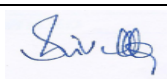
 <b>GERDAU STEEL INDIA PVT LIMITED</b>																												
PLANT: TADIPATRI. DIST.: ANANTPUR. A.P.: 515411																												
<b>TEST CERTIFICATE</b>										F/QA-TC/12 Rev. 01																		
TC No : 2018/00095915					Invoice No. :					Quantity		t		Rolling Input : 160X160 mm														
Customer : Sample TC										S.O. No. / Date :																		
PROCESS ROUTE :- <b>BF&gt;&gt;BOF&gt;&gt;LRF&gt;&gt;VD&gt;&gt;CCM(EMS &amp; AMLC)&gt;&gt;RM</b>										Size : 34 Dia			Truck No.:															
Heat No:- <b>35629</b>										Product : <b>Rolled bar</b>		Colour Code:		BASE PURPLE/BLACKDOT														
NO OF BUNDLES: NO OF BARS:					Grade :- <b>16MNCR5</b>																							
TAS No. : 2278/2016					TDC No :- MAC-TS-039, Rev: 02, Dated: 04.05.2017					Condition :As Rolled		Reduction Ratio:		28.20 :1														
<b>CHEMICAL COMPOSITION</b>																												
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	<b>0.14</b>	<b>1.15</b>	<b>0.27</b>	<b>0.019</b>	<b>0.008</b>	<b>1.07</b>	-	-	-	<b>0.024</b>	-	-	-	-														
<b>OTHER ELEMENTS</b>										<b>GAS LEVEL</b>																		
Element	%B	%Nb	%As	%Sb	%Sn	%W	%Bi				O <sub>2</sub> PPM	H <sub>2</sub> PPM	N <sub>2</sub> PPM															
Min.	-	-	-	-	-	-	-				Min	-	-	-														
Max.	-	-	-	-	-	-	-				Max	20	2	100														
Actual	-	-	-	-	-	-	-				Actual	16	0.7	75														
<b>MECHANICAL PROPERTIES</b>																												
Requirement	Hardness (BHN)	Impact Strength (IZOD/CHARPY)	Yield Strength (N/mm <sup>2</sup> )	UTS (N/mm <sup>2</sup> )	%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	162	-	-	826	976	13.5	36	Actual	40.9	36.5	33.9	-	-	-														
<b>METALLURGICAL PROPERTIES</b>																												
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)	<b>INCLUSION RATING AS PER ASTM E45 (METHOD A)</b>																							
					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																
<table border="1"> <tr> <td>Spark &amp; Spectral Test:</td> <td>100% OK</td> <td rowspan="5"> <b>Other Tests:</b>            1. MFL: 100% OK            2. Step Turn: Found Satisfactory            3. Blue Fracture: -            4. Upset Test: -         </td> <td colspan="3" 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	<b>Other Tests:</b> 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:	-		
Spark & Spectral Test:	100% OK	<b>Other Tests:</b> 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:	-																											
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 12.02.2018																				
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																												