



## UNIT-I

## TEST CERTIFICATE

TEST CERTIFICATE ACCORDING TO EN10204 TYPE 3.1

<b>Customer Address:</b> M/S- S.S.B. ENGINEERS PVT.LTD. PLOT NO-C-158 A MATSYA INDUSTRIAL AREA  ALWAR -RAJASTHAN-(INDIA) PIN CODE NO.301030	<b>Material Process Route Specification</b>          Heat No. A32824 ✓ Grade 19CrNi5 ✓ Supply Size 120 MMØ ✓ Supply Condition AS HOT ROLLED ✓ Colour Code WHITE ✓	<b>Billet Route</b> EAF-LRF-VD-CCM-AML-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	<b>Test Certificate No.</b> 2024-25/0023109
			<b>Date</b> 16-12-2024  <b>Invoice No.</b> 15987  <b>Weight (MT.)</b> 20.920 <b>Input/Billet Size</b> 320x250 MM <b>Reduction Ratio</b> 7.08:1(Spec-6:1 min) <b>No's of Pcs</b> 38 <b>No's of Bundles</b> 8 <b>Length Size</b> 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	0.910	0.240	0.026	0.017	1.130	1.040	0.070	0.003	0.023	0.110	0.0009	-	-	-	-	2.50

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

Distance (mm)	1.5	3	5	7	9	11	13	15	20	25								
Spec.	Min	41.5	40	37	35	33	31	34	27	23.5	29							
	Max	47	46.5	45.5	44	43.5	43	41.5	40	36.5	33.5							
Achieved (HRC)		45.5	44	43.5	42.5	38.5	36.5	34.5	32.5	30.0	29.0							

### Mechanical Properties

Parameters		IS:1608/ASTM A370				IS:1757		ASTM A255		IS:1500	
		Tensile Strength	Yield Strength	Elongation	Reduction Area	Impact Strength Charpy U-notch (Joules)		D.I. Value		Surface Hardness As Rolled (BHN)	
								(Inch)	(mm)		
Spec.	Min	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	245	-
Achieved		-	-	-	-	-	-	-	-	201/212	-

### Metallurgical Results

Parameters		Inclusion Rating (IS : 4163 / ASTM : E45A / JK Chart)										Grain Size IS 4748 / ASTM E112 (No.)	Depth of Decarburization		Micro Structure
		WORST FIELD RATING											IS 6396/ASTM E1077		
		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	-		-	0.42 MM		
Achieved		1.5	0.5	0.5	0.0	0.0	0.0	1.0	0.0	-	6.0 to 6.5	-	0.42 MM		

### 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	-

Parameters	Dimensional Tolerance	Spark Test	X-RF	Gas Analysis Report Test method-Leco		
				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	92.0	0.82

#### 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: