



®

Vardhman

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

TEST CERTIFICATE NO. 2017/12/454

DATE. 21/12/2017

To Shivam Autotech Ltd.

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-970002816 are as indicated below against each order No. etc.

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

TEST RESULTS

IS : 7283

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.	Code	Length of Bar	No of Bars
		SAE8620	62960	45 mm		Round	200*200	25.1	Hot Rolled	Blue Base/Black Line	4-6Mtr.	

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.	0.18	0.15	0.70	--	--	0.40	0.40	0.15	--	--	0.015	--	--	--	--
Max.	0.23	0.35	0.90	0.040	0.035	0.70	0.60	0.25	0.30	--	0.050	--	--	--	--
Actual	0.205	0.215	0.750	0.019	0.014	0.41	0.52	0.155	0.095	0.005	0.026	0.0021	0.0016	0.0003	0.003
	O2 ✓	N2 ✓	H2 ✓	Grain Size ✓			Total Decarb (mm) ✓			D.I. Value ✓			Micro Structure		
	In PPM			(IS:4748/ASTM E112)			(IS:6396)			Inch.					
Min.	--	60	--	6			--			--			Uniform distribution of Pearlite & Ferrite		
Max.	15	90	2	8			1% of section			--					
Actual	9	79	1.3	6.5/7.5			0.16 mm			--			Pearlite + Ferrite & bainite structure		

INCLUSION RATING - IS:4163 / ASTM E45A / ISO 4967, Method A

	A		B		C		D		JIS			DIN		Hardness BHN	
	Thin	Thick	Thin	Thick	Thin	Thick	Thin	Thick	A	B+C	Total	K3	K4	Min	Max
Max.	2.0	1.5	2.0	1.5	2.0	1.5	2.0	1.5						--	--
Actual	2.0	--	0.5	--	--	--	1.5	--						175	195

JOMINY HARDENABILITY (IN HRC) (IS 3848)

MM / Inch	J3/16														
Min.	36 ✓														
Max.	40 ✓														
Actual	37.5 ✓														

MECHANICAL PROPERTIES (IS 1608)

	Test Condition	Tensile Strength	Yield Strength	Elongation	Reduction Area	Impact Strength
Min.	H & T	650 Mpa	350 Mpa	8%	--	--
Max.		880 Mpa	550 Mpa	25%	--	--
Actual	H & T	824 Mpa ✓	508 Mpa ✓	17.5% ✓	--	--

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	C2R2S2 max	As per IS4075	Surface Defect as per IS13352:1992	--
Actual	C2R2S2 max	OK As per IS4075	MPI 100% bars done -OK	--
	Ultrasonic Test	MFLT	Dimension Tolerance	Ovality / Lobbing
Required	--	--	IS:3739	--
Actual	--	--	As 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

Banding 60 Micron Max.

Reference Standard IS 7283:1992, Customer Specification MAC-TS-044, Rev.00, DT.02.11.2016

For any Technical Support / Quality related issues please contact -

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For any Test Certificate related issues please contact -

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Checked by:
Engineer - R&DApproved by:
Authorised Signatory

For VARDHMAN SPECIAL STEELS LTD.