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*भारतीय मानक*  
**ढलाई मे प्रयुक्त प्राकृतिक संचकन रेत के लिए विशिष्टि**  
(*पहला पुनरीक्षण*)

**Draft Indian Standard**  
**SPECIFICATION FOR NATURAL MOULDING SAND FOR USE IN**  
**FOUNDRIES**  
(*First Revision*)

ICS No. 77.180

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**Foundry and Steel Castings Sectional  
Committee, MTD 14**

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**Last date for receipt of comment is  
22 March 2023**

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**FOREWORD**

This standard was first published in 1965. This revision has been brought out to bring the standard in the latest style and format of the Indian Standards.

In addition, the following changes have been made:

- a) Reference clause is included;
- b) Clause 5 is modified;
- c) Clause 9.2 is added; and
- d) Inclusion of clause which states particulars to be provided by supplier,

Natural moulding sand contains variable amount of clay which acts as bond between the sand grains. It occurs as loose or as consolidated deposit of sedimentary origin. The mineralogical constituents of the clay may belong to the kaolinite group like dickite, kaolinite, nacrite, halloysite and montmorillonite, or to the secondary mica group; each group has its own characteristic properties. Natural moulding sand, therefore, possesses strength, plasticity and refractoriness to varying extent depending upon the clay minerals present.

Natural moulding sand may be used as such for a variety of purposes in foundries. But when it contains a greater amount of clay, it is blended with river sand, dune sand or any other variety of sand which is relatively clay-free so as to get the optimum properties desired in the sand mixture.

No marking clause has been included in this standard as natural moulding sand is supplied loose.

This standard contains a clause on green compressive strength requirement of natural moulding sand (*see 9*) which requires the purchaser to specify it, if necessary, while placing an order.

This standard contains clause **10** which call for an agreement between the purchaser and the supplier.

For the purpose of deciding whether 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 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. 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*  
**SPECIFICATION FOR NATURAL MOULDING  
SAND FOR USE IN FOUNDRIES**  
(*First Revision*)

## **1 SCOPE**

This standard covers the requirements for natural moulding sand for use in foundries.

## **2 REFERENCES**

The following standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicted were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

<i>IS</i>	<i>Title</i>
IS 460	Test Sieves — Specifications
Part 1: 2020	Wire cloth test sieve ( <i>fourth revision</i> )
Part 3: 2020	Methods of Examination of Apertures of Test Sieves ( <i>fourth Revision</i> )
IS 1387 : 1993	General requirements for the supply of metallurgical materials ( <i>second revision</i> )
IS 1811 : 1984	Methods of sampling foundry sand ( <i>first revision</i> )
IS 1918 : 1966	Methods of physical tests for foundry sands

## **3 SUPPLY OF MATERIAL**

**3.1** General requirements relating to the supply of natural moulding sand for use in foundries shall be as laid down in IS 1387.

**3.2** As far as possible, the sand shall be free from gravel.

## **4 SAMPLING**

Representative samples shall be drawn according to the scheme of sampling given in IS 1811.

## **5 GRADES**

**5.1 Grades** – Natural moulding sand for use in foundries shall be of three main grades, namely, Grades A, B and C with respect to clay content (*see Table 1*). Each main grade shall be of 11

sub-grades, namely, Grades 850/425, 600/300, 425/212, 300/150, 212/106, 150/75, 850/300, 600/212, 425/150, 300/106 and 212/75 based on the distribution of sand grains (*see* Table 2). The grade of natural moulding sand shall be designated with a symbol which shall be a combination of gradation according to clay content and grain size distribution.

**5.2 Designation** – Natural moulding sand falling under Grade A with respect to clay content and sub-grade 850/425 according to its grain size distribution shall be designated as:

### Grade A 850/425

## 6 CLAY CONTENT

The clay content of different grades of natural moulding sand, when determined in accordance with IS 1918, shall be as given in Table 1.

**Table 1 Clay Content of Natural Moulding Sand**  
(Clauses 5.1 and 6)

<i>Sl No.</i>	<i>Grade</i>	<i>Clay, Percent</i>
(1)	(2)	(3)
i)	A	05 to 10
ii)	B	10 to 15
iii)	C	15 to 20

## 7 REFRACTORINESS

When tested in accordance with the method given in IS 1918, the refractoriness of different grades of natural moulding sand shall be as given below:

<i>Sl No.</i>	<i>Grade</i>	<i>'A' Sintering Temperature Range</i>
(1)	(2)	(3)
i)	A	1350° to 1450 °C
ii)	B	1200° to 1350 °C
iii)	C	1100° to 1200 °C

## 8 GRAIN SHAPE

When tested in accordance with the method given in IS 1918, washed sand grains shall be mostly of sub-angular to round shape.

## 9 GRAIN FINENESS

**9.1** The different grades of natural moulding sand, when tested in accordance with the method given in IS 1918, shall have the grain fineness as given in Table 2.

**Table 2 Grain Fineness of Natural Moulding Sand**  
(Clauses 5.1 and 9.1)

<b>FRACTION RETAINED</b>			
<b>Sl No.</b>	<b>GRADE</b>	<b>On IS Sieve Designation</b>	<b>Percent,</b>
		<b>(Micron)</b>	<b>Min</b>
(1)	(2)	(3)	(4)
i)	850/425	850, 600 and 425	60
ii)	600/300	600, 425 and 300	60
iii)	425/212	425, 300 and 212	60
iv)	300/150	300, 212 and 150	60

v)	212/106	212, 150 and 106	60
vi)	150/75	150, 106 and 75	60
vii)	850/300	580, 600, 425 and 300	60
viii)	600/212	600, 425, 300 and 212	60
ix)	425/150	425, 300, 212 and 150	60
x)	300/106	300, 212, 150 and 106	60
xi)	212/75	212, 150, 106 and 75	60

**9.2** The test sieves used shall be in accordance with sizes specified in IS 460 (Part 1). The standard test sieve will, after period of time, become less accurate. The sieve shall, therefore, be periodically checked according to IS 460 (Part 3) and the correction factor shall be determined and applied to the result.

NOTE — 1 In case IS sieves is not available, equivalent BS or ASTM Sieves specified in Annex A may be used. The BS and ASTM sieves listed in Annex A have their apertures within the limits specified for the corresponding IS sieves.

## **10 GREEN COMPRESSIVE STRENGTH**

Where required, the green compressive strength and the method of its determination shall be as agreed between the manufacturer and purchaser.

## **11 PARTICULARS TO BE MENTIONED BY SUPPLIER**

The particulars shall include the following information:

- a) Reference to this standard;
- b) Grade and Designation;
- d) Size range; and
- e) Any other information, if required.

**ANNEX A**  
*(Clause 9.2)*  
**Comparative Sieve Designations of IS, BS and ASTM Sieves**

<b>Sl No.</b>	<b>IS Sieve</b>	<b>BS Sieve</b>	<b>US Standard Sieve (ASTM Sieve)</b>
(1)	(2)	(3)	(4)
i)	850 - micron	18	841 $\mu$ (20)
ii)	600 - micron	25	595 $\mu$ (30)
iii)	425 - micron	36	420 $\mu$ (40)
iv)	300 - micron	52	297 $\mu$ (50)
v)	212 - micron	72	210 $\mu$ (70)
vi)	150 - micron	100	149 $\mu$ (100)
vii)	106 - micron	150	105 $\mu$ (140)
viii)	75 - micron	200	74 $\mu$ (200)