

Supply of pure iron forgings

Specification no.	Date	Revision no.	Number of pages
MSS/11	March 1, 2020	0	4

1. Scope

The tender is invited for supply of pure iron cuboid forging. Following is organization of the tender document.

- a. Para 2: Technical requirements
- b. Para 3: Weight tolerances
- c. Para 4: Inspection and qualification requirements – acceptance requirements
- d. Para 5: Provisions of handling and safe storage of the material
- e. Para 6: Compliance statement requirements
- f. Para 7: Deliverables
- g. Para 8: Documentation requirements
- h. Para 9: Measurements by purchaser
- i. Para 10: Approval of dispatch of the material
- j. Annexure A: Compliance Statement

2. Technical requirements

2.1) Chemical composition

The percentage of iron in the forgings shall be more than 99.5 %.

The maximum permissible values for other elements are as given below

% weight Composition	C	Mn	P	S	N	Cu
Max Permissible	0.01	0.12	0.01	0.008	0.006	0.03

2.2) Physical Properties

S.No.	Parameter	Value
a.	Grain Size (ASTM E 112-12)	Grain size number (G) < 6.0
b.	Microstructure	Ferritic
c.	Specific Gravity (nominal)	7.85 g/cm ³
d.	Ultimate Tensile Strength (nominal)	≥240 MPa
e.	Yield Strength (nominal)	≥120 MPa

2.3) Magnetic Properties

Parameter	Value
Saturation Induction B _{sat}	> 2.15 Tesla
Magnetic field Intensity required for 1 T	< 500 A/m
Magnetic field Intensity required for 1.5 T	< 1200 A/m
Magnetic field Intensity required for 2.0 T	< 20000 A/m
μr(max) – as forged	> 3200
Coercive Force	< 100 A/m

2.4) Forging Parameters

Compression ratio	≥ 3
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3) Weight Tolerance

- a) ± 10% in Weight.

4) Inspection and qualification requirements – acceptance requirements

4.1 The supplier must furnish certificate of conformity as per code EN 10204 with correlated heat marking on the forgings.

4.2 Magnetic Testing as per ASTM A596M or equivalent method

For measurement of DC magnetic properties, a sample from the heat lot with dimensions suitable for manufacturing test specimens shall be sent to the purchaser. Details of the sample is given in Para 9. DC magnetic properties will be measured by the purchaser. Compliance to DC magnetic properties as per para 2.3 is an acceptance criterion.

4.3 Ultrasonic testing

The material shall be 100% tested as per EN 10228-3 quality class level 2/equivalent by the supplier. Test report shall be submitted to the purchaser. This test is part of acceptance criteria.

4.4 Chemical Tests

The Supplier shall submit the chemical analysis report of the heat from reputed laboratories for all the elements specified in Para 2.1. Chemical analysis will also be carried out by the purchaser on the sample (refer para 9). Compliance to chemical composition as per para 2.1 is an acceptance criterion.

4.5 Grain size measurements: The Supplier shall submit the grain size measurement report (G number as per para 2.2(a)). Grain size measurements will also be carried out by the purchaser on the sample (refer para 9). Compliance of Grain size with the requirements mentioned in Para 2.2 (a.) is an acceptance criteria.

5) Provisions of handling and safe storage of the material

- a) The supplier shall provide provision for convenient handling of the material. Hooks/tapings/other provisions shall be provided for ease of handling and shifting of the material using crane/fork lift. This shall be mutually agreed between supplier and purchaser.
- b) The forgings shall be surface treated to ensure corrosion-free condition of the supplied forgings. This shall be mutually agreed between supplier and purchaser.

6) Compliance statement requirements

The supplier shall submit duly filled and signed compliance statement as given in annexure A.

7) Deliverables

SN	Height (mm)	Width (mm)	length (mm)	Tolerances	Approximate Total weight	Remarks
1.	800	800	3300	DIN 7527 Sheet 6	16,700 Kg	The length shall be divided into minimum two and maximum three pieces, with each length not less than 1 meter and not more than 2 meters

8) Documentation requirements

- a) Documents to be submitted with the technical bid. These documents will be the basis for technical evaluation.
 - i. Duly filled and signed Annexure A
 - ii. Data sheet/catalogue of the offered material
 - iii. Past purchase orders (for reference only)
 - iv. DC magnetic properties of representative sample from the iron grade.
 - v. Chemical composition of representative sample from the iron grade.
 - vi. Grain-size measurements of representative sample from the iron grade.

- b) Documents to be sent after manufacturing of the pure iron and before dispatch of the material. All stated measurements/tests shall be done on the manufactured material.
- i. Certificate of conformity based on EN 10204 as per para 4.1
 - ii. Ultrasonic test results as per para 4.3.
 - iii. Chemical analysis report as per para 2.1 and para 4.4
 - iv. Dimensional measurement report as per para 7
 - v. Grain-size measurement report as per para 2.2 a
 - vi. Recommended annealing cycle

9) Measurements by purchaser

The supplier shall send non-returnable sample from the corresponding heat to the purchaser. Details of the desired sample are as follows.

a. Form factor	:	Block
b. Length	:	300 mm ± 1 mm
c. Width	:	300 mm ± 1 mm
d. Height	:	20 mm ± 0.1 mm
e. Quantity	:	1 Nos

The supplier can request modifications in the size and form factor of the sample. Same shall be mentioned in point 6 of compliance statement. Purchaser, can except or reject such request. The purchaser reserves the right to negotiate the final form factors of the samples with the supplier.

The cost of sending the above sample shall be borne by the supplier. The sample shall be sent along with the documents mentioned in Para 8 b. Purchaser will carry out following measurements on above sample.

- a. DC magnetic properties (refer para 2.3 and para 4.2).
- b. Chemical analysis (refer para 2.1 and para 4.4)
- c. Grain size measurement (refer para 2.2 (a) and para 4.5)

10) Approval of dispatch of the material

The manufactured material shall be dispatched by the supplier only after written approval from the purchaser. The approval for dispatch will be given on the basis of documents submitted by the supplier (para 8 b) and on the basis of the measurements carried out by the purchaser on samples provided by the supplier (para 9). The acceptance/non-acceptance of the material will be communicated within 15 days of receipt of the concerned documents and sample.

Annexure A

Compliance Statement (to be filled in by the supplier and attached with the technical bid)
(This document shall be produced on letter head of the company)

SN	Parameter/Particulars	Offered by the supplier
1.	Name and address of the Original manufacturer of the soft iron	
2.	Chemical specifications (% weight composition)	
a.	C	
b.	Mn	
c.	P	
d.	S	
e.	N	
f.	Cu	
3.	Magnetic properties	
a.	Saturation Magnetic Flux density (Tesla)	
b.	Magnetic field Intensity required for 1T (A/m)	
c.	Magnetic field Intensity required for 1.5T (A/m)	
d.	Magnetic field Intensity required for 2.0 T (A/m)	
e.	Maximum Relative Permeability	
f.	Coercive Force (A/m)	
4.	100% UT testing as per EN 10228-3 quality class level 2 (Attach reference report or specifications)	
5.	Range of Grain size number G of the offered material (as per ASTM E 112-12)	
6.	It is agreed to send sample to purchaser as per Para 9.	
7.	It is agreed to send documents as per Para 8.	
8.	Deliverables (as per Para 2.4, Para 3 and Para 7) are acceptable.	

We have read and understood the technical requirements of the tender as specified in technical specifications number MSS/11 and agree to and comply with all the technical requirements of the tender even if they are not explicitly mentioned in this document.

Authorized Signatory of the supplier with stamp