



PM/ IS 13502/ 2/ Jan 2023

PRODUCT MANUAL FOR
Pig Iron
According to IS 13502:2023

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence 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 licence/certificate.

1.	Product	:	IS 13502:2023
	Title	:	Pig Iron
	No. of amendments	:	0
2.	Sampling Guidelines		
a)	Raw material	:	
b)	Grouping Guidelines	:	Please refer Annex - A
c)	Sample Size	:	For Physical tests: Size and Mass (2 Nos.) For chemical composition: 5 pieces of 50 X 50 mm/50 g drillings
3.	List of Test Equipment	:	Please refer Annex - B
4.	Scheme of Inspection and Testing	:	Please refer Annex - C
5.	Possible tests in a day	:	All tests
6.	Scope of the Licence :		
	Licence is granted to use Standard Mark as per IS 13502:2023 with the following scope:		
	Name of the product	Pig Iron	
	Number	1.1, ..	
	Designation	PG Si Mn 1 P 40,..	
	Pig Iron for	Steel Making,..	

ANNEXURE A
TOPRODUCT MANUAL FOR
Pig Iron
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GROUPING GUIDELINES

1. IS 13502:2023 covers requirements of Pig Iron for steel making and for foundry purposes. Grade wise classification of Pig Iron are indicated in Table 2 of IS 13502:2023

2. Based on the above, the product is divided into the following groups for the purpose of GOL/CSoL:

Group-1- Pig Iron for Steel Making	Designation- PG Si x Mn 1 P 40, PG Si x Mn 3 P 40 and PG Si x Mn 5 P 40	One sample of any one designation may be drawn from Group-1 to cover all the designations of the product within that group
Group-2- Pig Iron for Foundry Purpose	Designation- PG Si x Mn P 8 PG Si x Mn 1 P 8	-do-
Group-3- Pig Iron for Foundry Purpose	Designation- PG Si x Mn 3 P 8 , PG Si x Mn 3 P 12 , PG Si x Mn 3 P 20, PG Si x Mn 3 P 40, PG Si x Mn 3 P 100, PG Si x Mn 3 P 130	If sample of designation with lower phosphorus content (Stringent Variety) has been tested and found conforming, the scope may cover all designations with higher phosphorus content (Less Stringent Variety) and the designation which was tested. e.g PG Si x Mn 3 P 8 is to be tested, to cover all designations of group 3 in licence scope.
Group-4- Pig Iron for Foundry Purpose	Designation-PG Si x Mn 5 P 8 , PG Si x Mn 5 P 12, PG Si x Mn 5 P 20, PG Si x Mn 5 P 40, PG Si x Mn 5 P 100, PG Si x Mn 5 P 130	If sample of designation with lower phosphorus content (Stringent Variety) has been tested and found conforming, the scope may cover all designations with higher phosphorus content (Less Stringent Variety) and the designation which was tested. e.g if designation PG Si x Mn 5 P 8 is tested, then all designations of group 4 may be covered in scope of GOL/CSoL. Eg. PG Si x Mn 5 P 12 is to be tested, to cover all designations of group 4 in licence scope

3. However, the licence can be granted for all designations of Pig Iron specified in the Indian Standard and applied by the applicant/licencee, provided that the firm is having all the necessary manufacturing and testing facilities for the manufacture and testing of designations of Pig Iron proposed to be included in the licence.

4. During the operation of license, BO shall ensure that all Designations /grades covered in the license are drawn for independent testing on rotation over a period of time.

ANNEXURE B
TO PRODUCT MANUAL FOR
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LIST OF TEST EQUIPMENTS

Major test equipment required to test as per requirements of Indian Standard.

Sl. No.	Test Equipment/Chemicals and Identification Numbers (Where applicable)	Tests Used in with Clause Reference
1.	Weighing balance, Heater/ Heating element along with energy regulator, Ice water bath, Vol Flask Cap – 1 litre, (Whatman) filter paper No. 040, Suction Filtration Facility, Filter paper pulp pad, Standard Reference Material (NML) with certificate Potassium Permanganate (KMnO₄), Sodium Nitrite (NaNO₂), Ammonium Molybdate [(NH₄)₂ MoO₇], Ammonium Phosphate [(NH₄)₃ PO₄], Potassium Nitrate (KNO₃), Phenolphthalein Solution, Rectified spirit or methyl alcohol, Sodium Hydroxide (NaOH), Hydrofluoric Acid (HF), Perchloric Acid (HClO₄), Sulphurous Acid, Hydrobromic Acid (HBr), other chemicals and reagent as applicable	Phosphorus (7)
2.	Hot plate, Conical flask Reagents: silver nitrate, ammonium persulphate sodium arsenite solution, Dilute Nitric Acid, Phosphoric Acid, Dilute Sulphuric Acid, Concentrated Nitric Acid, NaCl Solution, Permanganic acid	Manganese content (7)
3.	Medium textured filter paper, Porcelain casserole, platinum crucible, filter paper pulp, hot plate, hot air oven, muffle furnace Reagents: Silver nitrate solution, concentrated nitric acid, concentrated sulphuric acid, Dilute Hydrochloric Acid, Dilute Sulphuric Acid, Perchloric Acid, Tartaric acid and hydrofluoric acid	Silicon content (7)
4.	ashless paper pulp, paper pulp pad, hot plate, dessicator, Reagents: ammonium nitrate, methyl red, dilute ammonium hydroxide, Concentrated hydrochloric acid Concentrated nitric acid, Perchloric acid, Hydrofluoric Acid	Nickel content(7)
5.	Hot plate, stop watch Reagents: dilute sulphuric acid and phosphoric acid mixture, concentrated nitric acid, ammonium persulphate, silver nitrate, dilute hydrochloric acid, ferrous ammonium sulphate, standard potassium permanganate solution.	Chromium content(7)
6.	Reagents: Perchloric Acid, Phosphoric Acid, Nitric Acid, Hydrochloric Acid, Dilute sulphuric acid, potassium thiocyanate solution, stannous chloride solution, n-butyl acetate, Iron-Mo free, molybdenum metal (99.9 pc pure) Spectrophotometer, Volumetric flask, conical flask, titration apparatus (burette, pipette)	Molybdenum content(7)

