


P.O. GAMHARIA, DIST.-SARAIKELA KHARASWAN, JAMSHEDPUR-832105 JHARKHAND. PHONE 0657-3295772/773


Customer/SP					PO No/ Date	4718005410/03.06.2017	
TC No	50000000770	Invoice No	2011001278	Quantity	15.280 MT	Rolling Input	150 X 150 mm
Batch No.	B2221201						
Heat No	B22212	Grade	20MNCR5		Product	ROUND BAR FINISHED	
Spec code	UML-002-BAR	Date	02-02-2016	Issue No: 0	Rev: 0	Condition	AS ROLLED
Prodt Dt	17-JUN-2017	Nom Size	56.00 mm		Colour Code	BLUE	

OTHER ELEMENTS								CARBON EQV	GAS LEVEL		
Elements	%Sn	%As	%Sb	%Nb	%B	%Te	%W		O2 PPM	H2 PPM	N2 PPM
Min.	-	-	-	-	-	-	-	-	-	-	-
Max.	-	-	-	-	-	-	-	-	20	2.0	90
Actual	-	-	-	-	-	-	-	-	15	1.5	73

MECHANICAL PROPERTIES							JOMINY HARDENABILITY (HRC)						
Requirement	Hardness BHN	Impact Strength (IZOD/CHARPY) (Joule)	Yield Strength (Kg/mm2)	UTS (Kg/mm2)	%E	%RA							
Min.	-	-	-	-	-	-	J- 4/16"	-	-	-	-	-	-
Max.	240	-	-	-	-	-	Min.	36.0	-	-	-	-	-
Act.Min.	159	-	-	-	-	-	Max	40.0	-	-	-	-	-
Act.Max.	162	-	-	-	-	-	Act.	38.0	-	-	-	-	-

METALLURGICAL PROPERTIES						INCLUSION RATING AS PER ASTM E-45							
Specific 	Depth of Decarb (mm)	Macro Etch (ASTM E381)	Max. Depth of Surface Defect (mm)	Grain Size (ASTM E112)	Spheroidised (%)	A		B		C		D	
						T	H	T	H	T	H	T	H
Min	-	-	-	5	-	-	-	-	-	-	-	-	-
Max	-	C2R2S2	-	8	-	2.5	1	2.0	0	2.0	0	2.0	0
Actual	-	C2R1S1	-	6-7	-	1.5	0	1	0	0	0	1	0
Micro structure		Ferrite Pearlite											

Spark & Spectral Test/PMI	OK	MPI	100 % OK	Blue Fracture	NA	Hardness after Heat treatment of sample.	
Surface Inspection: (as per Spec.)	100% OK	Step Turn	No Streak	Cold Upset	NA	Requirement	
Ultrasonic Test:(as per Spec.)	100 % Satisfactory					Actual in BHN	

REDUCTION RATIO	9.13:1	PROCESS ROUTE	BF>EAF>LRF>VD>CCP>SBM
Remarks: DIMENSION : +0.60/-0.00 , OVALITY 0.40			
LENGTH OF BAR- 5.00 MTRS. TO 6.00 MTRS.	Test certificate meets TDC Results based on sample testing	 USHA MARTIN LIMITED (USHA ALLOYS & STEELS DIVISION)	
MATERIAL IS FREE FROM RADIOACTIVE ELEMENTS			
Corporate Office: 2 A, Shakespeare Sarani, Kolkata: 700 016. Email ID: uasdaq_hod@ushamartin.co.in			