



CORPORATE PURCHASE SPECIFICATION

AA 195 09

Rev. No. 02

PREFACE SHEET

CARBON STEEL CASTINGS

FOR INTERNAL USE ONLY
REMOVE THIS PREFACE BEFORE ISSUE TO SUPPLIERS

Comparable Standards:

- 1. INDIAN : IS: 1030-1998
Gr: 200-400 W

Suggested/Probable Suppliers and Grades:

Use plant's vendor list.

User Plant References:

- 1. BHOPAL : BP 19 599

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Revisions : Cl: 30.8.28 of MOM of MRC-FCF+HTM			APPROVED : INTERPLANT MATERIAL RATIONALISATION COMMITTEE-MRC (FCF+HTM)		
Rev. No. 02	Amd.No.	Reaffirmed	Prepared BHOPAL	Issued Corp. R&D	Dt. of 1st Issue October, 2001
Dt: 01.10.2005	Dt :	Year :			



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CARBON STEEL CASTINGS

1.0 GENERAL:

This specification governs the quality of carbon steel castings.

2.0 APPLICATION:

For general engineering purposes, weldable quality.

3.0 CONDITION OF DELIVERY:

Castings shall be supplied in suitably heat-treated condition.

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

The material shall comply with the requirements of the following national standard and also meet the requirements of this specification

IS: 1030 - 1998 | Carbon Steel Castings For General
Gr: 200-400 W | Engineering Purposes.

5.0 DIMENSIONS AND TOLERANCES:

Castings shall be true to drawings.
Holes upto and including 50 mm in diameter are to be cast solid unless otherwise stated in BHEL order/drawing.
Untoleranced dimensions should be as per IS : 4897.

6.0 MANUFACTURE:

The steel for the manufacture of castings shall be made from electric arc or electric induction process.

7.0 HEAT TREATMENT:

Heat treatment shall be carried out at suitable temperature to give the properties specified.
Any flame or arc cutting which may have to be done, shall be carried out before heat treatment.
Test pieces shall also be heat treated along with the castings they represent.
The method of heat treatment and the relevant records of heat treatment shall be furnished to BHEL.

Revisions :			APPROVED :		
Cl. 30.8.28 of MOM of MRC-FCF+HTM			INTERPLANT MATERIAL RATIONALISATION COMMITTEE-MRC (FCF+HTM)		
Rev. No. 02	Amd.No.	Reaffirmed	Prepared	Issued	Dt. of 1st Issue
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8.0 FINISH:

All castings shall be properly fettled and dressed and all surfaces shall be thoroughly cleaned

9.0 FREEDOM FROM DEFECTS:

The castings shall be free from defects such as blowholes, sand inclusions, shrinkage, cavities, hard spots, cold shuts, cracks etc. which may adversely affect machining and utility of castings.

When it is necessary to remove risers by flame cutting, care shall be taken to make the cut at a sufficient distance from the body of the casting so as to prevent any defect being introduced into the casting due to local heating.

10.0 CHEMICAL COMPOSITION:

The melt analysis and the permissible variation in the composition of the material from the melt analysis when analysed in accordance with IS : 228, shall be as follows:

Element	Melt analysis % max.	Product analysis, % Permissible variation
Carbon	0.25	+ 0.02
Silicon	0.60	+ 0.03
Manganese	1.00	+ 0.05
Sulphur	0.035	+ 0.005
Phosphorus	0.040	+ 0.005

11.0 TEST SAMPLES:

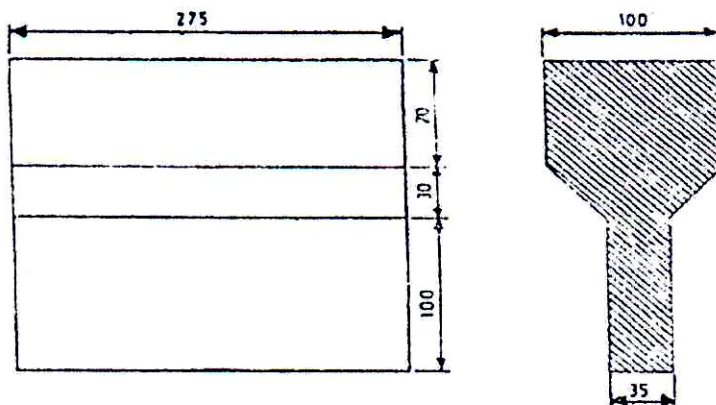
The test pieces shall be cast integrally when required as per drawing/order. When cast separately, the test pieces shall be supplied in the following sizes:

- 1) Tensile test pieces - 30 mm X 25 mm X 300 mm
- 2) Bend Test pieces - 25 mm X 20 mm X 300 mm
or 25 mm dia X 300 mm length

Test pieces shall be heat treated along with the castings they represent.



DETAILS OF KEEL BLOCK



ALL DIMENSIONS IN mm

12.0 MECHANICAL PROPERTIES:

12.1 When tested to IS: 1608, test pieces shall show the following properties:

Tensile strength : 400 N/mm², minimum.

