IS 7509 : 1993
(Reaffirmed 1999)
Edition 2.1
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भारतीय मानक

तापीय रोधन सीमेन्ट — विशिष्टि

(पहला पुनरीक्षण)

Indian Standard

THERMAL INSULATING CEMENTS — SPECIFICATION

(First Revision)

(Incorporating Amendment No. 1)

UDC 662.998 : 666.946

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

Price Group 2

FOREWORD

This Indian Standard 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.

The material covered by this standard is in the form of dry powder, intended to be mixed with a suitable proportion of water, applied as a plastic mass, and dried in place, for use as insulation and not as a finishing cement.

The standard covers the specification of thermal insulating cements for use at limiting temperatures up to 350°C, 750°C and 950°C. Typical materials used are:

TYPE 350

a) Hydrated magnesium carbonate and/or hydrated calcium silicate with suitable reinforcing fibres.

b) Predominantly mineral wool fibres with suitable proportion of heat resistant binders.

TYPE 750

Hydrated calcium silicate and/or diatomaceous earth (silica) with suitable proportion of heat resistant binders and reinforcing fibres.

TYPE 950

Exfoliated vermiculite and/or diatomaceous earth (silica) with suitable proportion of heat resistant binders.

After the publication of IS 7509 : 1974 Thermal insulating cement (type 750), IS 7510 : 1974 Thermal insulating cement (type 350) and IS 9350 : 1980 Thermal insulating cement (type 950) covering thermal insulating cements for the range from 350°C to 950°C — the Committee decided to amalgamate the three standards into one.

The Committee responsible for the preparation of this standard is given at Annex B.

This edition 2.1 incorporates Amendment No. 1 (April 1999). Side bar indicates modification of the text as the result of incorporation of the amendment.

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.

Indian Standard

THERMAL INSULATING CEMENTS — SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes requirements and method of sampling and test for thermal insulating cements for use at temperatures up to 950°C.

2 REFERENCES

The following Indian Standards are the necessary adjuncts to this standard:

IS No.	*Title*
3069 : 1965	Glossary of terms, symbols and units relating to thermal insulation materials
3346 : 1980	Method for the determination of thermal conductivity of thermal insulation materials (two slab guarded hot plate method) (*first revision*)
4905 : 1968	Methods for random sampling
5724 : 1970	Methods of test for thermal insulating cements
9490 : 1980	Method for determination of thermal conductivity of insulation materials (water colorimeter method)

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions of terms, symbols and units given in IS 3069 : 1965 and the following shall apply.

3.1.1 *Consistency of Wet Mixed Thermal Insulating Cement*

The degree at which it resists deformation due to the application of outside force.

4 TYPES

The material shall be of three types, *viz*,

Type 350 for use of temperatures up to 350°C,

Type 750 for use of temperatures up to 750°C, and

Type 950 for use of temperatures up to 950°C.

5 REQUIREMENTS

5.1 The material shall be in the form of dry powder and/or granulated aggregate.

5.2 The material shall conform to the requirements given in Table 1 when tested in accordance with the methods referred to in col 6 of the table.

Table 1 Requirements of Thermal Insulating Cements

Sl No.	Characteristic	Requirements			Method of Test, Ref to Cl in IS 5724 : 1970
		Type 350	Type 750	Type 950	
(1)	(2)	(3)	(4)	(5)	(6)
i)	Service temperature	350°C	750°C	950°C	—
ii)	Consistency, percent				5
	a) Method A	35 to 45	35 to 45	—	
	b) Method B	175 to 230	175 to 235	—	
iii)	Dry covering capacity m^2, 1 cm, in thickness per 100 kg of dry cement, *Min*	17.5	20.0	14.0	6
iv)	Compressive strength at 5 percent deformation, kg/cm^2, *Min*	3.5	3.5	5.0	7
v)	Volume change (shrinkage) upon drying, percent, *Max*	25	25	30	6
vi)	Linear shrinkage (length) after heat soaking at service temperature, percent, *Max*	2.0	3.0	3.0	9
vii)	Dry adhesion to steel, kg/cm^2, *Min*	0.35	0.35	0.50	10
viii)	Thermal conductivity W/mK, *Max*				IS 9490 : 1980/IS 3346 : 1980
	Mean Temp, °C				
	100	0.09	0.07	0.14	
	200	0.11	0.09	0.16	
	300	—	0.11	0.18	
	400	—	—	0.20	

6 PACKING AND MARKING

6.1 Packing

The material shall be packed as agreed to between the purchaser and the supplier. However, polyethylene bonded hessian bags or paper lined hessian bags are generally used.

6.2 Marking

Packages shall be legibly and indelibly marked with the following information:

a) Indication of the source of manufacture;

b) Net mass of the contents;

c) Name and type of the material;

d) Amount and method of adding water, method of curing and drying; and

e) Batch number and year of manufacture.

7 SAMPLING

The method of drawing representative samples of the material and criteria for their conformity shall be as prescribed in Annex A.

ANNEX A

(*Clause* 7)

SAMPLING OF THERMAL INSULATING CEMENTS

A-1 SCALE OF SAMPLING

A-1.1 Lot

All bags of insulating cement 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 bags to be selected (*n*) shall depend on the lot size (*N*) and shall be in accordance with Table 2.

A-1.3.1 These bags shall be selected at random. In order to ensure the randomness of selection, random sampling procedures given in IS 4905 : 1968 may be adopted.

Table 2 Number of Bags to be Selected for Sampling

(*Clause* A-1.3)

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

A-2 PREPARATION OF TEST SAMPLE 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 weighing not less than 45 kg which would be sufficient for carrying out triplicate determination of all characteristics given in Table 1.

A-2.1.1 The composite sample shall be divided into three equal parts, one for the purchaser, another for the supplier 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. These bags shall be properly stitched and labelled with full identification particulars.

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

A-2.2 Tests for determination of all characteristics given in Table 1 shall be conducted on the composite sample.

A-3 CRITERIA FOR CONFORMITY

A-3.1 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 Table 1.

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Thermal Insulation Materials Sectional Committee, CHD 027

Chairman

PROF B. C. RAYCHAUDHURI
B-138, Sarita Vihar, New Delhi-110044

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Member Secretary

SHRI SANJAY GUPTA
Assistant Director (Chem), BIS

Thermal Insulating Cements, Castable and Performed Thermal Insulation Products Subcommittee, CHD 027 : 03

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(*Continued on page 4*)

(*Continued from page 3*)

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