## JSW STEEL LIMITED - SALEM WORKS

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

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

TEST CERTIFICATE

Billet/Bloom Size 280MM 370MM :18.12.2017 :705408771 Po Number: HAPPY FORGINGS 7100496907 14.260 MT Weight Po date Packing Slip No Invoice No No. of PCS : 11.01.2018. : 400751892 Truck No.: TN52L8748 SO Date : 18.12.2017 No. of Bundles SO No Date MIL (mm) 0 mm Length (mm) : BXXIX22541 AND OPP.HINDUSTAN TYRES 6,000,00 mm Customer Name: HAPPY FORGINGS LIMITED UNITH LUDHIANA, Punjab-141120, India 110.0 mm RCS Size (mm) 20MNCR5 Grade Certificate No. : 227320 Cust. Address Heat No A4596

HFL\_TDC\_108,0\_0,28,06,2013,28,06,2013 TDC NO

Element C%		CHEMICAL ANALYSIS														Prod STD	Prod STD No QDQA06 612	A06 61
	%   Si%	Mn%	%d	8%	Cr% Mc	Mo% Ni%		B ppm V%	% C n %	Pb%	Sn%	T1%	%qN	Zr% /	As%	Sb% Al%	% Cappm	n CE%
MIN 0.1700	00 0.150	1.100		0.020	1.000				- 3						1	0,0200	00	
MAX 0.2200	00:300	1.400	0.035 (	0.0350	1.300 0.0	0.060 0.2	0.250	0.010	0 0.250	0.010	0.020				0.010	0.010 0.0400	00	
Actual 0.170	70 0.250	1.230	0.013	0.024	1.250 0.0	0.004 0.0	0.019	0.003	3 0.015	0.001	0.004	0.004 0.0038 0.002		0.001	0.002	0.001 0.020	50 9	0.629
Gas Levels:		N ppm	. [ /80]	44			O ppm	1 / 20 ] -12.	1-12.2				Нрр	H ppm : [ / 2:00]-1:36	2.00]-	1.36		
MECHANICAL PROFERTIES	AL PRO	PERTIE								-								
		Tensile	Test ( )				Hardne	Hardness Test						Impact Test (	Test (	-		
Cond.										Š	Spec							
Spec. YS		UTS	Elong.	RA	As	pel	As Quenched	ched	As Q&T		Test In Temp Vi	Imp. Value (min)	-		2	3	γ.	Avg.
			%	%									1					4
Min										Ţ		-						
Max	i				8					1		Ť	- 35					
Actue:										1			-	-	-			-
Edge / Corner Radius (mm)	er Radiu	s (mm)							()nse	Upset Type				Upse	Unsetability			
JOMINY HARDENABILITY	RDENA	BILITY	15 3848	15 3843 : 1981	_							P	leal Die	Ideal Diameter (DI) : [	]: ((a)	-17	-	-
Distance	J6/16			1			-										-	
MIN (HRC)	35.0			1		-	-	+										_
MAX (HRC)	39.0			1	-	-											ł	1
Actual(HRC) 36.00	36.00						-			*								-
METALLURGICAL PROPE	GICAL	PROPE	RTIES &	PHYSI	RTIES & PHYSICAL INSPECTION	PECT	NO										-	
S	Surface Inspection	spection		Step Down Test	Test	BF	BFT Test	IMP	MPI Test	Segre	Segregation Test	est	Spark Test	Test	Spe	Spectra Test		Metascope Test
Actual	OK			Pass				100	100 % OK				100 % OK	SK.	-	100 % OK	100	100% OK.
4	Macro Etch Test	ch Test	2	Micro Structure	cture		CN	CZ	CZ Looser	CZ	CZ Closer		GBC Level	evel	O	DEG SPH	Dis	Distortion
Spec	C2R2S2	22		H.			1				1	1	1					
Actual	C2R2S2	525	II	Ferrite Pearlite	sarlite			1										
9	Grain	Decarb	Banding	D	A		8			O		0		SOO		5	Ultrasonic	
5)	Size	(mm)	(mrl)	Thir	n Thick		Thin	Thick	Thin	Thick	Thin	1 Thick	ŏ	шп			Test	
Spec 5.0		/ 0.50		2.5	+	-	2.0	0.0	2.0	0'0	2.0			38.1 µm		50% / 80%	20% / 80% Back Wall Echo	cho
Actual 7	7.00 0	0.380 mm		1.50	0.50		0.50	0.00	0.00	000	0.50	00'0	00			100	100% Pass	
Inclusion Rating Test Standard: ASTM E45 - 13, A	ating Ter	st Stand	ard: ASTM E45-	IM E45	-13, A		Grain S	Grain Size Standard: A. Banding Test Standard	Grain Size Standard: ASTM E112 Banding Test Standard:	STIM ET	12 - 13		Dec:	arb Star	ndard.	Decarb Standard, SAE J419_198312 UT Standard, ASTM A388/A388M - 1	Decarb Standard: SAE J419_198312 UT Standard: ASTM A388/A388M - 16	(0
אמסוס דונסו	100		1						-									

INSPECTION CERTIFICATE 3.1 ACCORDING TO EN 10204 : 2004

Supply Condition: AS ROLLED

: Tested in Auto Inspection Line.

: 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. Reference

CORRECT AND ACCURATE AND MEET THE DEQUIREMENTS CONDITION, GENERAL STEEL REQUIREMENTS AND THE ME CERTIFY THAT CONTENTS OF THIS REPORT ARE OF THE PURCHASE ORDER, TECHNICAL DELIVERY MATERIAL CERTIFICATION REQUIREMENTS. INSPECTION AND STORAGE

2. CERTIFICATE SHALL NOT BE REPRODUCED EXCEPT IN FLAL WITHOUT THE WRITTEN APPROVAL OF ISSUING 1 THE RESULTS RELATES ONLY TO THE ITEM TESTED AUTHORITY

NOTE

FOR JSW STEEL I INNITED 1 S. M. KUMAR - AVP (PC & QAD)