Yield stress : 200 N/mm², minimum.

Percentage Elongation : 25, minimum.
on 5.65 So gauge length.

12.2 Bend Test:

When tested to IS: 1599, test pieces shall be capable of being bent cold without fracture through 90° around a former of radius 25 mm.


13.0 NON-DESTRUCTIVE TESTS:

The following tests shall be conducted:

- i) Ultrasonic examination as per BHEL standard AA 085 01 04.
- ii) Liquid penetrant examination as per BHEL standard AA 085 01 31
- iii) Magnetic particle examination as per BHEL standard AA 085 01 33.

Norms and acceptance shall be as specified in the order / drawing.



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<p>14.0 REPAIR OF CASTINGS:</p> <p>Repair of castings shall not be carried out without the prior permission of BHEL.</p> <p>15.0 SCOPE OF THIRD PARTY INSPECTION:</p> <p>Wherever, separate quality plan is not attached, the scope of third party inspection shall be as follows:</p> <ol style="list-style-type: none">1. Review of supplier's declared chemical composition.2. Selection of test samples for mechanical tests and witness of mechanical tests.3. Witness of Non-destructive tests as applicable.4. Review of HT charts.5. Dimensional inspection. <p>16.0 TEST CERTIFICATE:</p> <p>Three copies of test certificate shall be supplied unless otherwise specified in the order in the test certificate proforma annexed to this specification, (Annexure - I).</p> <p>In addition, the supplier shall ensure to enclose one copy of the test certificate along with their dispatch documents to facilitate quick clearance of the material.</p> <p>17.0 PACKING AND MARKING:</p> <p>Castings shall be suitably packed to prevent corrosion and damage during transit.</p> <p>Machined surfaces shall be properly protected with anticorrosive compounds.</p> <p>Each package of casting (when supplied separately) shall be legibly marked with the following information :</p> <p>AA 195 09. BHEL Order No. Supplier 's Name . Consignment / Identification No. Cast No. Weight.</p> <p>18.0 REFERRED STANDARDS (Latest Publications Including Amendments):</p> <table border="0"><tr><td>1. BHEL AA 085 01 04</td><td>2. BHEL AA 085 01 31</td><td>3. BHEL AA 085 01 33</td></tr><tr><td>5. IS:228</td><td>6. IS:1030</td><td>7. IS:1599</td></tr><tr><td>8. IS :1608</td><td>9. IS.4897</td><td></td></tr></table>			1. BHEL AA 085 01 04	2. BHEL AA 085 01 31	3. BHEL AA 085 01 33	5. IS:228	6. IS:1030	7. IS:1599	8. IS :1608	9. IS.4897	
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ANNEXURE-I: RECOMMENDED TEST CERTIFICATE FORMAT FOR CASTINGS

SUPPLIERS'S NAME AND ADDRESS												
1. Customer :						6. Cast No. & Date :						
2. TC No. & Date :						7. Batch No. :						
3. PO No. :						8. Heat Code :						
4. Process of Melting :						9. Spec.. No. :						
5. Deoxidisation Process						10. Test Bar Size						
II. CASTING COVERED BY T.C.												
Sl. No.	Drawing No. & Item No.					Description	Quantity & Weight					
12. CHEMICAL COMPOSITION (PERCENT)												
Element	C	Si	Mn	S	P							
As per Min.												
Spec. Max..												
Actual Values.												
13. HEAT TREATMENT (To be accompanied by Recorder Chart, wherever called for)												
Condition	Temp.°C				Soaking Time, Hrs..				Cooling Medium			
14. MECHANICAL PROPERTIES												
	T.S. N/mm2	Y.S. 0.5/0.2% Proof N/mm2	% E on GL 5.85 SO	% R.A. Mn	Hardness BHN Mn. 3 Values	Impact Value, Joules	Bend					
As per Min.												
Spec. Max.												
Actual Values.												
15. Surface Finish (When called for in the order/drg)												
16. DIMENSIONAL INSPECTION												
17. NON-DESTRUCTIVE TESTS												
Nature of Test	Acceptance Level	Instrument used	Range	Results	Any other details							
Ultrasonic												
Radiographic												
Dye Penetrant/ Magnetic Particle												
18. OTHER TESTS, IF ANY (MICRO- Scope, Hydraulic, Etc.)												
19. IDENTIFICATION ON CASTING AS PER CPS.												
We hereby certify that the items mentioned above have been tested and inspected in our presence and are found to be in accordance with the drawings, specifications and purchase order.												
Signature & Seal of the Inspecting Officer (Purchase Representative)						Signature and Seal of the Chief of Quality Control Chief Metallurgist of the Supplier.						
Date :						Date :						
INSTRUCTION :												
a) If steel is produced by LD or Oxygen process, Nitrogen content should be furnished and shall not exceed 0.008%												
b) Test Certificates are to be furnished as per Purchase Order and Specifications, in A4 Size transparent paper.												
c) All the entries including signature should be in black ink.												
d) If testing is done by outside agencies, the original TCs shall be furnished.												
e) The actual Test Certificate may run into more than one A4 size paper, if needed, to facilitate filling up of details.												

