

# R. L. STEELS & ENERGY LTD.

## TEST CERTIFICATE

Regd. Office: Gut No. 78 to 81, Pangra Shiver Chitegaon, Paithan Road, Aurangabad - 431 107  
Maharashtra, India. Phone : 02431-661231, 251163 Fax : 02431-251879  
E-mail : qc@rlsteels.com, Website : www.rlsteels.com

Format No. : FT/QAD/03  
Issue Dt : 01/10/2017  
Rev No.: 00

Customer: M/S SHARDA PRECISION PVT LTD

PLOT NO. K-1, MIDC, WALUJ, AURANGABAD.

### General Information & Material Details

TC NO.	Date	Invoice No.	Date	Truck No.	No. of Bund.	Quantity in MT	Length	Supply Condition	Colour code
17-5028	28-03-2018	RL17-SI-4564	28-03-2018	MH 20 AA 7456	13	25.530	5.0 TO 6.0 MTR	AS ROLLED	GREEN+WHITE+RED+GREEN
Process Route		Heat No.	Grade	As Cast Size		Product Size		Reduction Ratio	Customer TDC
EAF/LRF/VD/CCP-with MEMS		2-WVW-3	16MnCr5	130X130		36DIA		-	-

### Chemical Composition & Tramp Elements

Element	%C	%Si	%Mn	%P	%S	%Cr	%Mo	%Ni	%Cu	%V	%Al	%Ti	%B	%Ca	%As
Min.	0.14	0.15	1.00	-	0.020	0.80	-	-	-	-	-	-	-	-	-
Max.	0.19	0.35	1.30	0.025	0.035	1.10	-	-	-	-	-	-	-	-	-
Actual	0.18	0.25	1.18	0.024	0.027	1.05	0.015	0.064	0.038	0.006	0.022	-	-	-	-

### Tramp Elements (Contd.) & DI / CE

Element	%Sn	%Pb	%Sb	CE	DI Value	Gas Analysis.			Dimension Tolerance	
							O2	H2	N2	Size Tol. (MM)
Min	-	-	-	-	-	Min	-	-	-	-
Max	-	-	-	-	-	Max	25.00	-	-	Specification
Actual	-	-	-	-	-	Actual	14.00	1.30	74.00	As per IS 3739, Grade I.

### Mechanical Properties

Test Code	Hardness As Rolled (BHN)	Hardness (H&T Condition) (BHN)	YS (Kg/mm <sup>2</sup> )	UTS (Kg/mm <sup>2</sup> )	%El.	%RA	Impact Values (Joules)		Macrostructure	Microstructure
							Izod	Charpy	Macrostructure As per ASTM E-381	
Spec.	-	-	-	-	-	-	-	-	Better Than C2R2S2	-
Actual Value	170-178	-	-	-	-	-	-	-	C2R1S1	-

### Metallurgical Properties

Test Code	Decarb ASTM J419 (mm)	Grain Size as per ASTM E112	Inclusion Rating (As per IS 4163/ ASTM E-45A) Plate IR				Magnaflux Test (100% Bars)	UT Test (100% Bars)	Spark/ Spectral Test (100% Bars)	-	-
			Series	A	B	C	D				
Spec.	-	-	T / H	-	-	-	-	-	-	-	-
Actual Value	-	6.0 / 7.0	T / H	1.5 / 0.5	0.5 / 0.0	0.0 / 0.0	1.5 / 0.5	OK	OK	OK	-

### Other Test Results

### Hardenability Test Result

Jominy Distance (mm/inch)	J 4/16"														
Spec (HRC)	33-37														
Actual Hardness (HRC)	35.00														

Remarks : Material is conforming to the customer specification.

DECLARATION : TEST RESULTS ARE BASED ON ACTUAL TESTS CARRIED OUT ON SAMPLES DRAWN AS PER QUALITY ASSURANCE PLAN.  
TEST CERTIFICATE CONFORMS TO THE CUSTOMER TDC.

For R. L. STEELS & ENERGY

(AUTHORISED SIGNATORY)



## PAHARIMATA ENGINEERING PVT. LTD.

Date:- 01-04-2018

### MATERIAL TEST CERTIFICATE FOR CHEMICAL ANALYSIS

TO -

M/S EICHER

Equipment used:- SPECTROMAXx  
Raw Material Size:- DIA.36.00MM  
Heat no 2-WVV-3  
Heat Code :- AU11C  
Raw Material Supplier :- R L STEEL  
Sample No.:- Sample no.1

#### TEST RESULTS

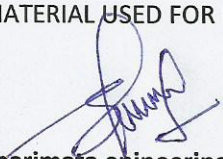
Test Conducted	Specified as per "16Mncr5" Grade (in %age)	Obsevation (in %age)
<b>Chemical Analysis</b>		
% C	0.14-.019	0.175
% Mn	1.00-1.30	1.18
% Si	0.40 MAX	0.26
% S	0.035 MAX	0.026
% P	0.025MAX	0.023
0 % Cr	0.80-1.10	1.06
% Ni		
%Mo		
% Al	0.05MAX	0.022

**Remarks:** The checked Parameters of given sample conforms to-16MNCr5 grade.

**Jominy Test :SPECIFICATION**-J1/16" = 43 HRCMAX, J4/16" = 33-37 HRC

**Jominy Test Findings:** OBSERVED-J1/16" = 41 HRC, J4/16" = 35 HRC

THIS MATERIAL USED FOR ED2404,2405,2406,2407,2408,2414,2415,2416,2417

  
For Paharimata engineering pvt. Ltd.



Date:-.04.04.2018

To, VECV,Devas

Kind Atten-Mr.Sachin Waghmare- (Asst.manager SQA)

Respected sir,

We are sending jominy samples of HeatNo.2-WVW-3 material- 16MNCRDIA 32.00 MM.Hea code-AU11C

Raw material source R L STEEL . RM received on date 30/03/2018 QTY:-28.530MT.

Material checked WITH PMI TEST and confirmed to grade 16MNCR5.cross verification certificates and mill T.C. sending with samples. heat number punched on the sample at both ends.

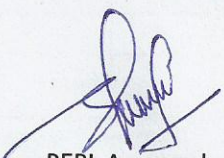
JOMINY HARDNEES REQ J1/16"=43HRCMAX,OBSERVED J1/16"=41 HRC

J4/16"=33-37HRC,OBSERVED J4/16"=35 HRC

This material used for following components ED2404,2405,2406,2407,2408,2414,2415,2416,2417

This is for your information.

Regards,



PEPL Aurangabad.