 2, clause 5.4, line 2 ) — Substitute '3.59' for '3 590'.*

( CHD 027 )

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Reprography Unit, BIS, New Delhi, India

*Indian Standard*

**SPRAYED MINERAL WOOL THERMAL INSULATION – SPECIFICATION**

*( First Revision )*

**1 SCOPE**

This standard prescribes requirements and methods of sampling and test for sprayed mineral wool thermal insulation.

**2 REFERENCES**

The Indian Standards listed below are necessary adjuncts to this standard:

| <i>IS No.</i> | <i>Title</i>                                                                                                                                             |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3069 : 1992   | Glossary of terms, symbols and units relating to thermal insulation materials ( <i>first revision</i> )                                                  |
| 3144 : 1992   | Methods of test for mineral wool thermal insulation ( <i>second revision</i> )                                                                           |
| 3346 : 1980   | Method of test for determination of thermal conductivity of thermal insulation materials ( two slab guarded hot plate method ) ( <i>first revision</i> ) |
| 3677 : 1985   | Unbonded rock and slag wool for thermal insulation ( <i>second revision</i> ) ( <i>Superseding</i> IS 5696 )                                             |
| 3809 : 1979   | Fire resistance test for structures ( <i>first revision</i> )                                                                                            |
| 5688 : 1982   | Methods of performed block-type and pipe covering type thermal insulation ( <i>first revision</i> )                                                      |
| 5724 : 1970   | Methods of test for thermal insulating cements                                                                                                           |

**3 TERMINOLOGY**

For the purpose of this standard, the definitions of terms, symbols and units given in IS 3059 : 1992 shall apply.

**4 MATERIAL**

**4.1 Mineral Wool**

Mineral wool conforming to IS 3677 : 1985 shall be used.

**4.2 Sprayable Mineral Wool**

Mineral wool with suitable binder, uniformly blended to ensure that it does not separate during normal handling and spraying operations shall be used.

**5 REQUIREMENTS**

**5.1 Density**

The density of the applied and dried material ( *see A-2.2.1* ) shall be in the range of 200 to 250 kg/m<sup>3</sup> and shall also not vary by more than  $\pm 15$  percent from the value declared by the manufacturer. The method of test for determination of density shall be as prescribed in 4 of IS 5688 : 1982.

**5.2 Compressive Strength**

Compressive strength of the material ( *see A-2.2.1* ) shall be as given below when tested in accordance with the method prescribed in 7 of IS 5724 : 1970:

| <i>Deformation<br/>Percent</i> | <i>Compressive Strength,<br/>Min Pa ( N/m<sup>2</sup> )</i> |
|--------------------------------|-------------------------------------------------------------|
| 5                              | 2 630                                                       |
| 10                             | 4 550                                                       |
| 15                             | 6 460                                                       |
| 20                             | 8 380                                                       |

**5.3 Thermal Conductivity**

The thermal conductivity of the material ( *see A-2.2.1* ) shall not exceed the values given below when determined in accordance with the method prescribed in IS 3346 : 1980:

| <i>Mean Temperature,<br/>°C</i> | <i>Thermal Conductivity,<br/>W/mK</i> |
|---------------------------------|---------------------------------------|
| 100                             | 0.066                                 |
| 150                             | 0.072                                 |
| 200                             | 0.079                                 |
| 250                             | 0.085                                 |
| 370                             | 0.101                                 |

#### 5.4 Adhesion

Adhesion of the dried material to steel shall be  $3\ 590\ \text{kN/m}^2$  when tested by the method prescribed in 10 of IS 5724 : 1970.

#### 5.5 Heat Resistance

The material shall not suffer visible deterioration of the fibrous structure when tested by heating to  $600^\circ\text{C}$ , in accordance with the method prescribed in IS 3144 : 1992.

#### 5.6 Incombustibility

When tested in accordance with the method prescribed in 15 of IS 3144 : 1992, the material shall be found to be incombustible.

#### 5.7 Fire Protection

When the material is to be used for fire protection purposes, it shall satisfy the heating conditions ( time-temperature curve ) as specified in IS 3809 : 1979 for determination of fire resistance rating.

#### 5.8 Thickness

The thickness of finished, sprayed-on insulation shall not vary from the nominal value by more than  $+10\ \text{mm} -3\ \text{mm}$  for thickness up to  $100\ \text{mm}$  and by  $-5\ +15\ \text{percent}$  for the thickness above  $100\ \text{mm}$ .

#### 5.9 Corrosion Protection

The material shall not corrode the surface on which it is applied.