VENDOR'S NAME & ADDRESS:		CUSTOMER: BHEL, PROJECT:		BHEL P.O. NO.:		OP. NO.:						
PRODUCT:		BHEL SPEC: FP 50817		REV: 00		REV NO: 00						
DATE:		PAGE 1 OF 2		AGENCY		REMARKS						
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*D	P	W	V

RAW MATERIALS & BOUGHT OUT ITEMS												
1		(a) Chemical properties	Major	Chem test	1/heat	IS 2062	IS 2062 Gr E250(Fe410W) QLY "B"	Manufacturer's TC	✓	2		1
1.1	MS plates	(b) Mechanical properties	Major	Mech test	1/heat	IS 2062	IS 2062 Gr E250(Fe410W) QLY "B"	Manufacturer's TC	✓	2		1
		(c) UT examination (plates above 40 mm)	Major	UT	100%	IS 2062, ASTM A435	IS 2062 Gr E250(Fe410W) QLY "B, ASTM A435	Manufacturer's TC	✓	2		1
		(d) Dimension	Major	Measurement	100%	PO	PO	Manufacturer's TC	✓	2		1
1.2	Bars, angles, beams, channels	(e) Chemical properties	Major	Chem test	1/heat	IS 2062	IS 2062 Gr E250(Fe410W) QLY "A"	Manufacturer's TC	✓	2		1
		(f) Mechanical properties	Major	Mech test	1/heat	IS 2062	IS 2062 Gr E250(Fe410W) QLY "A"	Manufacturer's TC	✓	2		1
		(g) Dimension	Major	Measurement	100%	PO	PO	Manufacturer's TC	✓	2		1
INPROCESS INSPECTION												
2.1	Fitting and welding	Welder Qualification	Critical	Test	100%	WE 008, WPS	WPS	PQR		2		1
2.2	NDE Weld joints	DP examination	Critical	Test	100%	AA 0850131	AA 0850129	Inspection report		2		1
2.3	Stress relieving	Heat treatment	Critical	SR	100%	HY 0640763	HY 0640763	Heat cycle	✓	2		1
2.4	NDE Weld joints	(b) Radiography examination	Critical	RT	10% on butt weld, 100% on butt weld pl th above 37.50 mm	ASME Sec III, DIV-1	UW 51/52	Test report	✓			
2.5	Machining	Concentricity & perpendicularity (to be checked on machine)	Major	Measurement	100%	Drawing	Drawing	Dimension report		2		1

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT / CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

Signature

APPROVED BY	APPROVED BY
VENDOR'S SIGNATURE & STAMP	BHEL QA SIGNATURE & STAMP
CUSTOMER'S SIGNATURE & STAMP	

VENDOR'S NAME & ADDRESS:		MANUFACTURING QUALITY PLAN				OP. NO.:					
CUSTOMER: BHEL.		BHEL P.O. NO.:	REV: 00	REV: 00	REV NO: 00	DATE:					
PROJECT:		P.O. DATE:	FP 50617	REV: 00		PAGE 2 OF 2					
PRODUCT:		BHEL SPEC:									
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*D	AGENCY	REMARKS
2.6	NDE Pressure test	Hydraulic pressure test	Major	Test	100%	at 5 kg/sq cm for 30 min	no leakage, no pressure drop	Test report	✓	P 2	1
2.7	Painting (high build coal tar epoxide paint)	Paint thickness	Major	Measurement	at min 10 locations	AA 56101	AA 56101 (total DFT 100 micron)	Inspection report		2	1
2.8	Painting (TRP)	Paint (TRP) on machined area, drill & tap holes	Major	Verification	100%	AA 55153, HY 0490563	HY 0490563 (cat F)	Inspection report		2	1
2.9	Identification	by weld deposits of letter size 30 mm	Major	Verification	100%	Drawing	Drawing	Inspection report		2	1
3	FINAL INSPECTION & TESTING										
3.1	Finished product	(a) Identification	Major	Verification	100%	Drawing	Drawing	Inspection report	✓	2	1
		(a) Dimension	Major	Measurement	100%	Drawing	Drawing	Dimension report	✓	2	1
		(b) Correlation of materials and verification of TC's and final report	Major	Verification	100%	Drawing, FP 50617	Drawing, FP 50618	Final inspection report	✓	2	1
Legend TC - Test certificate PO - purchase order WPS - welding procedure specification UT - ultrasonic test NDE - non destructive examination RT - radiography test SR - stress relieving											

Handwritten signature

PREPARED BY	APPROVED BY
VENDOR'S SIGNATURE & STAMP	BHEL QA SIGNATURE & STAMP
CUSTOMER'S SIGNATURE & STAMP	APPROVED BY