



BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY (BUET)

DEPARTMENT OF CIVIL ENGINEERING

Mobile: 01819 557 964; PABX: 966 5650-80 Ext. 7226; www.buet.ac.bd/ce/

STRENGTH OF MATERIALS LABORATORY



TENSION TEST OF DEFORMED M.S. BARS

Sent by: Col. Towficur Rahman (Retd.),

Sr. General Manager (Marketing & Sales), Ratanpur Steel Re-Rolling Mills Ltd.

BRTC No.: 1100-58644/CE/13-14; Dt. 11/2/2014

Ref.: RSRM/BUET(BRTC)/400W & 500W-6/14; Dt. 10/2/2014

Date of Test: 16/2/2014

Sl. No.	Frog Mark	Nominal Dia	Actual Dia	Actual Unit Weight	Average Actual Unit Weight	Yield or Proof Load	Yield or Proof Strength *	Average Yield or Proof Strength (YS)	Ultimate Load	Ultimate Strength *	Average Ultimate Strength (TS)	TS/YS	Elongation (%) ASTM (G. length = 203.2 mm)	Avg. Elong. (%) ASTM (G. length = 203.2 mm)	Bend Test ASTM	Rebend Test ASTM
		mm	mm	kg/m	kg/m	kN	MPa	MPa	kN	MPa	MPa					
1	RSRM-TMT-500W	25	24.7	3.767	3.783	254	520	520	315	640	650	1.25	18	-	Satisfactory	-
2	RSRM-TMT-500W	25	24.7	3.776		253	515	(75500 psi)	319	650	(94000 psi)		15		Satisfactory	-
3	RSRM-TMT-500W	25	24.8	3.806		262	535	(5350 kg/sq.cm)	320	650	(6600 kg/sq.cm)		14		Satisfactory	-
4	RSRM-TMT-500W	20	20.0	2.461	2.463	174	555	550	189	605	635	1.15	14	15	Satisfactory	-
5	RSRM-TMT-500W	20	20.0	2.470		168	535	(79500 psi)	205	655	(92500 psi)		16		Satisfactory	-
6	RSRM-TMT-500W	20	20.0	2.459		175	555	(5600 kg/sq.cm)	205	655	(6500 kg/sq.cm)		15		Satisfactory	-
7	RSRM-TMT-500W	16	16.0	1.582	1.582	105	520	525	134	670	670	1.28	14	15	Satisfactory	-
8	RSRM-TMT-500W	16	16.0	1.582		106	525	(76000 psi)	135	675	(97500 psi)		15		Satisfactory	-
9	RSRM-TMT-500W	16	16.0	1.582		106	525	(5350 kg/sq.cm)	135	675	(6850 kg/sq.cm)		15		Satisfactory	-
10	RSRM-TMT-500W	12	12.0	0.890	0.891	53.1	470	510	73	645	665	1.30	15	15	Satisfactory	-
11	RSRM-TMT-500W	12	12.0	0.894		59.3	525	(73500 psi)	76	675	(96500 psi)		15		Satisfactory	-
12	RSRM-TMT-500W	12	12.0	0.890		59.8	530	(5200 kg/sq.cm)	76	675	(6800 kg/sq.cm)		16		Satisfactory	-
13	RSRM-TMT-500W	10	9.9	0.609	0.599	48.2	610	565	56	705	675	1.19	11	-	Satisfactory	-
14	RSRM-TMT-500W	10	9.8	0.591		43.4	550	(82000 psi)	52	660	(98000 psi)		13		Satisfactory	-
15	RSRM-TMT-500W	10	9.8	0.596		42.5	540	(5750 kg/sq.cm)	52	660	(6900 kg/sq.cm)		13		Satisfactory	-

Conversion factors: $1.0 \text{ kg/cm}^2 = 14.219 \text{ psi} (\text{lb/in}^2) = 0.09807 \text{ MPa} (\text{N/mm}^2)$

*Strengths are based on nominal area

Nom. Bar dia. (mm)	50	40	32	28	25	22	20	16	12	10	8
Nom. Area (sq.mm)	1964	1257	804	616	491	380	314	201	113	79	50