NOTE — It has been found that if the chloride content in the material exceeds 0.01 percent by mass and if the conditions are such that chloride concentration can take place on the surface of certain austenitic stainless steels, there is a possibility of stress corrosion at elevated temperature. If such an instance arises, suitable measures should be taken during the application of insulation, for example, a coating of sodium silicate inhibitor prior to application of insulation.

#### 5.10 Optional Requirements

If required by the purchaser, the material shall also comply with the requirements given below:

##### 5.10.1 Resistance to Vibration

The material shall show not more than 1 percent by height of settlement when tested by the method prescribed in IS 3144 : 1991.

##### 5.10.2 Resistance to Jolting

The material shall show not more than 3 percent by height of settlement or as agreed to between the purchaser and the supplier, when tested by the method prescribed in IS 3144 : 1992.

### 6 PACKING AND MARKING

#### 6.1 Packing

Sprayable fibrous insulation shall be packed in the manufacturer's standard commercial packagings or as agreed to between the purchaser and the manufacturer.

#### 6.2 Marking

The packagings shall be legibly and indelibly marked with the following information:

- a) Indication of the source of manufacture,
- b) Batch number or year of manufacture,
- c) Net mass of contents,
- d) Recommended temperature range of use, and
- e) Density of the material.

6.2.1 The packagings may also be marked with the 'Standard Mark' of the Bureau.

6.3 Information on spray apparatus and method of application shall be furnished along with the supply.

### 7 SAMPLING

Representative samples of the material shall be drawn and their conformity to this specification determined in accordance with the method prescribed in Annex A.

ANNEX A

( Clause 7 )

SAMPLING OF SPRAYABLE MINERAL WOOL THERMAL INSULATION

A-1 SCALE OF SAMPLING

A-1.1 Lot

All containers of sprayable fibrous insulation belonging to the same batch of manufacture, in a single consignment, shall be grouped together and each such group shall constitute a lot.

A-1.2 For ascertaining the conformity of the lot to the requirements of this specification, tests shall be carried out on each lot separately.

A-1.3 The number of units to be selected ( *n* ) shall depend on the lot size *N* and shall be in accordance with Table 1.

Table 1 Number of Units to be Selected for Sampling

| Lot Size      | No. of Units to be Selected |
|---------------|-----------------------------|
| (N)           | (n)                         |
| (1)           | (2)                         |
| Up to 25      | 1                           |
| 26 to 50      | 2                           |
| 51 to 100     | 3                           |
| 101 and above | 4                           |

A-1.3.1 In order to ensure the randomness of selection, a random sampling procedure as given in IS 4905 : 1968 shall be adopted.

A-2 PREPARATION OF TEST SAMPLES AND NUMBER OF TESTS

A-2.1 From each of the bags selected according to A-1.3, approximately equal quantity of the material shall be taken and thoroughly mixed to form a composite sample and the composite sample, so prepared, shall be tested for all the characteristics as given in 5.

A-2.1.1 The composite sample shall be divided into three equal parts, one for the purchaser, another for the manufacturer and the third to be used as the referee sample.

A-2.1.2 These three parts of the composite sample shall be transferred to separate sample bags, which shall be properly stitched and labeled with full identification particulars.

A-2.1.3 The referee test sample shall bear the seal of both the purchaser and the manufacturer. It shall be kept at a place agreed to between the purchaser and the manufacturer for use in case of any dispute between the two.

A-2.2 Tests for determination of all characteristics given in 5 shall be conducted on the composite sample by preparing the samples as given in A-2.2.1.

A-2.2.1 Preparation of Samples

Place a 1 000 mm × 1 000 mm square steel frame, 50 mm deep, upon a horizontal polyethane lined base such as plywood, plaster board, etc. Apply the insulation to depth of the form in the manner prescribed by the manufacturer. Air dry the insulation until successive measurements of mass, taken at 24 hours intervals, do not vary by more than one percent. After drying, cut a 500 mm × 600 mm square specimen from the centre position. Use this for determination of density, after which it may be cut for subsequent testing. If necessary, more samples may be prepared in this manner for requirements prescribed in 5.2 to 5.7.

A-3 CRITERIA FOR CONFORMITY

The lot shall be declared as conforming to the requirements of this specification if all the test results on the composite sample satisfy the corresponding requirements given in the standard.

### **Standard Mark**

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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Doc : No CHD 027 ( 0173 )

**Amendments Issued Since Publication**

| Amend No. | Date of Issue | Text Affected |
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