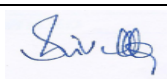
		GERDAU STEEL INDIA PVT LIMITED															
PLANT: TADIPATRI. DIST.: ANANTPUR. A.P.: 515411																	
TEST CERTIFICATE										F/QA-TC/12 Rev. 01							
TC No : 2018/00102246		Invoice No. : ST2018001467				Quantity : 10.337 t		Rolling Input : 160X160 mm									
Customer : GERDAU STEEL INDIA PVT LTD.						S.O. No. / Date : 55534											
PROCESS ROUTE :- BF>>BOF>>LRF>>VD>>CCM(EMS & AMLC)>>RM						Size : 28 Dia		Truck No.: AP02TE 4814									
Heat No:- 37317						Product : Rolled bar		Colour Code:		BASE PURPLE/BLACKDOT							
NO OF BUNDLES: 4 NO OF BARS: 352		Grade :- 16MNCr5															
TAS No. : 2278/2016		TDC No :- MAC-TS-039, Rev: 02, Dated: 04.05.2017				Condition :As Rolled		Reduction Ratio:		41.58 :1							
CHEMICAL COMPOSITION																	
Element	%C	%Mn	%Si	%P	%S	%Cr	%Ni	%Cu	%Mo	%Al	%Pb	%V	%Ti	%Ca			
Min.	0.14	1.00	-	-	-	0.80	-	-	-	-	-	-	-	-			
Max.	0.19	1.30	0.40	0.035	0.035	1.10	-	-	-	0.040	-	-	-	-			
Actual	0.15	1.16	0.28	0.014	0.011	1.05	-	-	-	0.023	-	-	-	-			
OTHER ELEMENTS												GAS LEVEL					
Element	%B	%Nb	%As	%Sb	%Sn	%W	%Bi				O ₂ PPM	H ₂ PPM	N ₂ PPM				
Min.	-	-	-	-	-	-	-				Min	-	-	-			
Max.	-	-	-	-	-	-	-				Max	20	2	100			
Actual	-	-	-	-	-	-	-				Actual	16	0.7	72			
MECHANICAL PROPERTIES												JOMINY HARDENABILITY (HRC)					
Requirement	Hardness (BHN)	Impact Strength (IZOD/CHARPY)	Yield Strength (N/mm ²)	UTS (N/mm ²)	%Elong.	%RA				J1/16"	J3/16"	J4/16"	-	-	-		
Min.	-	-	-	600	800	9	35				Min.	-	-	33	-	-	-
Max.	240	-	-	-	1100	-	-				Max.	42	-	37	-	-	-
Actual	169	-	-	625	920	11	36.5				Actual	41.0	36.3	33.3	-	-	-
METALLURGICAL PROPERTIES												INCLUSION RATING AS PER ASTM E45 (METHOD A)					
Require-ment	Depth of Decarb (mm) (SAE J419 TYPE III)	Macro Etch (ASTM E 381)	Max. Depth of Surface Defect (mm)	Grain Size (ASTM E 112)													
					A		B		C		D						
					T	H	T	H	T	H	T	H					
Min.	-	-	-	6	Min	-	-	-	-	-	-	-	-				
Max.	1% of dia max	-	-	8	Max	2.0	1.5	2.0	1.5	2.0	1.5	2.0	1.5				
Actual	0.18	C1R1S1	-	7-8	Actual	1.0	0.5	1.0	-	-	-	1.0	0.5				
Spark & Spectral Test: 100% OK												Other Tests: -		Oil Quenched Core Hardness:			
Surface Inspection: 100% OK												1. MFL: 100% OK					
Ultrasonic Test: 100% OK												2. Step Turn: Found Satisfactory					
MPI: -												3. Blue Fracture: -					
												4. Upset Test: -					
Remarks		Microstructure : Pearlite + Ferrite. Mechanical properties OK after H&T Ultrasonic Test: 0.8x15 mm SDH , MFL: 0.3x10 mm															
Length of Bar :- 6000mm		"We certify that the contents of this report are correct & accurate & meet the requirements of the purchase order, technical delivery conditions, general steel requirements & the material certification requirements". Supplied material is free from radioactive element.															
Technical Service 29.05.2018																	
Corporate Office: 304/305 World Trade Centre. Brigade Gateway Complex. Malleswaram (West). Bangalore: 560046. India																	
Please contact in case of query e-mail id: inml.techservice@gerdau.com																	