भारतीय मानक

पॉलिश किये हुए निर्माण-पत्थर – विशिष्टि

भाग 1 ग्रेनाइट

Indian Standard

POLISHED BUILDING STONES — SPECIFICATION

PART 1 GRANITE

UDC 666·963·2

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

February 1995

Price Group 2

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Stones Sectional Committee, had been approved by the Civil Engineering Division Council.

Granite is an important structural and ornamental stone because of its high compressive strength and durability. Dimensioned granite should take and preserve high polish as it is susceptible of being carved for ornamental, monumental and inscription purposes. Uniformity in grain size and the uniform distribution of the constituent minerals generally control the colour, appearance, quality and the strength of the rocks.

Based on appearance, granites may be broadly classified as

i) Pink granites (mostly covers alkali granites); and

ii) Grey and multi-coloured granites (covering mostly calc alkali granites).

Granites occuring in several parts of India are widely distributed through out the archean terrain. Pink, red, grey and other multi-colour granites are presently being produced and exported from the country. This standard has therefore been formulated to guide the users as well as exporters about the various quality parameters of polished granite.

This standard is formulated in parts. Part 1 of this standard has been formulated for granite only. The other parts of this standard covering rest of the building stones are under preparations.

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.

The compsition of the technical committee responsible for the formulation of this standard is given at Annex B.

Indian Standard

POLISHED BUILDING STONES — SPECIFICATION

PART 1 GRANITE

1 SCOPE

1.1 This standard covers physical properties and finish requirements of polished granite used for various purposes.

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 GENERAL REQUIREMENTS

3.1 Granites should be free from all imperfections and injurious minerals that may interfere with the appearance, strength, structural integrity and its amenability to take good polish. Imperfections are mostly imparted by the textural variations which is a function of degree of uniformity and the distribution of the constituent minerals. Hair line cracks/joints, flowers, moles, knots, white and dark lines due to segregation of light coloured minerals in multi-coloured granites and ferromagnesium minerals in light coloured granites are considered to be the imperfections. Granites should be free from deletereous minerals such as pyrite, marcasite and minerals such as biotite, chlorite, ilmenite, etc, which interfere with the colour and appearance on weathering and also affect polishing characteristics.

4 DIMENSIONS

4.1 Slabs

4.1.1 The slabs shall be rectangular or square and of specified dimensions. The tolerance on length and breadth shall be $\pm$ 2 mm and on thickness $\pm$ 1 mm. The bottom face may be rough but the top surface shall be fine polished and joint faces shall be dressed with the top surface without hollowness and spalling off.

5 PHYSICAL PROPERTIES

5.1 The physical properties of granite shall conform to the requirements given in Table 1.

6 FINISH

6.1 The surface of the polished granite shall be mirror finish without any hairline crack. The polish on the surface shall be checked with glassometer instrument and shall not be less than 95 percent.

7 MARKING

7.1 Slabs may be marked in a suitable manner with the manufacturer's identification mark or initials.

7.2 BIS Certification Marking

The product may also be marked with Standard Mark.

7.2.1 The use of the Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

8 SAMPLING

8.1 Lot

In any consignment all the slabs of the same quarry shall be grouped together to constitute a lot.

8.1.1 Samples shall be selected and tested separately for each lot for determining its conformity or otherwise to the requirements of the specification.

8.2 The number of slabs to be selected for the sample shall depend upon the size of the lot and shall be in accordance with Table 2.

8.2.1 The slabs in the sample shall be selected at random in accordance with IS 4905 : 1968.

8.3 All the slabs selected in accordance with col 2 of Table 2 shall be examined for general requirements, dimensions and finish. Any slab failing in any one or more of the above requirements shall be considered as defective. A lot shall be considered as conforming to those requirements if the number of defective slabs obtained is not more than the permissible number of defectives given in col 3 of Table 2.

Table 1 Physical Properties of Granite

(*Clause* 5.1)

Characteristic	Requirements		Test Methods, Ref to Indian Standard
	Pink Granite	Multi-coloured and Grey Granites	
Moisture content (percent)	0·15 *Max*	0·15 *Max*	13030 : 1991
Dry density (*m/v*)	2·58 to 2·63	2·60 to 2·68	13030 : 1991
Specific gravity (*Min*)	2·75	2·75	1124 : 1974
Water absorption	0·50 (*Max*)	0·50 (*Max*)	1124 : 1974
Porosity (percent)	1·02 to 2·50	1 to 2	1124 : 1974
Compressive strength (kg/cm^2)	1 000 – 1 500	1 300 – 2 200	1121 (Part 1) : 1974
Tensile strength (*Min*)	90 kg/cm^2	90 kg/cm^2	1121 (Part 3) : 1974
Shear strength (kg/cm^2)	280 – 425	300 – 540	1121 (Part 4) : 1974
Hardness (mohs)	6 to 7	6 to 7	13630 (Part 13) : 1993
Hardness (schmidt) No.	80 to 100	85 to 110	12608 : 1989
Hardness (shore) No.	50 to 60	46 to 61	12608 : 1989
Ultrasonic pulse velocity	5 000 *Min*	5 000 *Min*	13311 (Part 1) : 1992
Resistance to wear	Not greater than 2 mm on the average and 2·5 mm for any individual specimen	Not greater than 2 mm on the average and 2·5 mm for any individual specimen	1706 : 1972

