

**MUKAND SUMI SPECIAL STEEL LIMITED.**  
Hospet Road, Kanakapura Village, Koppal, Karnataka, 583228  
Tel : 91-08539-286603-08 (6 lines)  
**TEST CERTIFICATE**



CUSTOMER : SSB ENGINEERS ,ALWAR			Invoice.No: 9023146779		PROCESS ROUTE			TC NO. K196575 DATE: 16.10.2024		
CUSTOMER SPECIFICATION NO		HEAT NO	GRADE	SECTION ( IN mm )	COLOR CODE	SUPPLY CONDITION	LENGHT ( IN Mtrs. )	OVALITY ( IN mm )	NO.OF PIECES	QUANTITY (MTS)
MET-W-04 Issue No 17 Dt: 01.09.2015		M196575	16MNCR5ALN	60 ROUND	Half (White + Gray)	AS ROLLED	5.00 TO 6.00	AS PER IS 3739	330	40.930

CHEMICAL COMPOSITION																				
	%C	%Si	%Mn	%P	%S	%Ni	%Mo	%Cr	%Cu	%Al	%Sn	%V	N <sub>2</sub> ppm	O <sub>2</sub> ppm	H <sub>2</sub> ppm	%Ti	CaPPM	Bppm	%As	%Sb
REQ	0.140-0.190	0.150-0.400	1.000-1.300	0.035Max	0.035Max	0.250Max		0.800-1.100	0.300Max	0.020Min		0.010Max	80.0-110.0	20.0Max	2.00Max	0.003Max	20.000Max	5.000Max		
ACT	0.1810	0.2850	1.2230	0.0190	0.0200	0.0200	0.0060	1.0350	0.0160	0.0270		0.0040	103.000	8.000	1.590	0.0020	8.0000	1.0000		

MECHANICAL PROPERTIES																	
	TENSILE VALUES				IMPACT  STRENGTH (IZOD/CHARPY)	HARDNESS  (BHN)	JOMINY VALUES (HRC)										DI  VALUE
	YS	UTS	%EL	%RA			J13mm										
REQ						240 BHN MX	24/31										
ACT						164	29.5										

METALLURGICAL PROPERTIES																
	SPARK/ SPECTRAL TEST	STEP DOWN TEST	MACRO ETCH RESULTS(ASTM E-381)	INCLUSION RATING (ASTM - E - 45 ) Method 'A' Plate I(Worst Fields)								GRAIN SIZE (ASTM E-112)	SURFACE DEFECT LEVEL (mm)	CORE HARDNESS (OILQUENCH (HRC)	UPSET TEST RESULTS	TOTAL DEPTH OF DECARBURIZATION IN mm
				A		B		C		D						
				T	H	T	H	T	H	T	H					
REQ	OK	OK	C2R2S2Max	20	20	10	10	10	10	15	15	6 to 8	OK	NA	NA	0.40 mm Max
ACT	OK	OK	<C2/R2/S2	15	05	05	00	00	00	10	05	70	OK	NA	NA	0.38

REMARKS 1 BLOOM SIZE 240X280MM2 REDUCTION RATIO 1:23.76  
2 MPI TEST 100% DONE & FOUND OK  
3 STEP DOWN TEST : OK AS PER JIS G0556-1977.  
4 MICROSTRUCTURE :OK

5 REQ AL/N2 : 2.0/3.0, ACT 2.62.  
6 "MATERIAL IS FREE FROM RADIO ACTIVE ELIMENTS"

*[Handwritten signature and stamp]*

*[Handwritten signature]*

**PREPARED BY**

QF.NO.HS / QA/ 10.01 DG.Rev.01 Dtd : 23.02.2015

**AUTHORISED SIGNATORY**

K.POMESH(Sr.GM-QAD)