



उत्पाद मैनुअल

Steel Shots for Use in Foundries — Specification

IS 4606:1983 के अनुसार

PRODUCT MANUAL
FOR

Steel Shots for Use in Foundries — Specification
ACCORDING TO IS 4606:1983

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो) अनुरूपता मूल्यांकन (विनियम, 2018 की योजना -I के तहत प्रमाणन के संचालन में एकरूपता और पारदर्शिता के लिए इस उत्पाद मैनुअल का उपयोग सभी क्षेत्रीय / शाखा कार्यालयों और लाइसेंसधारियों द्वारा संदर्भ सामग्री के रूप में किया जाएगा। दस्तावेज़ का उपयोग बीआईएस प्रमाणन प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure uniformity of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification.

1.	मानक संख्या IS No.	:	IS 4606: 1983
	शीर्षक Title	:	Steel Shots for Use in Foundries — Specification
	संशोधनों की संख्या No. of amendments	:	1
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	No Specific Requirements Note: This section indicates the requirements for raw material (if specified in the IS) for which compliance is to be established during Grant of Licence / Change in Scope of Licence / Factory Surveillance

b)	समूहीकरण दिशानिर्देश Grouping Guidelines	:	Please refer Annex-A
c)	नमूने का परिमाण Sample Quantity	:	1 Kg – Steel Shots Note: This section indicates the quantity of the sample of the product and/or the raw material (if applicable), required to be sent to the laboratory for testing, for the purpose of Grant of Licence/Change in Scope of Licence/ Factory Surveillance (incase of market surveillance, effort may be made to procure therequired quantity of product sample, as far as possible since raw material sample may not be available in market)
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer to Annex-B
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	:	Please refer to Annex-C
5.	एक दिन में संभावित परीक्षण Possible tests in a day		
	All tests are possible to be carried out in a day. Note: This section is for the guidance of BIS Certification Officers/Technical Auditors of BIS Authorized Outside Surveillance Agencies (OSAs) during factory inspection to provide readyreference regarding the tests which can be witnessed during the inspection in the factory by the officer/auditor.		
6.	लाइसेंस का दायरा /Scope of the Licence:		
	“Licence is granted to use Standard Mark as per IS 4606: 1983 with the following scope:		
	Name of the product	Steel Shots for Use in Foundries	
	Shot Number	S-S 2000 / S-S 1700 / S-S 1400 / S-S 1180 / S-S 1000 / S-S 850 / S-S 710 / S-S 600 / S-S 425	

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

ANNEX-A

GROUPING GUIDELINES

i. Based on the sieve size, following shot numbers have been defined in the Standard:

- S-S 425
- S-S 600
- S-S 710
- S-S 850
- S-S 1000
- S-S 1180
- S-S 1400
- S-S 1700
- S-S 2000

ii. Considering the above, following grouping guidelines for GoL/ CSoL have been developed:

Group	Shot Number
1.	S-S1000 / S-S850 / S-S710 / S-S600 / S-S425
2.	S-S2000 / S-S1700 / S-S1400 / S-S1180

- a) One sample of highest shot number from each group shall be tested to cover all the lower shot numbers up to and including the shot number tested in that particular group in the scope of licence.
- b) Scope of Licence shall be restricted based on the manufacturing and testing facilities available.
- c) During operation of licence, samples of each variety covered in the scope of licence, shall be tested in rotation, to the extent possible

ANNEX – B

LIST OF TEST EQUIPMENTS (*INDICATIVE LIST, FOR GUIDANCE ONLY*)

