

GERDAU STEEL INDIA PVT. LTD., FARIDABAD

Customer Name: SHIVAM AUTOTECH

Invoice No. F1220183024 Date 15.06.18

Quantity 10.406 Truck No. RT-406A-0513

GERDAU

GERDAU STEEL INDIA PVT LIMITED

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

TEST CERTIFICATE

F/QA-TC/12 Rev. 01

TC No : 2018/00102766	Invoice No. : ST2018001720	Quantity : 10.406 t	Rolling Input : 160X160 mm
Customer : GERDAU STEEL INDIA PVT. LTD	S.O. No. / Date : 45368		
PROCESS ROUTE :- BF>>BOF>>LRF>>VD>>CCM(EMS & AMLC)>>RM	Size : 38 Dia	Truck No.: AP02TC 4185	
Heat No:- 38052	Grade :- 16MNCR5	Product : Rolled Bar	Colour Code: PURPLE BASE/WHITE DOT
NO OF BUNDLES: 4 NO OF BARS: 192			
TAS No. :2280/2016	TDC No :- MAC-TS-043B, Rev: 00, Dated: 20.04.2017	Condition :As Rolled	Reduction Ratio: 22.57 :1

CHEMICAL COMPOSITION

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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	1.12	0.32	0.024	0.004	0.99	-	-	-	0.026	-	-	-	-		
OTHER ELEMENTS												GAS LEVEL				
												O ₂ PPM	H ₂ PPM	N ₂ PPM		
	Element	%B	%Nb	%As	%Sb	%Sn	%W	%Bi								
	Min.	-	-	-	-	-	-	-					Min	-	-	-
	Max.	-	-	-	-	-	-	-					Max	20	2	100
Actual	-	-	-	-	-	-	-					Actual	16	0.7	63	

MECHANICAL PROPERTIES

MECHANICAL PROPERTIES								JOMINY HARDENABILITY (HRC)						
Requirement	Hardness (BHN)	Impact Strength (IZOD/CHARPY)		Yield Strength (N/mm ²)	UTS (N/mm ²)	%Elong.	%RA							
								J1/16"	J3/16"	J4/16"	-	-	-	
Min.	-	-	-	600	800	9	35	Min.	-	-	30	-	-	-
Max.	240	-	-	-	1100	-	-	Max.	42	-	34	-	-	-
Actual	165	-	-	820	983	13	36.5	Actual	41.5	38.1	32.6	-	-	-

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	
Min.	-	-	-	6	T	H	T	H	T	H	T	H
Max.	1% of dia max	-	-	8	2.0	1.5	2.0	1.5	2.0	1.5	2.0	1.5
Actual	0.20	C1R1S1	-	6.5-7.5	Actual	1.0	0.5	1.0	-	-	1.0	0.5

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 is in H&T condition.
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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 05.06.2018
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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