JSW STEEL LIMITED - SALEM WORKS

QR / QA / 54

Works: pottaneri Village, Mecheri Post - 636 453, salem, india

Registered Office: "JSW CENTRE", Bandra Kurla Complex, Bandra (East), Mumbai - 400 051

TEST CERTIFICATE

Certificate No. : 232203	**Date : 09.02.2018**	**Po Number:4500012833**
Customer Name: MM FORGINGS LIMITED	**SO No : 400778614**	**Po date :06.02.2018**
Cust. Address : BUDAKUDI VILLAGE	**SO Date : 06.02.2018**	**Packing Slip No :705532875**
VIRALIMALAI,Tamil Nadu-621316,India	**Truck No.: TN34B2579**	**Invoice No :7100586072**

Heat No	Grade	Size (mm)	Length (mm)	M\L (mm)	No. of Bundles	No. of PCS	Weight	Billet/Bloom Size
A5355	42CRMO4	75.0 mm RCS	6,000.00 mm	0 mm	5	35	8.820 MT	280MM_370MM

TDC NO : MSA_003L,0_1,31.08.2011,14.01.2015

Process Route : BF_EOF_LRF_VD_CCM_EMS_BM

Reduction Ratio : 7.00 / - 18.65 : 1

CHEMICAL ANALYSIS Prod STD No : QDQA06_80

Element	C%	Si%	Mn%	P%	S%	Cr%	Mo%	Ni%	B ppm	V%	Cu%	Pb%	Sn%	Ti%	Nb%	Zr%	As%	Sb%	Al%	Ca ppm	CE%
MIN	0.3800	0.150	0.600		0.020	0.900	0.150												0.0200		
MAX	0.4500	0.400	0.900	0.025	0.0350	1.200	0.300	0.200		0.030	0.300		0.030	0.0200	0.010		0.010	0.010	0.0450		
Actual	0.408	0.250	0.740	0.009	0.023	1.090	0.202	0.024	2	0.002	0.024	0.001	0.001	0.0033	0.002	0.002	0.001	0.002	0.023	5	0.793

Gas Levels : N ppm : [/ 100] -58 O ppm : [/ 20] -11.8 H ppm : [/ 2.00] -1.82

MECHANICAL PROPERTIES :

	Tensile Test (ASTM A370 - 16)				Hardness Test			Impact Test ( )												
Cond.	Quenched & Tempered				Quenched & Tempered			Spec.												
Spec.	YS	UTS	Elong.	RA	As Rolled	As Quenched		As Q&T	Test Temp	Imp. Value (min)	1		2		3		Avg.			
	MPa	MPa	%	%		BHN		BHN												
Min	705.00	900.00	12.00	48.00		450		264												
Max		1,095.00						327												
Actual	780.640	1035.240	21.500	54.600		480.0		302.0												

Edge / Corner Radius (mm) : Upset Type : Upsetability:

JOMINY HARDENABILITY ( ) Ideal Diameter (DI) : [/] -

Distance	J1.5	J9	J20	J25																
MIN (HRC)	54.0	52.0	47.0																	
MAX (HRC)	99.9	60.0	99.9	49.0																
Actual(HRC)	59.00	57.70	53.20	49.00																

METALLURGICAL PROPERTIES & PHYSICAL INSPECTION

	Surface Inspection	Step Down Test	BFT Test	MPI Test	Segregation Test	Spark Test	Spectra Test	Metascope Test
Actual	OK			100 % OK		100 % OK	100 % OK	100% OK.
	Macro Etch Test	Micro Structure	CN	CZ Looser	CZ Closer	GBC Level	DEG. SPH	Distortion
Spec	C2R2S2	F_P	/	/	/			
Actual	C2R2S2	Ferrite - Pearlite						

	Grain Size	Decarb (mm)	Banding (µm)	A		B		C		D		DOS µm	Ultrasonic Test
				Thin	Thick	Thin	Thick	Thin	Thick	Thin	Thick		
Spec	5.0 / 8.0	/	/	2.0	1.0	2.0	1.0	0.5	0.5	1.0	1.0		3mm FBH
Actual	7.00	0.300 mm		2.00	1.00	0.50	0.00	0.00	0.00	0.50	0.00		100% Pass

Inclusion Rating Test Standard: ASTM E45 - 13, A | Grain Size Standard: ASTM E112 - 13 | Decarb Standard: SAE J419_198312

Macro Etch Test Standard: ASTM E381 - 17 | Banding Test Standard: | UT Standard:

JSW COLOR CODE : YELLOW | CUSTOMER COLOR CODE :

INSPECTION CERTIFICATE 3.1 ACCORDING TO EN 10204 : 2004

Supply Condition : AS ROLLED

Remarks :

Reference : WE HERE BY CERTIFY THAT THE MATERIAL SHIPPED UNDER THIS TEST CERTIFICATE DID NOT COME IN DIRECT CONTACT WITH ANY MERCURY, CADMIUM HEXAVALENT CHROMIUM CONTAINING DEVICES, FREE FROM RADIOACTIVE CONTAMINATION EMPLOYING A SINGLE BOUNDARY OF CONTAINMENT DURING THE MANUFACTURING PROCESS,TESTS, INSPECTION AND STORAGE.

WE CERTIFY THAT CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND MEET THE REQUIREMENTS OF THE PURCHASE ORDER,TECHNICAL DELIVERY CONDITION, GENERAL STEEL REQUIREMENTS ANDTHE MATERIAL CERTIFICATION REQUIREMENTS	NOTE: 1. THE RESULTS RELATES ONLY TO THE ITEM TESTED. 2. CERTIFICATE SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN APPROVAL OF ISSUING AUTHORITY.	For JSW STEEL LIMITED S. M. KUMAR - AVP (PC & QAD)