

**JSW STEEL LIMITED – SALEM WORKS**

QR/QA/54

Works: pottāneri Village, Mecheri Post- 636 453, salem, India
Registered, Office: "JSW CENTRE", Bandra Kuria Complex, Bandra (East), Mumbai – 400 051**TEST CERTIFICATE**

Certificate No. : 118933					Date : 29.06.2016		Packing Slip No : 702854124	
Customer Name : JSW Steel Ltd.-Depot – Ludhiana					SO No. : 400660934		Ex. Invoice No. : 1520071412	
Cust. Address : c/o Shiva Steel Industries					SO Date : 01.07.2017			
Ludhiana, Punjab-141020, India					Truck No. : TN52H5198			
Heat No.	Grade	Size (mm)	Length (mm)	M\L (mm)	No. of Bundles	No. of PCS	Weight	Prod. STD No.
96315	EN353	140.00 mm DIA	6,240.00 mm		9	27	21.250 MT	QDQA06_869

Process Route : BF_EOF_LRF_VD_CCM_EMS_BM

Billet/Bloom Size : 340MM_400MM

Reduction Ratio : 1.80 / - 8.84 : 1

CHEMICAL ANALYSIS

Element	C%	Si%	Mn%	P%	S%	Cr%	Mo%	Ni%	B ppm	V%	Cu%	Pb%	Sn%	Ti%	Nb%	Zr%	As%	Sb%	Al%	Ca ppm	CE9
MIN																					
MAX																					
Actual	0.170	0.23	0.910	0.014	0.026	1.120	0.120	1.010	3	0.003	0.013	0.000	0.003	0.002	0.000	0.000	0.000	0.000	0.025	10	

Other Elements :

Gas Levels : N ppm : [/90] -85

O ppm : [/20] -12.1

H ppm : [/2.00] -1.3

MECHANICAL PROPERTIES :

Test. Cond.	As rolled							
Spec	YS	UTS	ELONG	RA	As Rolled	As Quenched	As Quenched	As Q&T
UOM	MPa	MPa	%	%				
MIN								
MAX								
Actual								

Impact Test Temp :	*Energy – T1		**Strenth - T1		*Energy – T2		**Strenth – T2		*Energy – T3		**Strenth – T3	
Impact Test Type : CHARPY	MIN											
Impact Notch type : V	MAX											
Impact Test Cond. : AR	ACTUAL											
*J **Kgm/cm2	Test Temp											

Edge Radius (mm) :

Upset Percentage :

Upsetability :

JOMINY HARDENABILITY

Ideal Diameter (DI) : [/] -

Distance	J7/16"																			
Min (HRC)	34																			
Max (HRC)	38																			
Actual(HRC)	36																			

METALLURGICAL PROPERTIES & PHYSICAL INSPECTION

	Surface Inspection		Step Down Test		BFT Test		MPI Test		Segregation Test		Spark Test		Spectra Test		Ni-Spot Test	
Actual	OK						OK				OK		OK			
	Macro Etch Test			Micro Structure			CN		CZ Looser		CZ Closer		GBC Level		Supply Condition	
Spec	C252R2			F_P			/		/		/				AS ROLLED	
Actual	C252R2			Ferrite-Pearlite												
S	Grain Size	Decarb (mm)	Bending (μm)	A		B		C		D		DOS μm	Ultrasonic Test			
				Thin	Thick	Thin	Thick	Thin	Thick	Thin	Thick					
Spec	5.0 / 8.0	/0.50	/	3.0	2.0	3.0	2.0	3.0	2.0	2.0	1.0	38.1 μm	20% / 80% Back Wall Echo			
Actual	7.00	0.270 mm		1.50	0.00	0.50	0.00	0.00	0.00	0.50	0.00		Pass			

Inclusion Rating Test Standard : ASTM_E45_A

Grain Size Standard : ASTM_E112

Decarb Standard : SAE_J419

Macro Etch Test Standard : ASTM E381

Tensile Test Standard:

Jominy Test Standard:

JSW COLOR CODE : WHITE BASE + ONE BROWN LINE

CUSTOMER COLOR CODE : YELLOW BASE + WHITE DOT

INSPECTION CERTIFICATE 3.1 ACCORDING TO EN 10204 : 2004

Remarks : Spark test is 100% OK, Mobile Spectro Test is 100% OK. Metascope Test is 100% OK

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, FREE FROM RADIOACTIVE CONTAMINATION EMPLOYING A SINGLE BOUNDARY OF CONTAINMENTS 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 REQUIREMENT AND THE MATERIAL CERTIFICATION REQUIREMENTS.

For JSW STEEL LIMITED

B.M HASAN – General Manager