



Vardhmān®



VARDHMAN SPECIAL STEELS LTD.

C-58, FOCAL POINT, PHASE V, LUDHIANA (PB.) INDIA

Ph. No.: 0161-2670707-09

QF MSD 4.12.06

ISO/TS 16949 : 2009

Certificate : 37659-2008

ISO 14001 : 2004

Certificate : 177315-2015

OHSAS 18001 : 2007

Certificate: 177314-2015

TEST CERTIFICATE

IS : 7283



CM/L-9700028216

TEST CERTIFICATE NO. ___2017/10/088

DATE. 6/10/2017

To HAPPY FORGINGS LTD (UNIT-II)

We certify that the material described below fully conforms to IS:7283-1992. Chemical Composition and Mechanical Properties of the product tested in accordance with the Scheme of Testing and Inspection contained in the BIS Certification Marks licence No. CM/L-970002816 are as indicated below against each order No. etc.

(PLEASE REFER TO IS:7283-1992 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	Invoice No.	Grade	Heat No (Cast No)	Finished Section (Nominal Size mm)	Qty	Finish Shape	Cast Section (mm)	Red. Ratio	Supply Cond.	Color Code	Length of Bar	No of Bars				
	SM 17000 1951	1E1286	61904	75mm	16270	RCS	200*200	7.11	Hot Rolled	BLACK BASE / RED LINE	3-6MTR	75				
Manufacturing Route EAF-LRF-VD-CCP With EMS & AMLC																
% CHEMICAL COMPOSITION																
	C	Si	Mn	S	P	Ni	Cr	Mo	Cu	Sn	Al	Ti	Ca	B	V	
Min.	0.28	0.15	0.90	0.050	--	--	0.90	--	--	--	0.080	--	--	--	0.05	
Max.	0.33	0.35	1.20	0.080	0.035	--	1.20	--	--	--	0.130	--	0.0020	--	0.10	
Actual	0.32	0.205	1.13	0.063	0.029	0.05	1.18	0.01	0.12	0.005	0.10	0.0022	0.0005	0.0002	0.07	
	O2	N2	H2	Grain Size			Total Decarb (mm)			D.I. Value		Micro Structure				
	In PPM			(IS:4748/ASTM E112)			(IS:6396)									
Min.	--	--	--	5			--			92 mm		--				
Max.	20	100	2	--			--			122 mm		--				
Actual	12	76	1.2	6.5/7.5			--			99.82 mm		--				
INCLUSION RATING - IS:4163 / ASTM E45A/ ISO 4967, Method A										JIS		DIN		Hardness BHN		
	A		B		C		D								IS 1500:1983	
	Thin	Thick	Thin	Thick	Thin	Thick	Thin	Thick	A	B+C	Total	K3	K4		Min	Max
Max.	3.0	2.0	2.0	1.0	0.5	0.5	1.0	1.0							--	260
Actual	2.0	--	1.0	--	--	--	1.0	--							220	240
JOMINY HARDENABILITY (IN HRC) (IS 3848)																
MM / Inch	J1/16	J14/16	J16/16													
Min.	50	37	--													
Max.	55	--	48													
Actual	51.5	46.5	45.0													
MECHANICAL PROPERTIES (IS 1608)																
	Test Condition		Tensile Strength		Yield Strength		Elongation		Reduction Area		Impact Strength					
Min.	--		--		--		--		--		--					
Max.	--		--		--		--		--		--					
Actual	--		--		--		--		--		--					
Supplementary Requirements																
Standard	Internal Soundness (ASTM E381 / IS11371)				Step Down (IS 4075) / Blue Fracture Test (IS:10138)				Surface Defects (Visual / MFLT)				Bend Test (IS1599:1985)			
Required	C3R3S3 max				As per IS 4075				Depth of defect 0.3 mm max.				--			
Actual	C3R3S3 max				OK As per IS 4075				OK				--			
	Ultrasonic Test				MFLT				Dimension Tolerance				Ovality / Lobbing			
Required	Yes				--				IS:3739				IS:3739			
Actual	100% Bars manual ut done & found OK				--				Asper is 3739 gr 1				A s per IS3739 gr 1			
Mixup Test	100% Bars Checked by Spark, Metascope, Ni Spot test, Mobile Spectro - OK															

The Material Supplied to the Standard rolling Tolerances

Remarks:- Free from radioactive material or banned substances.

Reference Standard IS 7283:1992, Customer Specification Caterpillar Inc.Chg. No.17,DT.19.11.2010

For any Technical Support / Quality related issues please contact -
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K. Singh

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Checked by :
Engineer - R&D

Approved by :
Authorised Signatory

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