

## 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. : 246305

Customer Name: RAMAKRISHNA FORGINGS LIMITED

Cust. Address : PLOT NO. M-15, 16 &amp; NS-26,

JAMSHEDPUR, Jharkhand-832109, India

Date : 26.04.2018

SO No : 400809775

SO Date : 04.04.2018

Truck No.: NL01AB1612

Po Number: EMAIL

Po date : 04.04.2018

Packing Slip No : 705850428

Invoice No : 7100822793

Heat No	Grade	Size (mm)	Length (mm)	ML (mm)	No. of Bundles	No. of PCS	Weight	Billet/Bloom Size
E75021	EN353	125.00 mm DIA	6,000.00 mm	0 mm	4	14	8.149 MT	340MM 400MM

TDC NO : RF\_14\_D\_4\_01\_EN353\_VEC,3\_0,29.01.2018

Process Route : BF\_EOF\_LRF\_VD\_CCM\_EMS\_BM

Reduction Ratio : 8.00 / - 11.09 : 1

## CHEMICAL ANALYSIS

Prod STD No : QDQA06\_929

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	0.1400		0.500			0.750	0.080	1.000											0.0200		
MAX	0.2000	0.350	1.000	0.050	0.0500	1.250	0.150	1.500		0.030	0.250			0.0060	0.150				0.0600	20	
Actual	0.160	0.180	0.850	0.010	0.021	0.990	0.125	1.060	2	0.004	0.011	0.001	0.002	0.0034	0.002	0.001	0.003	0.001	0.030	5	0.597

Gas Levels : N ppm : [ / 80 ] -80

O ppm : [ / 20 ] -12.0

H ppm : [ / 2.00 ] -1.13

## MECHANICAL PROPERTIES :

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	Tensile Test ( )				Hardness Test			Impact Test ( )								
Cond.								Spec.								
Spec.	YS	UTS	Elong.	RA	As Rolled	As Quenched	As Q&T	Test Temp	Imp. Value (min)	1		2		3		Avg.
			%	%												
Min																
Max																
Actual																

Edge / Corner Radius (mm) :

Upset Type :

Upsetability:

## JOMINY HARDENABILITY ( SAE J406 200903 )

Ideal Diameter (DI) : [ / ] -

Distance	J5	J11																			
MIN (HRC)	37.0	33.0																			
MAX (HRC)	44.0	37.0																			
Actual(HRC)	42.50	33.50																			

## METALLURGICAL PROPERTIES &amp; PHYSICAL INSPECTION

	Surface Inspection		Step Down Test		BFT Test		MPI Test		Segregation Test		Spark Test		Spectra Test		Metascope Test	
Actual	OK		Pass				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	/ 0.40	/	2.0	1.0	2.0	0.0	2.0	0.0	2.0	1.0		20% / 80% Back Wall Echo			
Actual	7.00	0.350 mm		2.00	0.50	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:

Macro Etch Test Standard: ASTM E381 - 17

Banding Test Standard:

UT Standard: ASTM A388/A388M - 16

JSW COLOR CODE :

CUSTOMER COLOR CODE :

## INSPECTION CERTIFICATE 3.1 ACCORDING TO EN 10204 : 2004

Supply Condition : AS ROLLED

Remarks :

**Reference** : WE HEREBY 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 AND THE 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 &amp; QAD)

M-5897 GIGI