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CIN : L27100MH1984PLC034003

# SUNFLAG IRON & STEEL CO. LTD.

Regd. Office : 33, Mount Road, Sadar, Nagpur - 440 001 India

Works : Bhandara Road, Bhandara - 441 905 (Maharashtra)

## TEST CERTIFICATE

**SUNFLAG STEEL**  
F031504

CUSTOMER : RAMKRISHNA FORGINGS LTD		PROCESS ROUTE		TC NO. : 0022550	DATE : 16.05.2018
				INVOICE NO. : 182703080	DATE : 16.05.2018
		MBF-EAF-LRF-VD-CCM-RM		DELIVERY ORDER NO. : 81064853	TRUCK NO. : JH05Z8777

CUSTOMER SPECIFICATION NO.	HEAT No.	GRADE	SECTION IN (mm)	GRADE COLOUR CODE	BLT/BLM SIZE (mm)	SUPPLY CONDITION	LENGTH (Mtrs)	NO. OF PIECES	QTY (MT)
RF/14/D-401/150 R-05	/28.10.2017	10117	SCR420H	RND-56	PURPLE+BLUE	160x160 AS ROLLED	5.200	220	22.500

CHEMICAL COMPOSITION																							+26.535+4.09=53065 m		
	%C	%Mn	%P	%S	%Si	%Cr	%Cu	%Ni	%Mo	%V	%Al	%Pb	%Ti	%B	%Sn	%W	%As	%Ca	%Sb	%Co	%Nb	O2	N2	H2	
SP-MIN	0.17	0.55	-	-	0.15	0.35	-	-	-	-	0.020	-	-	-	-	-	-	-	-	-	-	ppm	ppm	ppm	
-MAX	0.23	0.90	0.030	0.030	0.35	1.05	0.25	0.25	0.06	0.02	0.050	-	0.020	0.0006	0.02	-	0.01	-	0.010	-	0.0100	15	90	2.0	
ACTUAL	0.17	0.86	0.0140	0.0070	0.2200	0.9900	0.0230	0.0160	0.0050	0.0040	0.0220	-	0.0024	0.0002	0.0010	-	0.0048	-	0.0006	-	0.0028	13	65	1.20	

+26.535 + 4.09 = 53.065 mt

MECHANICAL PROPERTIES									JOMINY VALUE (MM HRC)												
	As Rolled / H.T.			IMPACT	HARDNESS	DI	CE														
PS/YS	UTS	%EL	%RA	(IZOD/CHARPY)	(BHN)	VALUE	VALUE	J1.5	J3	J5	J6	J7	J9	J10	J11	J13	J15	J20	J25	J30	
( )	( )			( )																	
SPEC-MIN	-	-	-	-	-	-	-	40.0	37.0	32.0	-	29.0	-	-	21.0	-	-	-	-	-	
-MAX	-	-	-	-	-	240	-	48.0	48.0	37.0	-	34.0	-	-	32.0	-	-	-	-	-	
ACTUAL	-	-	-	-	-	160	-	42.0	40.0	36.0	-	33.0	31.0	-	28.0	26.0	24.0	21.0	18.0	16.0	

METALLURGICAL PROPERTIES																					
INCLUSION RATING (ASTM-E-45 /IS:4163)										GRAIN SIZE (ASTM - E- 112)	SURFACE QUALITY	QUENCH HARDNESS	JISG0555			DECARBURIZATION (MM)			MACRO ETCH RESULTS	REDUCTION RATIO	
	A T	A H	B T	B H	C T	C H	D T	D H			( )	dA	+	dB+dC	=	D	Ful	Partial	Total	ASTM-E-381	
SPEC-MIN	-	-	-	-	-	-	-	-	6	OK	-	-	-	-	-	-	-	-	-	-	6:1
-MAX	2.00	1.00	2.00	0.50	0.50	0.50	2.00	1.00	8	-	-	-	-	-	-	-	-	-	-	C2R2S2	-
ACTUAL	1.00	-	0.50	-	0.00	-	1.50	-	7/7.5	OK	-	-	-	-	0.000	-	0.25	0.25	0.25	C2R1S1	10.40

REMARKS : 100% SPARK/SPECTRAL:OK. STEP DOWN TEST:OK. U.S.T. (100%):OK. M.P.T. (100%):OK.

We certify that the material described above conforms to the specs.

For Sunflag Iron & Steel Co. Ltd.

*(Signature)*  
DSM QMS

*RHK*