



**PRODUCT MANUAL FOR
AUSTENITIC-MANGANESE STEEL CASTINGS
ACCORDING TO IS 276: 2000**

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 276: 2000
	Title	:	AUSTENITIC-MANGANESE STEEL CASTINGS
	No. of Amendments	:	Nil
2.	Sampling Guidelines:		
a)	Raw material	:	No specific requirement
b)	Grouping guidelines	:	Samples of any castings of any pattern of each grade applied for is to be drawn and tested for considering GOL/CSoL. BO shall ensure that all the grades covered in the license are drawn for independent testing on rotation over a period of time to the extent possible
c)	Sample Size	:	3 Test bars + 50 gms (for Gravimetric/Volumetric)/ 5 pcs. of 5 cm x 5 cm(Instrumental)
3.	List of Test Equipment	:	Please refer ANNEX –A
4.	Scheme of Inspection and Testing	:	Please refer ANNEX –B
5.	Possible tests in a day	:	All Tests if facilities for instrumental method is available
6.	Scope of the Licence	:	
	“Licence is granted to use Standard Mark as per IS 276:2000 with the following scope:		
	Name of the product	AUSTENITIC-MANGANESE STEEL CASTINGS	
	Grades	1 to 7	
	Any other aspect required as per the Standard	Drawing/Pattern	

ANNEX A
List of Test Equipment

Major test equipment required to test as per the Indian Standard:

SI No.	Test Equipment/Chemicals and Identification Numbers (Where applicable)	Tests Used in with Clause Reference
1	Digimatic/ Vernier Caliper, Steel Tape, Steel Scale	Workmanship & Finish (9)
2	Digimatic/ Vernier Caliper , UTM(400 kN, LC1N or better)	Mechanical Properties (14.1)
3	Brinell Hardness Testing Machine(3000 Kg/10 mm)	Brinell Hardness Test(14.2)
4	Apparatus for Bend test	Bend Test(14.3)
5	Ultrasonic Apparatus, Probe, Couplants, etc. Equipment For Magnetic Particle Flaw Detection and Inspection Mediums , etc. Equipment for Radiographic Tests	Non Destructive Test(15) (optional) Ultrasonic examination Magnetic Particle examination Radiographic examination
6	Strohlein Apparatus with Accessories Complete range of glass wares, 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 Reagents for C: tin granules or pure iron fillings, acidulated water/brine water, methyl red, Caustic potash	Carbon(8)
7	Carbon Sulphur Analyzer with Accessories	
8	Muffle Furnace, Hot Air Oven 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(8)
9	Instrumental method Using Spark-OES/AAS	
10	Instrumental method Using Spark-OES/AAS *Range of testing for Mn as per IS228 (Part 12) is 0.01%-5.0%	Manganese (8)
11	Analytical Balance & other common accessories Weighing balance, Heater/ Heating element along with energy regulator, Ice water bath, Vol Flask Cap – 1 litre, (Whatman) filter paper No. 40, Suction Filtration Facility, Filter paper pulp pad, Standard Reference Material (NML) with certificate Potassium Permanganate (KMnO ₄), Sodium Nitrite (Na ₂ NO ₃), Ammonium Molybdate [(NH ₄) ₂ Mo ₂ O ₇], Ammonium Phosphate [(NH ₄) ₃ PO ₄], Potassium Nitrate (K ₂ NO ₃), Phenolphthalein Solution, Rectified spirit or methyl alcohol, Sodium Hydroxide (NaOH), Hydrofluoric Acid (HF), Perchloric Acid (HClO ₄), Sulphurous Acid, Hydrobromic Acid (HBr) , other chemicals and reagent as applicable	Phosphorus (8)
12	Instrumental method Using Spark-OES	

13	Carbon Sulphur Analyzer with Accessories Ceramic boats/crucibles – desiccators, Fluxes -Low sulphur copper, tin or iron, Dilute hydrochloric acid, Starch Iodide solution, Potassium iodate	Sulphur(8)
14	Analytical Balance, Hot plate & other common accessories 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 (8)
15	Instrumental method Using Spark-OES/AAS	
16	Instrumental method Using Spark-OES/AAS	Molybdenum (8)
17	Analytical Balance, Hot Air Oven & other common accessories 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(8)
18	Instrumental method Using Spark-OES/AAS	

The above list is indicative only and may not be treated as exhaustive.

ANNEX B

Scheme of Inspection and Testing

1. 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 equipments.

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

3. LABELLING AND 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 of Inspection &Testing, control unit is defined as group of castings of one grade of material, cast from the same melt and heat-treated together under identical conditions.

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 8800. Manufacturing of castings shall conform to cl 6 & 12 of IS 276:2000.

6. TEST CERTIFICATE – For each consignment of BIS Certified material conforming to IS 276:2000 there shall be a test certificate which shall contain the Standard Mark, the cast/Control Unit 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

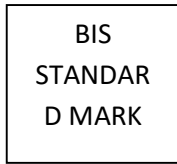
TABLE 1

AUSTENITIC MANGANESE STEEL CASTINGS
TABLE 1 LEVELS OF CONTROL
(Para 5 of the Scheme of Inspection and Testing)

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	No. of Sample	Levels of Control	
Cl	Requirement	Test Method				Frequency	Remarks
		Clause	Reference				
8	Ladle analysis	8.1 8.2 Table-1	Relevant parts of IS 228	R	One ladle Samples	Every melt	
	Product analysis	8.3 8.4 Table-1	IS 276: 2000 IS 6601	R	One Sample	Each melt	If specified in inquiry/order
9	Workmanship and finish	9.1 & 9.2	IS 276 :2000	R	Each casting	Each casting	-
10	Freedom from defects	10.1 & 10.3	-do-	R	-do-	-do-	-
11	Fettling and Dressing	11	Visual	R	-do-	-do-	-
14	Mechanical Tests						
	Brinell Hardness Test	14.1 14.2	IS 276 :2000 IS 1500 Pt.1	R	One Sample	Each control unit	
	Bend Test	14.1 14.3	IS 276 :2000	R	-do-	-do-	
	Tensile test (Optional)	14.1 14.4	IS 1608 Pt.1	S	-do-	-do-	If specified by the purchaser
15.	Non-destructive test	15	IS 276 :2000 IS 7666 IS 3703 IS 3658 IS 2595	S	As agreed to between the purchaser and the manufacturer		
16.	Repair of castings	16	IS 276: 2000	R	Each repaired castings		

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled 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 AUSTENITIC MANGANESE STEEL CASTINGS

TEST CERTIFICATE No. _____

DATE _____

To M/s _____ We certified that the material described below fully conforms to IS 276:2000 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 276:2000 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	(Nom Size)	Control Unit No.	Grade	Tolerances@	Qty in tonnes	Chemical composition	Mechanical Properties			NDT#		Pattern/ Drawing No. @	Remarks
							Tensile Test#	hardness	Bend test	Acceptance Level	Instrument Used		

If required by purchaser

@ as agreed between

REMARKS

WAGON NO.

TRUCK NO.

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

FOR XYZ STEEL COMPANY