

## UNIT-I

### TEST CERTIFICATE

#### TEST CERTIFICATE ACCORDING TO EN10204 TYPE 3.1

Customer Address: M/S- S S B ENGINEERS PVT LTD. PLOT NO C-158 A MATSYA INDUSTRIAL AREA  ALWAR -RAJASTHAN (INDIA) PIN CODE NO.301030	Material Process Route Specification  Heat No. Grade Supply Size Supply Condition Colour Code	Billet Route EAF LRF VD CCM AMLC EMS RM TDC No:-MAT1052D Dated:- 21.10.2021.Rev: 00 MFR No:1516 Date 08.09.2022 Revision No-1 Revision Date-07.11.2022	Test Certificate No. Date Invoice No.  Weight (MT.) Input/Billet Size Reduction Ratio No's of Pcs No's of Bundles Length Size	2024-25/0015978
				09-10-2024 11968  36560 320x250 MM 7.08 1(Spec-6.1 mm) 86 17 NA

### TEST RESULT

#### CHEMICAL ANALYSIS (ASTM E 415 / IS 8811)

Element	C%	Mn%	Si%	S%	P%	Cr%	Ni%	Mo%	V%	Al%	Cu%	Ca%	-	-	-	-	-	Al/N2 Ratio
Spec	Min	0.160	0.700	0.150	0.020	-	0.800	0.800	-	0.020	-	-	-	-	-	-	-	2.00
	Max	0.210	1.100	0.350	0.040	0.020	1.200	1.200	0.100	0.050	0.300	0.0025	-	-	-	-	-	3.00
Achieved		0.185	0.920	0.240	0.025	0.014	1.135	1.030	0.070	0.003	0.028	0.085	0.0009	-	-	-	-	2.92

#### JOMINY JOMINY HARDENABILITY TEST (IS:3848, ASTM A255, SAE J406)

Distance (mm)	15	3	5	7	9	11	13	15	20	25	-	-	-	-	-	-	-	-
Spec	Min	41.5	40	37	35	33	31	34	27	23.5	29	-	-	-	-	-	-	-
(HRC)	Max	47	46.5	45.5	44	43.5	43	41.5	40	36.5	33.5	-	-	-	-	-	-	-
Achieved (HRC)		45.0	44	43.0	42.0	39.5	36.5	34.5	32.5	30.5	29.5	-	-	-	-	-	-	-

### Mechanical Properties

Parameters	Spec	IS:1608/ASTM A370				Impact Strength Charpy U-notch (Joules)	ASTM A255		IS:1500 Surface Hardness As Rolled (BHN)
		Tensile Strength	Yield Strength	Elongation	Reduction Area		D.I. Value		
							(Inch)	(mm)	
	Min	-	-	-	-	-	-	-	245
	Max	-	-	-	-	-	-	-	197/212
Achieved		-	-	-	-	-	-	-	-

### Metallurgical Results

Metallurgical Results															
Parameters		Inclusion Rating (IS : 4163 / ASTM : E45A / JK Chart) WORST FIELD RATING									Grain Size IS 4748 / ASTM E112 (No.)	Depth of Decarburization IS 6396/ASTM E1077		Micro Structure	
		Type	A		B		C		D			DS	Complete		Partial
		Series	Thin	Thick	Thin	Thick	Thin	Thick	Thin	Thick					
Spec.	Min	-	-	-	-	-	-	-	-	-	6 or finer	-	1% of section/0.5 mm max.	Pearlite + ferrite	
	Max	2.0	2.0	1.0	1.0	0.5	0.5	1.5	1.5	-		-	0.42MM		
Achieved		1.5	0.5	0.5	0.0	0.0	0.0	1.0	0.0	-	6.0 to 6.5	-	0.42MM		

### Physical Properties, Non Destructive Test & Other Test

Parameters	Internal Soundness ASTM E381	Step Down Test IS 4075	Surface Inspection IS 13352	Magnetic Particle Inspection ASTM E1444	Ultrasonic Test ASTM A388	Upsetting Test IS 10167
Spec.	C2,R2,S2 MAX.	-	-	100% bars	100% bars	-
Achieved	Better than C2,R1,S1	Satisfactory	Satisfactory	Tested-Ok	100% bars Auto UT Tested-Ok	-

### Gas Analysis Report Test method-Leco

Parameters	Dimensional Tolerance	Spark Test	X-RF	Gas Analysis		
				O <sub>2</sub> (ppm)	N <sub>2</sub> (ppm)	H <sub>2</sub> (ppm)
Spec.	-	100% bars	100% bars	15 MAX.	90-110	2.0 MAX
Achieved	As per IS 3739 Grade 1	Tested-Ok	Tested-Ok	11.00	96.0	0.81

Remarks :  
This material comply with RoHS (Pb, Cd, Hg, Cr6+) and REACH permissible limits. 3TG (Tantalum, Tin, Tungsten and Gold) not added intentionally in the product. Material is free from radioactive contamination.

Prepared By :  
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Approved By:

Pre Dispatch Inspection:

In case of any Test certificate issue, please inform Dinesh Singla at quality04@arorairon.com, Mobile No. +919914538700