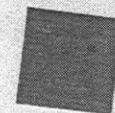


Web Site : www.sunflagsteel.com
E-mail : admin@sunflagsteel.com
Regd. Off. : (0712) 2524661
Works : (07184) 285551
CIN : L27100MH1984PLC034003

SUNFLAG IRON & STEEL CO. LTD.

Regd. Office : 33, Mount Road, Sadar, Nagpur - 440 001 India
Works : Bhandara Road, Bhandara - 441 905 (Maharashtra)

TEST CERTIFICATE



F031504

CUSTOMER : M M FORGINGS LIMITED				PROCESS ROUTE		TC NO. : 0011657		DATE : 26.01.2018			
						INVOICE NO. : 172717718		DATE : 26.01.2018			
				MBF-EAF-LRF-VD-CCM-RM		DELIVERY ORDER NO.: 81051951		TRUCK NO. : TN52H3103			
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			07878	SCR420H	RND-75	PURPLE+BLUE	210x232	AS ROLLED	5.500		7.990
TDC No. MSA044A REV No.3 DATE 10.10.2017											

CHEMICAL COMPOSITION

	%C	%Mn	%P	%S	%Si	%Cr	%Cu	%Ni	%Mo	%V	%Al	%Pb	%Ti	%B	%Sn	%W	%As	%Ca	%Sb	%Co	%Nb	O2	N2	H2
																						ppm	ppm	ppm
SP-MIN	0.17	0.55	-	-	0.15	0.85	-	-	-	-	0.020	-	-	-	-	-	-	-	-	-	-	-	-	-
-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	0.18	0.84	0.0090	0.0100	0.2200	0.9700	0.0150	0.1000	0.0350	0.0050	0.0290	-	0.0027	0.0002	0.0011	-	0.0050	-	0.0007	-	0.0020	14	76	1.10

MECHANICAL PROPERTIES

JOMINY VALUE (MM - HRC)

	As Rolled / H.T.	UTS	%EL	%RA	IMPACT (IZOD/CHARPY)	HARDNESS (BHN)	DI VALUE	CE 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	-	-	-	-	-	-	-	-	48.0	48.0	37.0	-	34.0	-	-	32.0	-	-	-	-	-
ACTUAL	-	-	-	-	-	-	-	-	41.0	38.0	34.0	-	30.0	26.0	-	24.0	22.0	20.0	18.0	15.0	14.0

METALLURGICAL PROPERTIES

	INCLUSION RATING (ASTM-E-45 / IS-4163)								GRAIN SIZE (ASTM)	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	- B-112		()	dA	+ dB+ dC	= D	Full	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	-	0.36	0.36	C2R2S1	11.03

REMARKS : 100% SPARK/SPECTRAL:OK.STEP DOWN TEST:OK.U.S.T. (100%):OK.M.P.T. (100%):OK.
MTRL IS FREE FM RADIOACTIVE ELEMENTS
SURFAC COND. SATISFACTORY

We certify that the material described above conforms to the specs.
For Sunflag Iron & Steel Co. Ltd.

[Signature]
DCM Q1513