Table 2 Sample Size and Criteria for Conformity

(*Clauses* 8.2 *and* 8.3)

Number of Slabs in the Lot	Number of Slabs to be Selected in Sample	Permissible Number of Defectives	Sub-sample Size in Number
(1)	(2)	(3)	(4)
Up to 100	5	0	3
101 to 300	8	0	3
301 to 500	12	0	6
501 to 1 000	20	1	6

8.4 The lot having been found satisfactory with respect to dimensions, general requirements and finish shall be tested for physical properties. For this purpose a sub-sample of size given in col 4 of Table 2 shall be selected at random. A lot shall be considered having been satisfied the requirements of the physical properties if none of the slabs tested for the physical requirements as per **5.1** failed in any of the tests.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*	*IS No.*	*Title*
1121 (Part 1) : 1974	Methods of test for determination of strength properties of natural building stones : Part 1 Compressive strength (*first revision*) (Amendment 1) (Reaffirmed 1993)	1121 (Part 3) : 1974	Methods of test for determination of strength properties of natural building stones : Part 3 Tensile strength (*first revision*) (Reaffirmed 1993)

IS No.	*Title*
1121 (Part 4) : 1974	Methods of test for determination of strength properties of natural building stones : Part 4 Shear strength (*first revision*) (Reaffirmed 1993)
1124 : 1974	Methods of test for determination of water absorption, apparent specific gravity and porosity of natural building stones (*first revision*) (Reaffirmed 1990)
1706 : 1972	Method for determination of resistance to wear by abrasion of natural building stones (*first revision*) (Reaffirmed 1993)
4905 : 1968	Methods for random sampling (Reaffirmed 1990)
12608 : 1989	Methods of test for hardness of rock
13030 : 1991	Method of test for laboratory detemination of water content, porosity, density and related properties of rock material
13311 (Part 1) : 1992	Methods of non-destructive testing of concrete : Part 1 Ultrasonic pulse velocity
13630 (Part 13) : 1993	Methods of test for ceramic tiles : Part 13 Determination of scratch hardness of surface according to Mohs

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Composition of the Stones Sectional Committee, CED 6

Chairman	*Representing*
DR V. M. SHARMA	Central Soil & Materials Research Station, New Delhi
Members	
SHRI K. K. AGRAWALA SHRI K. K. MADHOK (*Alternate*)	Builder's Association of India, Bombay
SHRI R. K. BANSAL	Delhi Marble Dealers Association, Delhi
SHRI I. M. BHATIA	Central Public Works Department, New Delhi
SHRI A. K. BHATTACHARYA SHRI P. BHASKARAN (*Alternate*)	Ministry of Surface Transport, New Delhi
SHRI N. S. BOHRA SHRI O. P. JAIN (*Alternate*)	Directorate of Mines and Geology, Rajasthan
MAJOR P. K. CHATURVEDI LT-COL S. N. BOLAKHE (*Alternate*)	Engineering-in- Chief's Branch, Army Headquarters, New Delhi
CHIEF ENGINEER SHRI I. C. DOGRA (*Alternate*)	Directorate General Border Roads, New Delhi
DIRECTOR ADDITIONAL DIRECTOR (*Alternate*)	Directorate of Geology and Mining, Lucknow
SHRI H. M. DAYAL SHRI A. K. SRIVASTAVA (*Alternate*)	Geological Survey of India, Lucknow
DIRECTOR (GERI) RESEARCH OFFICER, MTD (GERI) (*Alternate*)	Narmada & Water Resources Department, Government of Gujarat
DIRECTOR RESEARCH OFFICER, (MTD) (*Alternate*)	Maharashtra Engineering Research Institute, Nasik
DIRECTOR	A. P. Engineering Research Laboratories, Himayat Sagar, Hyderabad
SHRI S. M. DUGGAR SHRI HARI OM PRAKASH (*Alternate*)	Public Works Department, Government of Rajasthan, Jaipur
SHRI D. K. KANANGO SHRI B. K. MANDAL (*Alternate*)	National Test House, Calcutta
SHRI R. G. LIMAYE	Indian Institute of Technology, Bombay
DR G. S. MEHROTRA DR DINESH CHANDRA (*Alternate*)	Central Building Research Institute, Roorkee
SHRI Y. R. PHULL	Central Road Research Institute, New Delhi
SHRI P. C. PUROHIT SHRI M. KEVALIA (*Alternate*)	Rajasthan State Mineral Development Corporation Ltd, Jaipur
SHRI O. P. SACHDEVA SHRI R. M. UMATHEY (*Alternate*)	Indian Bureau of Mines, Nagpur
SHRI LAKHBIR SINGH SONKHLA	Public Works Department, Goverment of Himachal Pradesh, Shimla
SUPERINTENDING ENGINEER (DESIGNS) JOINT CHIEF ENGINEER (GENERAL) (*Alternate*)	Public Works Department, Goverment of Tamil Nadu,Madras
SHRI J. V. WAGH SHRI A. K. AJMERA (*Alternate*)	Associated Stones Industries (Kotah) Ltd, Bombay
SHRI J. VENKATARAMAN, Director (Civ Engg)	Director General, BIS (*Ex-officio Member*)

Secretary

SHRI R. S. JUNEJA
Joint Director (Civ Engg), BIS

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmoious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Addition'.

This Indian Standard has been developed from Doc : No. CED 6 (5264).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Printed at Printwell Printers, Aligarh, India