



PLANT PURCHASE SPECIFICATION (CFFP - HARDWARE)

FF 05073 Rev 01

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CAST IRON ITEMS

1. SCOPE

This specification governs the quality of cast iron items of various sizes used for production of steel ingots in Steel Melting Shop.

2. APPLICATION

The material shall be used as tools & tackles for production of steel ingots.

3. COMPLIANCE WITH NATIONAL STANDARDS

This specification in general is based on Indian standard IS: 3005 Part II (1979) Reaffirmed 2005. First revision.

4. CONDITION OF DELIVERY

-The castings shall be produced from high carbon iron solidifying to provide a structure containing large flake graphite within a matrix consisting of free ferrite and coarse lamellar pearlite phase.

-Massive free-carbide phase and grain boundary free-carbide phase shall be absent from the matrix.

-The Cast Iron Items shall be produced in accordance with the details of the drawing referenced and designated on the purchase order.

-The internal mould profile shall be symmetrical.

-The internal surface of moulds shall have a continuous plane-of-taper along each face and along each corner. The internal faces and corners shall be smooth and free from significant porosity and non-metallic inclusions.

-External surfaces shall be free from significant defects and from protrusions/imperfections likely to impair safety conditions during use.

-Where machined, surfaces shall be free from significant porosity and non-metallic inclusions.

-Castings shall be defect free.

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5. CHEMICAL COMPOSITION

The material shall conform to the following chemical composition when it is analyzed in accordance with IS -12308 or its equivalent national or international standard/ or any validated instrumental methods for analysis of cast iron.

ELEMENT	% MIN	%MAX
C	3.60	3.80
Si	1.50	1.80
Mn	0.50	0.70
S	0.04	0.08
P	-	0.05
Cr	-	0.04
Sn	-	0.005
Ni	-	0.20
CEV(Where $CEV = C + Si/4 + P/2$)	4.00	4.30

Where the iron used is produced as direct iron or "first fusion iron" from the blast furnace, the values of C and Si may be amended by agreement.

6. HARDNESS

The hardness of the Cast Iron Items of mass less than 15 tonnes shall not exceed 140 HB and for mass more than 15 tonnes it shall not exceed 130 HB. Hardness measurement standard should be relevant IS/ ASTM Standard/ any validated instrumental method in accordance with national/international standard.

7. FETTLING

Primary fettling of castings involve removal of stubs of riser-feeders and stubs of in-gates. The use of any type of burning/thermal technique to aid such fettling shall not be permitted. The end faces of the mould castings shall be machined normal to the centerline of the casting as per drawing.

Secondary fettling of the casting is accepted in that some fettling of casting defects from the casting may be carried out without significantly impairing the service behaviour and performance of the casting. The use of any type of burning/thermal technique shall not be permitted.

The fettling operation shall:

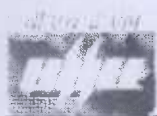
- Maintain the drawing defined section profile.
- Maintain a continuous plane-of-taper along each face and along each corner internally for the length of the mould.
- Localized indentations in the internal mould surface from removal of casting defects are not acceptable.

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8. HEAT TREATMENT

The Cast Iron Items shall be stress relieved by heating to a temperature of 700-750°C and soaking for 10-30 hours depending upon the thickness of the casting and by cooling slowly at the rate of 40 °C /hr in the furnace till the temperature of 250 °C is attained.

Soaking Hours:

Casting Thickness(mm)	Casting Wt(Tonnes)	Min. Soaking Hours
>300 mm	50-100	12
200- 300 mm	25-50	8
150-200	15-25	6
100-150	3-15	4

*For every increase in thickness of 25 mm, Soaking hours to be increased by 1 Hour.

9. INSPECTION :

- CFFP reserves the right to witness/third party inspection for the testing of the material at supplier's works and therefore the supplier shall notify his readiness for inspection of casting in advance.
- Scope of third party inspection: :
 - Witnessing the Chemical analysis, Heat Treatment Cycle, Mechanical Testing, Microstructure analysis for all castings.
 - Visual inspection for castings.
 - Item should be duly stamped by third party inspection agency. Details of stamp should be mentioned in inspection/ test report.
- CFFP may, at its discretion, test the casting after receipt and acceptance of the casting will be based on the CFFP'S test results.

10. IDENTIFICATION

Castings shall be identified with the maker's insignia, the casting type, and serial number. For moulds, the identity shall be cast on each trunnion side of the mould in minimum 100 mm letters readable in the wide-end-up orientation.

11. TEST CERTIFICATES

Certification shall be supplied with each casting showing compliance with the terms of this specification relating to material chemistry, heat treatment cycle, microstructure analysis, hardness and the dimensional condition as per clause-4 and inspection report as per clause- 9.

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REVISION RECORD SHEET

SN	Revision No.	Revision date	Nature of Changes
01.	01	17/01/17	-Chemical composition as per clause 5 changed: S = 0.06% min. changed to 0.04% min. CEV = 4.2% min. changed to 4% min. -Magnetic Particle Testing removed from clause 9 of specification.

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