

GERDAU STEEL INDIA PVT. LTD., FARIDABAD

Customer Name: SHIVAM AUTOTECH

Invoice No.: FD2018300107 Date: 05.05.18

Quantity: 10.500 Truck No.: HR-55H-4379



GERDAU STEEL INDIA PVT LIMITED

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

TEST CERTIFICATE

F/QA-TC/12 Rev. 01

TC No : 2018/00100462	Invoice No. : ST2018000713	Quantity : 26.097 t	Rolling Input : 160X160 mm
Customer : GERDAU STEEL INDIA PVT. LTD	S.O. No. / Date : 55543		
PROCESS ROUTE :- BF>>BOF>>LRF>>VD>>CCM(EMS & AMLC)>>RM	Size : 40 Dia	Truck No.: AP02TE 2628	
Heat No:- 37030	Product : Rolled bar	Colour Code:	WHITE/GREEN
NO OF BUNDLES: 10 NO OF BARS: 441	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	0.15	1.16	0.30	0.018	0.014	1.05	-	-	-	0.022	-	-	-	-
OTHER ELEMENTS														
Element	%B	%Nb	%As	%Sb	%Sn	%W	%Bi	GAS LEVEL						
Min.	-	-	-	-	-	-	-	O ₂ PPM	H ₂ PPM	N ₂ PPM				
Max.	-	-	-	-	-	-	-	Min	-	-	-			
Actual	-	-	-	-	-	-	-	Max	20	2	100			
								Actual	17	0.7	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	159	-	680	950	14.5	42	Actual	41.0	38.4	34.5	-	-

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				
Min.	-	-	-	6	T	H	T	H	T	H	T	H
Max.	1% of dia max	-	-	8	Min	-	-	-	-	-	-	-
Actual	0.20	C1R1S1	-	6.5-7	Max	2.0	1.5	2.0	1.5	2.0	1.5	2.0
					Actual	1.0	0.5	1.0	-	-	-	1.0

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:	-	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 :- 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 01.05.2018

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