



R. L. STEELS & ENERGY LTD.

TEST CERTIFICATE

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Customer: M/S PAHARIMATA ENGINEERING

K-235 MIDC, WALUJ, AURANGABAD

General Information & Material Details

TC NO.	Date	Invoice No.	Date	Truck No.	No. of Pcs	Quantity in MT	Length	Supply Condition	Colour code
17-4245	06-02-2018	RL17-SI-3885	06-02-2018	MH 21 8947	209	17.650	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-WAJ-4	16MnCr5		160X180		48DIA	-	-

Chemical Composition & Tramp Elements

Element	%C	%Si	%Mn	%P	%S	%Cr	%Mo	%Ni	%Cu	%V	%Al	%Ti	%B	%Ca	%As
	0.14	0.15	1.00	-	0.020	0.80	-	-	-	-	0.020	-	-	-	-
Max.	0.19	0.35	1.30	0.025	0.035	1.10	0.060	0.20	-	-	0.040	-	-	-	-
Actual	0.17	0.23	1.20	0.023	0.026	1.04	0.009	0.046	0.037	0.004	0.026	-	-	-	-

Tramp Elements (Contd.) & DI / CE

Tramp Elements (Contd.) & DI / CE						Gas Analysis.				Dimension Tolerance	
Element	%Sn	%Pb	%Sb	CE	DI Value	Gas (PPM)	O2	H2	N2	Size Tol. (MM)	-
Min	-	-	-	-	-		-	-	-	Specification	As per IS 3739, Grade I.
Max	-	-	-	-	-		25.00	-	-		
Actual	-	-	-	-	-		14.00	1.30	76.00		

Mechanical Properties

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

Metallurgical Properties

Metallurgical Properties								Other Test Results			
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	0.0 / 0.0	0.0 / 0.0	1.5 / 0.5	OK	OK	OK	-

Hardenability Test Result

Jominy Distance (mm/inch)	J 4/16"														
Spec (HRC)	33-37														
Actual Hardness (HRC)	34.50														

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



PAHARIMATA ENGINEERING PVT. LTD.

Date:- 22-02-2018

MATERIAL TEST CERTIFICATE FOR CHEMICAL ANALYSIS

TO -

M/S EICHER

Equipment used:- SPECTROMAXx
Raw Material Size:- DIA.48.00MM
Heat no 2-WAJ-4
Heat Code :- EI 26
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)
Chemical Analysis		
% C	0.14-0.19	0.166
% Mn	1.00-1.30	1.20
% Si	0.40 MAX	0.22
% S	0.035 MAX	0.027
% P	0.025MAX	0.010
% Cr	0.80-1.10	1.05
% Ni		
%Mo		
% Al	0.05MAX	0.03

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" = 42 HRC, J4/16" = 34 HRC

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


For Paharimata engineering pvt. Ltd.