Samples were received in unsealed condition

Minimum Standard Requirements BDS / ISO 6935-2: 2006			
Grade	Yield Strength N/mm ² or MPa	Ultimate Strength N/mm ² or MPa	Elongation (G. length: 5d) %
300	300	330	16
400/400W	400	440	14
500/500W	500	550	14

Minimum Standard Requirements (ASTM A615/A 615M)

ASTM A 615			ASTM A 615M			ASTM A 615/ A 615M			
Grade	Yield Strength psi (kg/cm ²)	Ultimate Strength psi (kg/cm ²)	Grade	Yield Strength MPa (kg/cm ²)	Ultimate Strength MPa (kg/cm ²)	Minimum Elongation %, (G. len: 8" (203.2 mm))			
40	40000 (2810)	70000 (4910)	300	300 (3050)	500 (5090)	11	12	-	-
60	60000 (4210)	90000 (6310)	420	420 (4275)	620 (6295)	9	9	8	7
75	75000 (5255)	100000 (7015)	520	520 (5275)	690 (7010)	-	7+	7	6

+ For 19 mm bar only.

Countersigned by: Dr. Md. Abdur Rouf, Professor, Dept. of Civil Engg.



Test performed by: Md. Ruhul Amin, Assistant Professor, Dept. of Civil Engg.

Important Notes: Samples as supplied to us have been tested in our laboratory. BRTC does not have any responsibility as to the representative character of the samples required to be tested. It is recommended that the samples are sent in a secure and sealed cover/packet/container under signature of the competent authority. In order to avoid fraudulent fabrication of test results, it is recommended that all test reports be collected by duly authorized person, and not by the Contractor/Supplier.



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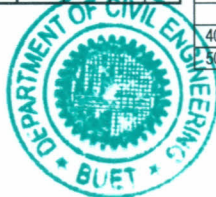
Sl. No.	Frog Mark	Nominal Dia	Actual Dia	Actual Unit Weight	Average Actual Unit Weight	Yield or Proof Load	Yield or Proof Strength *	Average Yield or Proof Strength (YS)	Ultimate Load	Ultimate Strength *	Average Ultimate Strength (TS)	TS/YS	Elongation (%) ISO (G. length = 5d)	Avg. Elong. (%) ISO (G. length = 5d)	Bend Test ISO	Rebend Test ISO
1	RSRM-TMT-500W	25	24.7	3.767	3.783	254	520	520	315	640	650	1.25	22	-	Satisfactory	-
2	RSRM-TMT-500W	25	24.7	3.776		253	515	(75500 psi)	319	650	(94000 psi)		21		Satisfactory	-
3	RSRM-TMT-500W	25	24.8	3.806		262	535	(5350 kg/sq.cm)	320	650	(6600 kg/sq.cm)		18		Satisfactory	-
4	RSRM-TMT-500W	20	20.0	2.461	2.463	174	555	550	189	605	635	1.15	21	23	Satisfactory	-
5	RSRM-TMT-500W	20	20.0	2.470		168	535	(79500 psi)	205	655	(92500 psi)		23		Satisfactory	-
6	RSRM-TMT-500W	20	20.0	2.459		175	555	(5600 kg/sq.cm)	205	655	(6500 kg/sq.cm)		24		Satisfactory	-
7	RSRM-TMT-500W	16	16.0	1.582	1.582	105	520	525	134	670	670	1.28	21	21	Satisfactory	-
8	RSRM-TMT-500W	16	16.0	1.582		106	525	(76000 psi)	135	675	(97500 psi)		21		Satisfactory	-
9	RSRM-TMT-500W	16	16.0	1.582		106	525	(5350 kg/sq.cm)	135	675	(6850 kg/sq.cm)		20		Satisfactory	-
10	RSRM-TMT-500W	12	12.0	0.890	0.891	53.1	470	510	73	645	665	1.30	22	23	Satisfactory	-
11	RSRM-TMT-500W	12	12.0	0.894		59.3	525	(73500 psi)	76	675	(96500 psi)		23		Satisfactory	-
12	RSRM-TMT-500W	12	12.0	0.890		59.8	530	(5200 kg/sq.cm)	76	675	(6800 kg/sq.cm)		25		Satisfactory	-
13	RSRM-TMT-500W	10	9.9	0.609	0.599	48.2	610	565	56	705	675	1.19	20	21	Satisfactory	-
14	RSRM-TMT-500W	10	9.8	0.591		43.4	550	(82000 psi)	52	660	(98000 psi)		22		Satisfactory	-
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Conversion factors: $1.0 \text{ kg/cm}^2 = 14.219 \text{ psi (lb/in}^2) = 0.09807 \text{ MPa (N/mm}^2)$

