ARORA IRON & STEEL ROLLING MILLS (P) LTD.

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

ISO 9001:2015

UNIT-I

TEST CERTIFICATE

TEST CERTIFICATE ACCORDING TO EN10204 TYPE 3.1

Customer Address:	**Material**	Billet Route	**Test Certificate No.**	2024-25/0025669
M/S -S.S.B. ENGINEERS PVT.LTD.	**Process Route**	EAF-LRF-VD-CCM-AMLC-EMS-RM	**Date**	26-01-2025
PLOT NO- C-158 A MATSYA INDUSTRIAL AREA	**Specification**	DANA Spec. Q.F. 1001 - R3, Dated-14/06/24	**Invoice No.**	18395
ALWAR -301030			**Weight (MT.)**	33.370
PIN CODE NO.301030	**Heat No.**	A33258	**Input/Billet Size**	250X250 MM
	Grade	16MnCr5	**Reduction Ratio**	22.12:1 (Spec-7:1 min)
	Supply Size	60 MMØ	**No's of Pcs**	247
	Supply Condition	AS HOT ROLLED	**No's of Bundle**	13
	Colour Code	PINK+GREEN	**Length Size**	NA

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	0.130	1.000	0.150	0.015	-	0.800	-	-	-	0.020	-	-	-	-	-	-	-	2.10
	Max	0.180	1.300	0.400	0.030	0.020	1.100	0.300	0.100	-	0.050	0.300	-	-	0.0005	0.0010	-	-	-
Achieved		0.160	1.275	0.250	0.023	0.018	1.080	0.145	0.037	0.004	0.025	0.120	-	-	0.0004	0.0005	-	-	2.87

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

Distance (MM)		1.5	5	10	15	20	25	30										
Spec. (HRC)	Min	39	34.5	29	25	22.5	21	20										
	Max	44	40.5	35.5	31.5	29	27.5	26.5										
Achieved (HRC)		43.0	39.0	33.5	29.0	25.5	23.5	22.5										

Mechanical Properties

Parameters		IS:1608 / ASTM A370 Test Condition: H & 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)	D.I. Value (mm)	Surface Hardness As Rolled (BHN)
Spec.	Min	1030	735	8	-	25 J	-	-	-
	Max	1370	-	-	-		-	-	260
Achieved		1118	937	10.8		32.5 J		-	163/179

Metallurgical Results

Parameters		Inclusion Rating (IS : 4163 / ASTM : E45A / JK Chart) WORST FIELD RATING									Grain Size IS 4748 / ASTM E112	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		(No.)			
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 6.5	NIL	0.25 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	Satisfactory	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	10.00	87.00	1.05

Remarks :

Material conforms to DANA Spec. Q.F. 1001 - R3, Dated-14.06.24
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
MACHINE STRAIGHTENED MATERIAL

Prepared By:	Approved By:	Pre-Dispatch Inspection:
VISHWAKARMA SHARMA		

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

S.S.B. ENGINEERS (P.) LTD. METALLURGIST DATE 29/1/25 ALWAR (RAJ.)