	etc.), hot plate, thermometer, separating funnel, dry filter paper and other laboratory glassware and apparatus	
7.	Digital weighing balance, Hot air oven, Muffle Furnace, Hot plate, Conc. Nitric Acid, Potassium chloride, phenolphthalein indicator, Hydrofluoric Acid, sodium hydroxide, Conc. Nitric Acid, Boric Acid, Zinc, Barium Chloride,	Carbon content (7)
8.	Digital weighing balance, Hot air oven Hot plate, Potassium nitrate, Dilute Hydrochloric Acid, Conc. Hydrochloric Acid, Dilute Sulphuric Acid, Hydrofluoric Acid, Conc. Nitric Acid, Boric Acid, Zinc(Sulphur free), Barium Chloride, Nickel crucible, Nickel rods, Hydrogen peroxide, sodium carbonate, sodium peroxide	Sulphur content(7)
9.	Steel Scale/Measuring Tape/Vernier Caliper, Radius Gauge	Size (6)
10.	Weighing Balance	Mass (6)
11.	Sieve of 500 micron, driller, Hammer	Size of Iron Mortar (7.1)

Note: The above is an indicative list for the purpose of guidance only

ANNEXURE C
TO PRODUCT MANUAL FOR
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SCHEME OF INSPECTION AND TESTING

1.0 LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipment.

2. TEST RECORDS – The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. LABELLING, MARKING –

The Standard Mark as given in the Schedule of the license and Licence Number (i.e. CM/L) shall be incorporated, and the marking shall be done as per the provisions of the Indian Standard, provided always that the product thus marked and packed conforms to all the requirement of the specification.

4. CONTROL UNIT – For the purpose of this scheme, pigs of 1000 MT or less representing same cast and grade which are manufactured under uniform conditions of production in the same place shall constitute a control unit.

5. LEVELS OF CONTROL - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

5.1 All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

5.2 General requirements relating to the supply of material shall conform to IS 1387.

6. TEST CERTIFICATE-For each consignment of BIS Certified material conforming to IS 13502:2023 there shall be a test certificate which shall contain the Standard Mark, the cast/ControlUnit number and the corresponding test results (as given in Annexure-I enclosed)

7. REJECTIONS – 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: LEVELS OF CONTROL

(1)				(2)	(3)		(4)
TEST DETAILS					LEVELS OF CONTROL		REMARKS
Clause	Requirements	Test Method		Test equipment requirement R: required (or) S: Sub-contracting permitted	No. of Samples	Frequency	
		Clause	Reference				
4	Grades	4.1, 7.1, 7.2 Table-1,2 Annex-A	IS 13502 IS 12308 (relevant parts) IS 460 (Part 1)	R	Three	Each Heat	
	ii) Ladle Analysis						
	ii) Check Analysis for Chemical Composition of Pigs	4.1, 4.2, 7.1, 7.2 Table-1,2&3 Annex-A		R	As per table-3 of IS 13502:2023	Each Control Unit	
6	Size and Mass	6.1, 6.1.1 Fig -1&2 Table-3	IS 13502	R	Adequate inspection to ensure that size and mass of Pigs are in accordance with specification		

Note-1: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empaneled by the Bureau.

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.

ANNEXURE I
(Para 6 of the Scheme of Inspection and Testing)
XYZ IRON COMPANY
(Registered office Address and works address)
TEST CERTIFICATE FOR Pig Iron

BIS
STANDARD
MARK

TEST CERTIFICATE No. _____

DATE _____

To M/s _____ We certified that the material described below fully conforms

to IS 13502:2023 Chemical composition and Physical properties of the product, as tested in accordance with the Scheme of Inspection and Testing contained in the BIS Certification Marks Licence No. CM/L _____ are as indicated below against each order No.

(PLEASE REFER TO IS 13502:2023 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	(Nom Size)	Control Unit No.	Designation	Number	Qty in tonnes	CHEMICAL COMPOSITION					PHYSICAL PROPERTIES		Remarks
						S %	P %	Si %	Mn %	Ni+Cr+Ti+V+Mo %	Size	Mass	

REMARKS

WAGON NO.

TRUCK NO.

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

FOR XYZ IRON COMPANY

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