

**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. : 221465				Date : 07.12.2017			Packing Slip No :705259695		
Customer Name: JSW Steel Ltd- Depot - Ludhiana				SO No : 400745295			Invoice No :7100396111		
Cust. Address : c/o Shiva Steel Industries				SO Date : 06.12.2017					
Ludhiana,Punjab-141020,India				Truck No.: TN52K8006					
Heat No	Grade	Size (mm)	Length (mm)	M/L (mm)	No. of Bundles	No. of PCS	Weight	Billet/Bloom Size	
E71773	20MNCR5	75.0 mm RCS	6,000.00 mm	0 mm	9	100	25.910 MT	250MM_250MM	

Process Route : BF_EOF_LRF_VD_CCM_EMS_BM

Reduction Ratio : 6.00 / - 11.25 : 1

CHEMICAL ANALYSIS																		Prod STD No : QDQA06_506			
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	0.1900	0.150	1.300		0.020	1.200													0.0200		
MAX	0.2200	0.350	1.400	0.025	0.0350	1.300	0.100	0.250		0.020	0.350		0.050	0.0100	0.020				0.0500		
Actual	0.202	0.310	1.310	0.011	0.024	1.253	0.006	0.019	3	0.004	0.017	0.001	0.004	0.0051	0.002	0.001	0.001	0.002	0.024	5	0.675

Gas Levels : N ppm : [/ 100] -62 O ppm : [/ 20] -11.7 H ppm : [/ 2.00] -1.07

MECHANICAL PROPERTIES :

	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 (ASTM A255 - 10(2014))																		Ideal Diameter (DI) : [/] -			
Distance	J5	J10	J20	J30																	
MIN (HRC)	42.0	38.0	32.0	29.0																	
MAX (HRC)	46.0	43.0	37.0	34.0																	
Actual(HRC)	44.50	42.50	35.50	32.00																	

METALLURGICAL PROPERTIES & PHYSICAL INSPECTION

	Surface Inspection		Step Down Test		BFT Test		MPI Test		Segregation Test		Spark Test		Spectra Test		Metascope Test	
Actual			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	/	/	3.0	2.0	2.5	1.5	1.0	1.0	1.5	1.0	38.1 µm	20% / 80% Back Wall Echo			
Actual	7.00	0.400 mm		2.50	1.00	1.00	0.00	0.00	0.00	0.50	0.00		100% Pass			

Inclusion Rating Test Standard: IS 4163 : 2004 Grain Size Standard: ASTM E112 - 13 Decarb Standard: SAE J419_198312
Macro Etch Test Standard: ASTM E381 - 17 Banding Test Standard: UT Standard: ASTM A388/A388M - 16

JSW COLOR CODE : CUSTOMER COLOR CODE : WHITE BASE + 1 RED DOT

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)
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