



# 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



CML-9700028216

TEST CERTIFICATE NO. 2018/05/509

DATE. 24/05/2018

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. CML-9700028216 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							
	37659-2008	1E1120	65465	100mm	31470	RCS	200*200	4.0	Hot Rolled	Red Base/White Line	3-6MTR	78							
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.	0.19	--	0.80	0.015	--	--	0.45	0.08	--	--	0.020	--	--	--	--				
Max.	0.23	0.18	1.10	0.025	0.020	--	0.70	0.25	--	--	--	--	0.0020	--	--				
Actual	0.205	0.105	1.05	0.022	0.015	0.055	0.655	0.105	0.090	0.005	0.025	0.0014	0.0010	0.0002	0.004				
	O2	N2	H2	Grain Size			Total Decarb (mm)			D.I. Value			Micro Structure						
	In PPM			(IS:4748/ASTM E112)			(IS:6396)												
Min.	--	--	--	5			--			43.2 mm			--						
Max.	--	--	--	--			--			61.0 mm			--						
Actual	13	78	1.2	6.5/7.5			--			45.97 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								--	220		
Actual	2.0	--	0.5	--	--	--	1.0	--								180	200		
JOMINY HARDENABILITY (IN HRC) (IS 3848)																			
MM / Inch	J1/16	J3/16	J8/16																
Min.	43	35	--																
Max.	48	--	29																
Actual	44.0	39.0	23.5																
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.28.04.2010																			
For any Technical Support / Quality related issues please contact - Mr. Dinesh Singh (Chief Manager - R&D) Mobile no. : 081466-25586 , email : met5.vss@vardhman.com																			
For any Test Certificate related issues please contact - Mr. K.K.Shukla (Officer - R&D) Mobile no. : 075080-02659 , email : met2.vss@vardhman.com Website : www.vardhmansteel.com																			
Checked by : Engineer - R&D										Approved by : Authorised Signatory									
For VARDHMAN SPECIAL STEELS LTD.																			