Sl. No.	Tests Used In With Clause Reference	Test Equipment/Chemical
1	Shape CI 5	IS Sieves of 2.80 mm, 2.30 mm, 2.00 mm, 1.70 mm, 1.40 mm, 1.18 mm, 1.00 mm, 850 Micron, 710 Micron, 600 Micron, 500 Micron, 424 Micron, 355 Micron, 300 Micron, Pan
2	Size CI 6	Sieve Shaker OR Manual Shaker, Vernier Caliper
3	Chemical Composition CI 7	Elemental Wise List Given Below OR Spectrophotometer with Sample Polishing Machine
	Carbon & Sulphur CI 7.1	Strohlein or Leco Apparatus with all attachments, Barometer with Chart, Hot Plate, Muffle Furnace, Complete Range of Glassware's, Measuring Cylinders, Desiccator, Porcelain Boats or Ceramic Crucibles, Thermometer, Electronic Balance, Distilled Water, Hot air oven, Oxygen - 99.5 Percent Minimum Purity, Ether or Acetone, Standard Reference Material (NML) with Certificate, Weighing Balance Reagents for C: Tin Granules or Pure Iron Fillings, Acidulated Water / Brine Water, Methyl Red, Caustic Potash Reagents for S: Ceramic Boats / Crucibles – Desiccators, Fluxes - Low Sulphur Copper, Tin or Iron, Dilute Hydrochloric Acid, Starch Iodide solution, Potassium Iodate
	Silicon CI 7.1	Medium Textured Filter Paper, Porcelain Casserole, Platinum Crucible, Filter Paper Pulp, Hot Plate, Hot Air Oven, Muffle Furnace, Weighing Balance, Standard Reference Material (NML) with Certificate Reagents: Silver Nitrate Solution, Concentrated Nitric Acid, Concentrated Sulphuric Acid, Dilute Hydrochloric Acid, Dilute Sulphuric Acid, Perchloric Acid, Tartaric Acid and Hydrofluoric Acid
	Manganese CI 7.1	Hot plate, Conical Flask, Weighing Balance, Standard Reference Material (NML) with Certificate Reagents: Silver Nitrate, Ammonium Persulphate, Sodium Arsenite Solution, Dilute Nitric Acid, Phosphoric Acid, Dilute Sulphuric Acid, Concentrated Nitric Acid, NaCl Solution, Permanganic Acid
	Phosphorous CI 7.1	Weighing Balance, Heater / Heating Element along with Energy Regulator, Ice Water Bath, Volumetric Flask Cap – 1 Liter, (Whatman) Filter Paper No. 040, Suction Filtration Facility, Filter Paper Pulp Pad, Standard Reference Material (NML) with Certificate Reagents: Potassium Permanganate (KMnO ₄), Sodium

		Nitrite (Na_2NO_3), Ammonium Molybdate $[(\text{NH}_4)_2 \text{Mo}_2\text{O}_7]$, Ammonium Phosphate $[(\text{NH}_4)_3 \text{PO}_4]$, Potassium Nitrate (K_2NO_3), Phenolphthalein Solution, Rectified Spirit or Methyl Alcohol, Sodium Hydroxide (NaOH), Hydrofluoric Acid (HF), Perchloric Acid (HClO_4), Sulphurous Acid, Hydrobromic Acid (HBr)
4	Hardness CI 8	Vicker Hardness Tester, Plastic Mount
5	Microstructure CI 9	Microscope, Sample Polishing Machine, Etching Solution
6	Density CI 10	Weighing Balance, Measuring Jar
7	Soundness CI 11	Plastic Mount
8	General Appearance & Freedom from Foreign Matter	Microscope, Wire Brush, Magnet
9	Sampling	Weighing Balance, Tray for Sampling

ANNEX C

SCHEME OF INSPECTION AND TESTING

1. QUALITY ASSURANCE PLAN

1.1 It is expected that manufacturers (licensees/applicants) will implement a Quality Assurance Plan i.e. a plan of regular testing and in-process controls, designed to ensure that the product bearing the Standard Mark conforms to all requirements of the Indian Standard.

1.2 The manufacturers shall define a Quality Assurance Plan defining the control unit (i.e. lot/batch etc.) and the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and submit the same to BIS Branch Office for information. The manufacturer shall comply with the same and maintain test records in accordance with para 2.4.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit is: Entire quantity of Steel Shots of the same Shot Number coming out of same cast/heat and manufactured under similar conditions in a day.

1.3.2 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in **Table 1**.

1.3.3 The manufacturer shall ensure inspection and testing as per the Quality Assurance Plan submitted by them on the whole production of the factory which is covered by this plan. Alternatively, the manufacturer has the option of adherence to the quality plan as per levels of control recommended in column 3 of Table 1.

1.4 However, all manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard.

2. ENSURING COMPLIANCE THROUGH TESTING- It is expected that manufacturers (licensees/applicants) will establish a suitably equipped and staffed in house laboratory (In house testing facility) for testing at least those parameters of the Indian Standard which require routine testing for ensuring quality of the product. This includes in-process controls as may be defined and put in place by the manufacturer and testing parameters/requirements which can only be performed in the factory.

