ARORA IRON & STEEL ROLLING MILLS (P) LTD.

DHANDARI KHURD, NEAR PHASE-VII, FOCAL POINT, LUDHIANA- 141 010.
Website : www.arorairon.com

IATF 16949:2016 | ISO 14001 : 2015 | ISO 45001 : 2018 | ISO 9001:2015

UNIT-I

TEST CERTIFICATE

TEST CERTIFICATE ACCORDING TO EN10204 TYPE 3.1

Customer Address:	**Material**	Billet Route	**Test Certificate No.**	2024-25/0023413
	Process Route	EAF-LRF-VD-CCM-AMLC-EMS-RM	**Date**	26-12-24
SSB ENGINEER PVT LTD	**Specification**	**DANA Spec. Q.F. 1001 - R2, Dated-12.05.20**	**Invoice No.**	16582
PLOT NO C-158 A MATSYA INDUSTRIAL AREA			**Weight (MT.)**	5430
ALWAR301030	**Heat No.**	**A32994**	**Input/Billet Size**	250X250 MM
	Grade	20MnCr5	**Reduction Ratio**	9.83:1 (Spec.7:1 Min)
	Supply Size	90 MMØ	**No's of Pcs**	20
	Supply Condition	AS HOT ROLLED	**No's of Bundle**	2
	Colour Code	BLUE+YELLOW	**Length Size**	4.0 to 6.0 meter

TEST RESULT

CHEMICAL ANALYSIS (ASTM E 415 / IS 8811)

Element		C%	Mn%	Si%	S%	P%	Cr%	Ni%	Mo%	V%	Al%	Cu%	-	-	B%	Ca%	-	-	Al/N2 Ratio
Spec.	Min	0.150	1.000	0.150	0.015	-	1.000				0.020	-	-	-	-	-	-	-	2.10
	Max	0.200	1.300	0.400	0.030	0.020	1.300	0.300	0.100		0.050	0.300	-	-	0.0005	0.0010	-	-	-
Achieved		0.190	1.195	0.240	0.026	0.020	1.180	0.110	0.035	0.004	0.030	0.130	-	-	0.0004	0.0010	-	-	4.11

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

Distance (mm)		1.5	5	10	15	20	25	30
Spec. (HRC)	Min	41	38	32	29	27	25.5	24.5
	Max	46	44	38.5	35.5	33.5	32	31
Achieved (HRC)		45.5	43.5	36.5	31.0	28.5	27.0	26.0

Mechanical Properties

Parameters		IS:1608/ASTM A370 Test Condition: Q & T				IS:1757	ASTM A255		IS:1500
		Tensile Strength (Mpa)	Yield Strength (Mpa)	Elongation (%)	Reduction Area (%)	Impact Strength Charpy U-notch (Joules)	D.I. Value (Inch)	(mm)	Surface Hardness As Rolled (BHN)
Spec.	Min	1230	930	7	-	25 KCU min(J)	-	-	-
	Max	1570	-	-	-		-	-	260
Achieved		1292	1128	8.9	-	32 J	-	-	179/187

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		-	-	-	-	-	-	-	-	-	5-8			Not Allowed	0.6% of the nominal diameter with maximum of 0.6 mm	Banding OK as per UNI 8449 (A max of GR-4 is acceptable)
	Max		2.0	1.5	2.0	1.0	0.5	0.5	1.0	1.0	-						
Achieved			1.5	0.5	0.5	0.0	0.0	0.0	1.0	0.0	-	6.0	to	7.0	NIL	0.18 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.	S3, C2, R3 MAX-	Free From Streaks	Free from surface defects	Free From Crack	Deffect Echo max 20% of back wall Echo	-
Achieved	Better than S1,C2,R1	ok	Satisfactory	100% Done OK	100% Done OK	-

Parameters	Dimensional Tolerance	Spark Test	X-RF	Gas Analysis Report Test method-Leco		
				O_2 (ppm)	N_2 (ppm)	H_2 (ppm)
Spec.	As per IS 3739 Grade 1	-	-	20 max	60-120	2.5 max
Achieved	As per IS 3739 Grade 1	100% Done OK	100% Done OK	11.00	73.00	0.87

Material confirms to DANA Spec. Q.F. 1001 - R2, Dated-12.05.20
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:	Approved By:	Pre dispatch Inspection:
Vishwakarma Sharma		

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