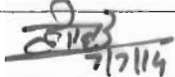
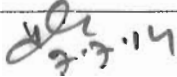
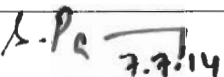



**GOVERNMENT OF INDIA  
(Ministry of Railways)**

**SPECIFICATION FOR  
FERRO SILICON  
(PL. No.90793201)**

Issued by

**MECHANICAL DRAWING OFFICE  
RAIL WHEEL FACTORY  
YELAHANKA, BANGALORE-560 064  
INDIA**

 7.7.14	 7.7.14	 7.7.14	 04.7.14
CME APPROVED	CWE/W REVIEWED	Dy. CME/Mfg. CHECKED	SSE/D PREPARED

## SPECIFICATION FOR FERRO SILICON

### 1.0 SCOPE

This specification covers the requirements of Ferro Silicon used in Steel Melt Shop/Rail Wheel Factory, Yelahanka, Bangalore-560 064.

### 2.0 USAGE OF FERRO SILICON

- 2.1** Ferro Silicon is used as a ladle addition to the liquid steel tapped from the Electric Arc Furnace. Final chemistry with respect to Silicon is achieved suitably for casting of Railway steel wheels.
- 2.2** Non-metallic/slag/sand inclusions in the Ferro Silicon results in the formation of slag and therefore, wheels thus cast will tend to have non-metallic inclusions causing rejection or rework. RWF has no facilities for secondary refining or vacuum degassing or Argon purging in the ladle. Therefore, the Ferro Silicon shall be absolutely free from slag/non-metallic/sand inclusions.
- 2.3** The manufacturer shall cast Ferro Silicon metal in single layer only. Multi-layer cast Ferro Silicon is not permitted. The consignment may consist of a number of melts of the same grade referred at 4.0.

### 3.0 MANUFACTURE AND QUALITY ASSURANCE PLAN (QAP)

#### 3.1 CHARACTERISTICS OF RAW MATERIALS USED

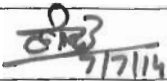
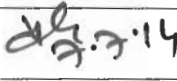
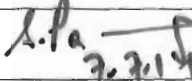
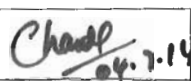
The manufacturer/supplier has to disclose the details of the grade, source, specification and acceptance criteria of all raw materials used for manufacturing ferro silicon to satisfy uses of the material as mentioned above.

#### 3.2 MANUFACTURING FACILITIES REQUIRED

The manufacturer shall have adequate manufacturing facilities such as manufacturing, crushing, sieving and packing.

#### 3.3 TESTING FACILITIES

The manufacturer shall have all facilities to test the properties of Ferrosilicon specified in this specification.

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**3.4 QUALITY ASSURANCE PLAN**

The manufacturer shall submit their QAP that will be followed in the manufacturing of Ferrosilicon to achieve the performance requirement described in clause 2.0. The QAP shall consider the following requirement.

- a) Details on grade, source, specification and acceptance criteria of all raw materials
- b) In-process control parameter norms.
- c) Finished product testing
- d) After sales service

Other details like M&P, technical manpower, testing facilities etc shall be as per the tender document.

**4.0 CHEMICAL COMPOSITION**

**4.1 Chemical Composition as per IS 1110:1995 grades FeSi73 Al05**

Silicon	:70 - 75%
Carbon	:0.15% Max.
Phosphorus	:0.05% Max.
Sulphur	:0.05% Max
Aluminium	:0.50% Max.

**4.2 SAMPLING NORM**

The sampling shall be done as per IS 1472 : 1996 or latest (Method for sampling Ferro Alloys for determination of chemical composition).

**4.3 TEST METHOD**

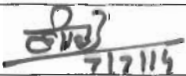
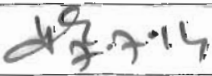
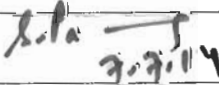

The sample drawn for clauses 4.1, 4.2 shall be tested as per IS 1559 : 1988 (reaffirmed) or latest.

**4.4 No slag/non-metallic/sand inclusion either on the surface or entrapped in the lump is acceptable.**

**5.0 SIZE**

**5.1 The material shall be supplied as crushed and screened particles as per size given below.**

Particle Size range	: 25 - 70 mm.
Size Tolerance	: Oversize and undersize each not to exceed 10% by mass
Dust	: Undersize shall not include dust (< 2mm)

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**6.0 SAMPLING PLAN**

6.1 Sampling Plan for CI 4.2 and 5.0 is as under:

The lots shall be offered in bags of each weighing **20 kg**.

SI No	Lot Size	Samples at random
1	<25 MT	8
2	> 25 < 50 MT	16
3	> 50 < 75 MT	24
4	> 75 < 100 MT	32

**7.0 ACCEPTANCE CRITERIA**

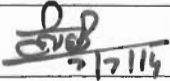
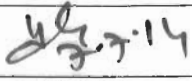
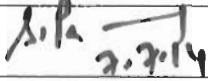
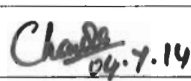
If the material fails to meet the requirement against clauses 4.1, 4.2 & 5.0 in first sampling, then double the numbers of sample shall be taken for ensuring conformity of the material clauses 4.1, 4.4 and 5.0. If any one of this sample fails to meet the clauses 4.1, 4.4 and 5.0 the lot stands rejected.

**8.0 TEST CERTIFICATE**

The supplier shall submit test certificate in support of conformance to this specification pertaining for lot intended to supply to Rail Wheel Factory, Bangalore.

**9.0 PACKING**

The material shall be packed in double walled eco-friendly biodegradable gunny bags weighing 20 kg each. Each bag shall be marked with Supplier's name and grade and date of manufacturing of material.

			
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