895
AGR.

GERDAU STEEL INDIA PVT LIMITED

GERDAU

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

TEST CERTIFICATE

F/QA-TC/12 Rev. 01

TC No : 2018/00095058	Invoice No. : ST2017006140	Quantity	9.967 t	Rolling Input : 160X160 mm	
Customer : GERDAU STEEL INDIA PVT. LTD		S.O. No. / Date : 51867			
PROCESS ROUTE :- **BF>>BOF>>LRF>>VD>>CCM(EMS & AMLC) >>RM**		Size : 48 Dia		Truck No.: AP02TC 2224	
Heat No:- **35202**		Product : **Rolled Bar**		Colour Code:	**WHITE/GREEN**
NO OF BUNDLES: 4 NO OF BARS: 116	Grade :- **16MNCR5**				
TAS No. : 903/2014	TDC No :- PFG/MQC/52,REV.NO.-00/02, DATE:08/08/2014	Condition :As Rolled		Reduction Ratio:	14.15 :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**	**1.15**	**0.26**	**0.015**	**0.024**	**1.04**	-	-	-	**0.029**	-	-	-	-

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	25	2	80
Actual	17	1.0	80

MECHANICAL PROPERTIES

Requirement	Hardness (BHN)	Impact Strength (IZOD/CHARPY)		Yield Strength (Kg/mm^2)	UTS (Kg/mm^2)	%Elong.	%RA
Min.	-	-	-	-	-	-	-
Max.	190	-	-	-	-	-	-
Actual	157	-	-	-	-	-	-

	JOMINY HARDENABILITY (HRC)					
	J1/16"	J4/16"	-	-	-	-
Min.	-	32	-	-	-	-
Max.	42	37	-	-	-	-
Actual	41.6	32.9	-	-	-	-

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)	
Min.	-	-	-	-	6	Min
Max.	0.50	C2R2S2	-	-	8	Max
Actual	0.21	C1R1S1	-	-	6.5-7	**Actual**

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	1.5
Actual	2.0	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 (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.

Gerdau Steel India Pvt. Limited

Technical Service 30.01.2018

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

ORIGINAL

ORIGINAL / DUPLICATE / TRIPLICATE

URJA METALLURGICAL SERVICES

J/P-15, TELCO-BHOSARI ROAD, OPPOSITE TO RELIANCE COMMUNICATION, BHOSARI,
PUNE-26 PH-020-40768765, 4078190, Email-urjametallurgical@gmail.com

TEST CERTIFICATE

Test Report No. 41093		Report Date :	20/03/2018
PRECIFORGE AND GEARS		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-646
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 48 MM BAR, MATL.SPEC.16MnCr5, HEAT NO.35202, 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 %	0.020		0.035	**Pb %**	--		
P %	0.019		0.035	**W %**	--		
Si %	0.26	0.15	0.40	**B %**	--		
Mn %	1.21	1.00	1.30	**N %**	--		
Ni %	--			--	--	--	--
Cr %	1.03	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 Accredition presently.

T-2335 NABL T-2336

ORIGINAL

ORIGINAL / DUPLICATE / TRIPLICATE

URJA METALLURGICAL SERVICES

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

TEST CERTIFICATE

Test Report No. 41204		
PRECIFORGE AND GEARS	Report Date:	21/03/2018
(DIVN. OF PATODIA FORGINGS AND GEARS LTD.)	Sample Received :	20/03/2018
GAT NO.150/2, MAHALUNGE INGLE	Tested Date :	21/03/2018
CHAKAN TALEGAON RD, TAL-KHED,PUNE-410 501.	Lab No:	UML-643
	Challan No :	DC/17-18/10556/17.3.18
	P.O. No :	-

Sample Description : DIA 48 MM BAR, MATL.SPEC.16MnCr5, HEAT NO.35202, SUPP NAME - GERDAU

JOMINY HARDENABILITY TEST **Test Method :**IS : 3848-1981 RA 2003

JOMINY DISTANCE FROM QUENCHED END IN MM	OBSERVED HARDNESS IN HRC
J - 1/16"	38.9 HRC (REQ.42 HRC MAX)
J - 4/16"	33.8 HRC (REQ - 33 - 37 HRC)
--	--
--	--
--	--
--	--
--	--
--	--
--	--
--	--
--	--
--	--
--	--
--	--
--	--
--	--
--	--

Remark : ABOVE TEST RESULT CONFORMS TO 16MnCr5 QUALITY MATERIAL.
MIN MAX VALUE SPECIFIED BY CUSTOMER.

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 Accredition presently.

T-2335 NABL T-2336