

897  
4HB

**GERDAU**

# **GERDAU STEEL INDIA PVT LIMITED**

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

## **TEST CERTIFICATE**

F/QA-TC/12 Rev. 01

TC No : 2018/00095059	Invoice No. : ST2017006140	Quantity : 6.391 t	Rolling Input : 160X160 mm
Customer : GERDAU STEEL INDIA PVT. LTD	S.O. No. / Date : 51867	Size : 40 Dia	Truck No.: AP02TC 2224
PROCESS ROUTE :- BF>>BOF>>LRF>>VD>>CCM(EMS & AMLC) >>RM	Product : Rolled Bar	Colour Code: WHITE/GREEN	
Heat No:- 35204	Grade :- 16MNCR5		
NO OF BUNDLES: 3 NO OF BARS: 110			
TAS No. : 903/2014	TDC No :- PFG/MQC/52,REV.NO.-00/02, DATE:08/08/2014	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	0.15	-	0.015	0.80	-	-	-	0.015	-	-	-	-
Max.	0.19	1.30	0.35	0.025	0.035	1.10	-	-	-	0.035	-	-	-	-
Actual	0.14	1.16	0.30	0.014	0.025	1.03	-	-	-	0.024	-	-	-	-

## **OTHER ELEMENTS**

Element	%B	%Nb	%As	%Sb	%Sn	%W	%Bi
Min.	-	-	-	-	-	-	-
Max.	-	-	-	-	-	-	-
Actual	-	-	-	-	-	-	-

## **GAS LEVEL**

	O <sub>2</sub> PPM	H <sub>2</sub> PPM	N <sub>2</sub> PPM
Min	-	-	-
Max	25	2	80
Actual	18	0.8	70

## **MECHANICAL PROPERTIES**

Requirement	Hardness (BHN)	Impact Strength (IZOD/CHARPY)	Yield Strength (Kg/mm <sup>2</sup> )	UTS (Kg/mm <sup>2</sup> )	%Elong.	%RA	JOMINY HARDENABILITY ( HRC )				
							J1/16"	J4/16"	-	-	-
Min.	-	-	-	-	-	-	Min.	32	-	-	-
Max.	190	-	-	-	-	-	Max.	42	37	-	-
Actual	153	-	-	-	-	-	Actual	41.8	32.8	-	-

## **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)
Min.	-	-	-	6
Max.	0.50	C2R2S2	-	8
Actual	0.23	C1R1S1	-	6.5-7

## **INCLUSION RATING AS PER ASTM E45 (METHOD A)**

A		B		C		D	
T	H	T	H	T	H	T	H
Min.	-	-	-	-	-	-	-
Max.	2.0	1.5	2.0	1.5	2.0	1.5	2.0
Actual	2.0	1.0	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 (free from harmful banding)

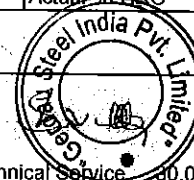
Length of Bar :- 6000mm

"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 30.01.2018

Corporate Office: 304/305 World Trade Centre, Brigade Gateway Complex, Malleswaram (West), Bangalore: 560048, India

Please contact in case of query e-mail id: [inm.techservice@gerdau.com](mailto:inm.techservice@gerdau.com)



# URJA METALLURGICAL SERVICES

ORIGINAL / DUPLICATE / TRIPLICATE

J/P-15, TELCO-BHOSARI ROAD, OPPOSITE TO RELIANCE COMMUNICATION, BHOSARI,  
PUNE-411020, TEL: 020-26768703, 40761250, Email: urjametallurgical@gmail.com

## TEST CERTIFICATE

Test Report No. 41091	Report Date :	20/03/2018
<b>PRECIFORGE AND GEARS</b>	Sample Received :	20/03/2018
(DIVN. OF PATODIA FORGINGS AND GEARS LTD.)	Tested Date :	20/03/2018
GAT NO.150/2, MAHALUNGE INGLE	Lab No:	UML-647
CHAKAN TALEGAON RD, TAL-KHED, PUNE-410 501.	Challan No :	DC/17-18/10556/17.3.18
Maharashtra - 411052	P.O. No:	-

Sample Description : DIA 40 MM BAR, MATL.SPEC.16MnCr5, HEAT NO.35204, SUPP NAME - GERDAU

### FERROUS TEST

Test Method : ASTM E 415-14

	OBS	MIN	MAX		OBS	MIN	MAX
C %	0.14	0.14	0.19	Cu %	--		
S %	0.021		0.035	Pb %	--		
P %	0.019		0.035	W %	--		
Si %	0.30	0.15	0.40	B %	--		
Mn %	1.24	1.00	1.30	N %	--		
Ni %	--			--	--	--	--
Cr %	0.97	0.80	1.10	--	--	--	--
Mo %	--			--	--	--	--
Al %	--			--	--	--	--
Nb %	--			--	--	--	--
Ti %	--			--	--	--	--
V %	--			--	--	--	--

**Remark:** ABOVE TEST RESULT CONFORMS TO DIN 17210-1969 GR.16MnCr5 QUALITY MATERIAL.

END OF REPORT

FOR URJA METALLURGICAL SERVICES



Rohidas B. Chavhan  
(Technical Manager)

Note- Sample(s) are not drawn by Urja Metallurgical Services. This report refers to sample(s) submitted for test. Report shall not be reproduced except in full, without the permission of the laboratory. Tests marked as \* (Star) are not covered under the scope of NABL Accreditation presently.



T-2335 NABL T-2336


J/P-15, TELCO-BHOSARI ROAD, OPPOSITE TO RELIANCE COMMUNICATION, BHOSARI,  
PUNE-26 PH-020-46768703, 4678190, Email-urjametallurgical@gmail.com

Test Report No. 41202	Report Date:	21/03/2018
<b>PRECIFORGE AND GEARS</b>	Sample Received :	20/03/2018
(DIVN. OF PATODIA FORGINGS AND GEARS LTD.)	Tested Date :	21/03/2018
GAT NO.150/2, MAHALUNGE INGLE	Lab No:	UML-644
CHAKAN TALEGAON RD, TAL-KHED,PUNE-410 501.	Challan No :	DC/17-18/10556/17.3.18
	P.O. No :	-

**Test Method :IS : 3848-1981 RA 2003**

[illegible]

**END OF REPORT**

  
Rohidas B. Chavhan  
(Technical Manager)

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