



# 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

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**Customer: M/S UNIQUE FORGINGS (INDIA) PVT. LTD.**

601/1, PHASE-4, GIDC, NEAR RAILWAY STATION, VITTHAL UDYOGNAGAR, gujrat.

### General Information & Material Details

TC NO.	Date	Invoice No.	Date	Truck No.	No. of Pieces	Quantity in MT	Length	Supply Condition	Colour code
18-0641	23-05-2018	RL18-SI-0703	23-05-2018	MH 20 BT 2121	208	16.080	5.0 TO 6.0 MTR	AS ROLLED	YELLOW+ BLUE+WHITE
Process Route		Heat No.	Grade	As Cast Size		Product Size		Reduction Ratio	Customer TDC
EAF/LRF/VD/CCP-with MEMS		2-XZK-4	EN353	160X180		48DIA		15.92:1	-

### Chemical Composition & Tramp Elements

Element	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu	%V	%Al	%Ti	%B	%Ca	%As
Max.	0.20	0.35	1.00	0.050	0.050	1.25	1.50	0.15	-	-	-	-	-	-	-
Actual	0.185	0.22	0.94	0.032	0.022	1.04	1.02	0.130	-	-	0.023	-	-	-	-

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

Element	%Sn	%Pb	%Sb	CE	DI Value	Gas (PPM)	O2	H2	N2	Size Tol. (MM)	Specification
Min	-	-	-	-	-	Min	-	-	-	-	As per IS 3739, Grade I.
Max	-	-	-	-	-	Max	-	-	-	-	
Actual	-	-	-	-	-	Actual	10.00	1.50	75.00	-	

### 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
Spec.	-	-	-	-	-	-	Izod Charpy	Macrostructure As per ASTM-381	-
Actual Value	197-206	-	-	-	-	-	-	C2R1S1	-

### Metallurgical Properties

Test Code	Decarb ASTM J419 (mm)	Grain Size as per ASTM E112	Inclusion Rating (As per IS 4136/ ASTM-45A) Plate IR	Magnaflux Test (100% Bars)	UT Test (100% Bars)	Spark/Spectral Test (100% Bars)	-	-
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

### Hardenability Test Result

Jominy Distance (mm/inch)	J 6/16"	-	-	-	-	-	-	-	-	-	-	-	-
Spec (HRC)	36-40	-	-	-	-	-	-	-	-	-	-	-	-
Actual Hardness (HRC)	38.00	-	-	-	-	-	-	-	-	-	-	-	-

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)

Accepted  
REVIEWED  
Date  
Sign.