2.1 For the guidance of manufacturers, Table 1 giving the recommended levels of control is given below. Column 2 of Table 1 indicates routine tests where test equipment is required in house as "R" or other tests which can be subcontracted as "S". Subcontracting is permitted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.2 For MSME manufacturers, the requirement of maintaining a laboratory/in-house testing facility for routine tests (indicated as "R" in Column 2 of Table 1) is also optional.

2.2.1 MSME manufacturers may utilize common cluster based facilities as per guidelines for the utilization of cluster based test facilities by MSMEs or the provisions of Sharing of testing facilities or get testing done from BIS recognized/empaneled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.3 Large Scale manufacturers shall maintain an in-house laboratory equipped at least with test facilities for routine tests (indicated as “R” in Column 2 of Table 1), where different tests given in the specification shall be carried out in accordance with the method given in the specification. They shall also implement a calibration plan for the in-house test equipment.

2.3.1 Alternatively, in lieu of an in-house laboratory, large scale manufacturers can also utilize the provisions of Sharing of testing facilities as per the Guidelines for Grant of Licence available on BIS website www.bis.gov.in. (Under Conformity Assessment>Product Certification Process). Even for subcontracted tests, provisions for sharing of testing facilities can be utilized.

2.4 TEST RECORDS- The manufacturers maintaining an in-house laboratory or utilizing common cluster based facilities or shared test facilities shall maintain test records for the tests carried out to establish conformity. For the tests being subcontracted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025, test reports issued by the laboratories shall be available for inspection by BIS.

3. PACKING AND MARKING - The Standard Mark as given in the Schedule of the licence shall be incorporated legibly and indelibly on each bag/container, provided always that the material so marked conforms to each requirement of the specification.

3.1 Packing and Marking shall be done as per the Indian Standard.

3.2 **Additional Marking requirements:** The material shall also be marked with the following additional requirement on each bag/container:

a) “For BIS certification details please visit www.bis.gov.in”

4. TEST CERTIFICATE – For each consignment of BIS Certified material conforming to IS 4606: 1983 there shall be a test certificate which shall contain the Standard Mark, the Control Unit/Heat number and the corresponding test results (as given in Annexure-I enclosed)

5. REJECTION - All the production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark. Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

TABLE 1
(ONLY FOR GUIDANCE PURPOSE)

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or)S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods Clause Reference			No. of Sample	Frequency	Remarks
5	Shape	8	IS 4606	R	One	Each Control Unit	
6	Size	6.3	IS 460 Part 1	R	One	Each Control Unit	
7	Chemical Composition	7	IS 228 Relevant Part	R	One	Each Cast	
8	Hardness	-	IS 1501	R	One	Each Control Unit	
9	Microstructure	9	IS 4606	R	One	Each Control Unit	
10	Density	10	IS 4606	R	One	Each Control Unit	
11	Soundness	11	IS 4606	R	One	Each Control Unit	
12	General Appreance & Freedom from Foreign Matter	12	IS 4602	R	One	Each Control Unit	

ANNEXURE I

(Para 4 of the Scheme of Inspection and Testing)
XYZ IRON AND STEEL COMPANY
(Registered office Address and works address)

TEST CERTIFICATE FOR
Steel Shots for Use in Foundries — Specification

TEST CERTIFICATE No.
TO M/s

DATE

We certified that the material described below fully conforms to IS 4606: 1983 Chemical, Physical and Mechanical properties of the product, as tested in accordance with the Scheme of Testing and Inspection contained in the BIS Certification Marks Licence No. CM/L- are as indicated below against each order No.

(PLEASE REFER TO IS 4606: 1983 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

Order No. & Date	Shot Num ber	Control Unit	Quantity	Chemical Composition in %					Mechanical Properties				Remark
				C	S i	M n	S	P	Harnes s	Microst ructure	Densit y	Soundne ss	

REMARKS
WAGON NO.
TRUCK NO.

FOR XYZ IRON AND STEEL COMPANY

“For BIS certification details please visit www.bis.gov.in”

(It is suggested that size A4 paper be used for this test certificate)