

<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: left;"> </div> <div style="text-align: center;"> <h2 style="margin: 0;">GERDAU STEEL INDIA PVT LIMITED</h2> </div> </div>																																									
PLANT: TADIPATRI. DIST.: ANANTPUR. A.P.: 515411																																									
TEST CERTIFICATE										F/QA-TC/12 Rev. 01																															
TC No : 2018/00095018					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 : 34 Dia		Truck No.:																													
Heat No:- 35284										Product : Rolled bar		Colour Code:		BASE PURPLE/BLACKDOT																											
NO OF BUNDLES: NO OF BARS:					Grade :- 16MNCr5																																				
TAS No. : 2278/2016					TDC No :- MAC-TS-039, Rev: 02, Dated: 04.05.2017					Condition :As Rolled		Reduction Ratio:		28.2 :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	0.14	1.21	0.29	0.018	0.014	1.06	-	-	-	0.026	-	-	-	-																											
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	0.8	85																											
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	160	-	-	818	965	13.5	38.5	Actual	41.8	38.3	35.2	-	-	-																											
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																													
Actual	0.19	C1R1S1	-	6.5-7.5	Actual	1.5	0.5	1.0	-	-	-	1.0																													
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Spark & Spectral Test:</td><td>100% OK</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> </table> </div> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Other Tests:</td><td>-</td></tr> <tr><td>1. MFL:</td><td>100% OK</td></tr> <tr><td>2. Step Turn:</td><td>Found Satisfactory</td></tr> <tr><td>3. Blue Fracture:</td><td>-</td></tr> <tr><td>4. Upset Test:</td><td>-</td></tr> </table> </div> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="3">Oil Quenched Core Hardness:</td></tr> <tr><td>Min. in HRC</td><td>-</td><td>-</td></tr> <tr><td>Actual in HRC</td><td>-</td><td>-</td></tr> </table> </div> </div>															Spark & Spectral Test:	100% OK	Surface Inspection:	100% OK	Ultrasonic Test:	100% OK	MPI:	-	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	-	-
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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 29.01.2018																															
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																																									