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500/500W	500	550	14

Minimum Standard Requirements (ASTM A615/A 615M)

ASTM A 615			ASTM A 615M			ASTM A 615/ A 615M			
Grade	Yield Strength psi (kg/cm ²)	Ultimate Strength psi (kg/cm ²)	Grade	Yield Strength MPa (kg/cm ²)	Ultimate Strength MPa (kg/cm ²)	Minimum Elongation %, (G. len: 8" (203.2 mm))			
40	40000 (2810)	70000 (4910)	300	300 (3050)	500 (5090)	10 mm	11	12	-
60	60000 (4210)	90000 (6310)	420	420 (4275)	620 (6295)	16 mm	9	8	7
75	75000 (5255)	100000 (7015)	520	520 (5275)	690 (7010)	22 mm	-	7+	6

+ For 19 mm bar only.

Countersigned by: Dr. Md. Abdur Rouf, Professor, Dept. of Civil Engg.

Test performed by: Md. Ruhul Amin, Assistant Professor, Dept. of Civil Engg.

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1	RSRM-G.60-400W	25	24.9	3.807	3.823	225	458	443	367	750	715	1.61	18	-	Satisfactory	-
2	RSRM-G.60-400W	25	24.9	3.830		217	442	(64000 psi)	345	700	(104000 psi)		17		Satisfactory	-
3	RSRM-G.60-400W	25	24.9	3.833		211	430	(4520 kg/sq.cm)	345	700	(7300 kg/sq.cm)		15		Satisfactory	-
4	RSRM-G.60-400W	20	19.8	2.411	2.415	142	453	452	223	710	710	1.57	22	-	Satisfactory	-
5	RSRM-G.60-400W	20	19.8	2.416		141	450	(65500 psi)	225	715	(103000 psi)		21		Satisfactory	-
6	RSRM-G.60-400W	20	19.8	2.418		142	453	(4610 kg/sq.cm)	221	705	(7250 kg/sq.cm)		25		Satisfactory	-
7	RSRM-G.60-400W	16	15.9	1.552	1.556	99.1	493	493	150	745	750	1.52	21	20	Satisfactory	-
8	RSRM-G.60-400W	16	15.9	1.564		97.1	483	(71500 psi)	152	755	(109000 psi)		19		Satisfactory	-
9	RSRM-G.60-400W	16	15.9	1.551		101	505	(5000 kg/sq.cm)	150	745	(7650 kg/sq.cm)		20		Satisfactory	-
10	RSRM-G.60-400W	12	12.0	0.882	0.881	52.2	462	452	82	725	720	1.59	23	24	Satisfactory	-
11	RSRM-G.60-400W	12	12.0	0.881		49.6	439	(65500 psi)	81	715	(104000 psi)		25		Satisfactory	-
12	RSRM-G.60-400W	12	12.0	0.881		51.3	454	(4610 kg/sq.cm)	81	720	(7350 kg/sq.cm)		23		Satisfactory	-
13	RSRM-G.60-400W	10	10.0	0.620	0.617	35	443	454	55	695	695	1.53	24	-	Satisfactory	-
14	RSRM-G.60-400W	10	9.9	0.605		34.5	437	(66000 psi)	50	640	(100000 psi)		28		Satisfactory	-
15	RSRM-G.60-400W	10	10.1	0.627		38.1	482	(4630 kg/sq.cm)	59	745	(7050 kg/sq.cm)		20		Satisfactory	-

Conversion factors: 1.0 kg/cm² = 14.219 psi (lb/in²) = 0.09807 MPa (N/mm²)

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40	40000 (2810)	70000 (4910)	300	300 (3050)	500 (5090)	11	12	-	-
60	60000 (4210)	90000 (6310)	420	420 (4275)	620 (6295)	9	9	8	7
75	75000 (5255)	100000 (7015)	520	520 (5275)	690 (7010)	-	7+	7	6

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