
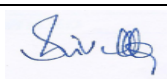


<div>  <div> <div>GERDAU STEEL INDIA PVT LIMITED</div> <div>PLANT: TADIPATRI. DIST.: ANANTPUR. A.P.: 515411</div> </div> </div>																										
TEST CERTIFICATE										F/QA-TC/12 Rev. 01																
TC No : 2018/00098197			Invoice No. :			Quantity		t		Rolling Input : 160X160 mm																
Customer : Sample TC						S.O. No. / Date :																				
PROCESS ROUTE :- BF>>BOF>>LRF>>VD>>CCM(EMS & AMLC)>>RM						Size : 28 Dia			Truck No.:																	
Heat No:- 36221						Product : Rolled bar			Colour Code:		BASE PURPLE/BLACKDOT															
NO OF SAMPLES :			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	1.15	0.29	0.019	0.008	1.06	-	-	-	0.025	-	-	-	-												
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	17	0.9	80													
MECHANICAL PROPERTIES																										
Requirement	Hardness (BHN)	Impact Strength (IZOD/CHARPY)	Yield Strength (N/mm ²)	UTS (N/mm ²)	%Elong.	%RA	JOMINY HARDENABILITY (HRC)																			
							J1/16"	J3/16"	J4/16"	-	-	-														
Min.	-	-	-	600	800	9	35	Min.	-	-	33	-	-	-												
Max.	240	-	-	-	1100	-	-	Max.	42	-	37	-	-	-												
Actual	164	-	-	827	981	12.5	36	Actual	42	39.2	35.8	-	-	-												
METALLURGICAL PROPERTIES																										
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)	INCLUSION RATING AS PER ASTM E45 (METHOD A)																					
					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													
<table border="1"> <tr> <td>Spark & Spectral Test:</td> <td>100% OK</td> <td rowspan="5"> Other Tests: 1. MFL: 100% OK 2. Step Turn: Found Satisfactory 3. Blue Fracture: - 4. Upset Test: - </td> <td rowspan="5"> Oil Quenched Core Hardness: Min. in HRC - - Actual in HRC - - </td> </tr> <tr> <td>Surface Inspection:</td> <td>100% OK</td> </tr> <tr> <td>Ultrasonic Test:</td> <td>100% OK</td> </tr> <tr> <td>MPI:</td> <td>-</td> </tr> <tr> <td></td> <td></td> </tr> </table>															Spark & Spectral Test:	100% OK	Other Tests: 1. MFL: 100% OK 2. Step Turn: Found Satisfactory 3. Blue Fracture: - 4. Upset Test: -	Oil Quenched Core Hardness: Min. in HRC - - Actual in HRC - -	Surface Inspection:	100% OK	Ultrasonic Test:	100% OK	MPI:	-		
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Surface Inspection:	100% OK																									
Ultrasonic Test:	100% OK																									
MPI:	-																									
Remarks	Microstructure : Pearlite + Ferrite. Mechanical properties OK after H&T Ultrasonic Test: 0.8x15 mm SDH , MFL: 0.3x10 mm																									
Length of Bar :-		"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 20.03.2018																		
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																										