

**GERDAU****GERDAU STEEL INDIA PVT LIMITED**

PLANT: TADIPATRI, DIST.: ANANTPUR, A.P.: 515411

TEST CERTIFICATE

F/QA-TC/12 Rev. 01

TC No : 2018/00095913	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 : 40 Dia	Truck No.:	
Heat No:- 35628		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:	20.3 :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	1.15	0.31	0.018	0.005	1.06	-	-	-	0.027	-	-	-	-
OTHER ELEMENTS														
Element	%B	%Nb	%As	%Sb	%Sn	%W	%Bi							
Min.	-	-	-	-	-	-	-							
Max.	-	-	-	-	-	-	-							
Actual	-	-	-	-	-	-	-							
												GAS LEVEL		
												O ₂ PPM	H ₂ PPM	N ₂ PPM
												Min	-	-
												Max	20	2
												Actual	16	0.8

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	161	-	823	972	13.5	37	Actual	40.8	36.9	33.7	-	-

METALLURGICAL PROPERTIES

Requirement	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	0.20	C1R1S1	-	6.5-7	Actual	1.0	0.5	1.0	-	-	1.0	0.5

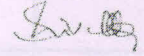
Spark & Spectral Test:	100% OK
Surface Inspection:	100% OK
Ultrasonic Test:	100% OK
MPI:	-

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	-	-

Remarks	Microstructure : Pearlite + Ferrite.	Mechanical properties OK after H&T	Ultrasonic Test: 0.8x15 mm SDH , MFL: 0.3x10 mm
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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.	
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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