

Sent by: Engr. Maksudul Karim, General Manager Shahriar Steel Mills Ltd., 18, Konapara, Jatrabari, Dhaka.

TEST OF DEFORMED M.S. BARS [ASTM A 615M-16]

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY (BUET) DEPARTMENT OF CIVIL ENGINEERING

Mobile: 01819557964; PABX: (8802) - 55167100, 55167228-57 Ext. 7226, Info: http://brtc.ce.buet.ac.bd/#/home, Report verification: http://verify.ce.buet.ac.bd



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STRENGTH OF MATERIALS LABORATORY

Ref.: Letter; Dt. 7/10/2023 Date of Test: 9/10/2023

BRTC No.: 1103-02581/CE/23-24; Dt. 8/10/2023

received in UNSEALED condition

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1 A615M-1																			_		
ASTM A615M-16 Weight Requirements and Nominal Area of bars (Table A1.1)	_	t	1	1	1		-	30 q	1	Г	r	ı	SSRM B500 DWR	SSRM B500 DWR	SSRM B500 DWR				Identification	Frog Mark /	
a of bars (Table	_	1	1	1	1	-	-	1	•	-		1	8	8	8	mm	dia.	Nominal	Desig./	Bar	
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30 30					Â						-			0.406		kg/m		Weight	Unit	Average	
60 60						-	-						25.7	25.7	26.7	kN		Load	Proof	Yield or	
) <u>,</u>			510	510	530	MPa		Strength	Proof	Yield or	
Conversion fac			•		1	-								(75000 psi)	520	MPa	(YS)	Strength	Yield or Proof	Average	
ctor: 1.0 MI	XIII(6+11111	1		1	1	-					1	,1	33.9	33.9	35.9	χŽ			Load	Tensile	
oa = 1.0 N/mm	7	J	1	1	1	1			1	1	1	1	675	675	715	MPa			Strength	Tensile	
Conversion factor: 1.0 MPa = 1.0 N/mm ² = 145 psi. Strengths are based on nominal area.		1	1		1	1		1			1	1		(99500 psi)	685	MPa	(TS)	Strength	Tensile	Average	
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inal area.		-									•			- i				 (%)	Elongation	Average	
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						80	Grade 80	3	Grade 75		Grade 60	
								rades	Steel G	nmon S	for Con	ASTM A615M-16 Tensile Requirements for Common Steel Grades
				t lengtl	per uni	mass	g same	rhavin	lain ba	d punc	fectly re	Actual diameter is the diameter of a perfectly round plain bar having same mass per unit length.
1-16.	1615M	ASTM /	ints of	uireme	not reg	se are	ly. The	ose on	ve purp	ormativ	for inf	Actual dia. and TS/YS ratio are provided for informative purpose only. These are not requirements of ASTM A615M-16.
		able A1	es in Ta	her size	for ot	follwed	nciple	on pri	d basec	derived	ars are	Area and weight of 8mm and 22m dia. bars are derived based on principle follwed for other sizes in Table A1.1
5M-16.	A615	n ASTM	/ered in	not cov	size is	ım bar	ght. 8n	nal wei	e nomi	% of th	than 94	ured unit weight shall not be less
1 22.	15.41	9.865	7.99	6.313	4.834	3.853	2.98	2.466	1.578	0.888	0.617	Nominal weight, kg/m 0.395 0.617 0.888 1.578 2.466 2.98 3.853 4.834 6.313 7.99 9.865 15.41 22.2
282	1963	50.3 79 113 201 314 380 491 616 804 1018 1257 1963 2827	1018	804	616	491	380	314	201	113	79	Nominal area, sq.mm 50.3
60	50	40	36	32	28	25	22	20	16	12	10	Bar desig / Nominal dia., mm 8 10 12 16 20 22 25 28 32 36 40 50 60
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28, 32, 36, 40, 50, 60	25, 22	10, 12, 16, 20	Bar Designation No.	Elongation in 8 in. [200 mm], min, %	Yield strength, min, psi [MPa]	Tensile strength, min. psi [MPa]			
7	8	9			60 000 [420]	90 000 [620]	[420]	Grade 60	
6	7	7			75 000 [520]	90 000 [620] 100 000 [690]	[520]	Grade 75	
6	7	7			80 000 [550]	105 000 [725]	[550]	Grade 80	

Dept. of Civil Engg., BUET, Dhaka-1000, Bangladesh Prof. Dr. Hasib Mohammed Ahsan, Test-in-Charge Countersigned by:

W38KjnJCm

Test performed by: Dr. Annesha Enam

Assistant Professor, Dept. of Civil Engg., BU

samples are sent in a secure and sealed cover/packet/container under the signature of a competent authority. In order to avoid fradulent fabrication of test results, this report has been printed on a securit Important Note: Samples as supplied to us have been tested. BRTC does not have any responsibility as to the representative character of the samples required to be tested. It is recommended that the It is also recommended that the test results be collected by a duly authorized person



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Testing & Consu

Bureau of Res

STRENGTH OF MATERIALS LABORATORY BRTC No.: 1103-02581/CE/23-24; Dt. 8/10/2023

Sent by: Engr. Maksudul Karim, General Manager TEST OF DEFORMED M.S. BARS [ASTM A 615M-16]

Shahriar Steel Mills Ltd., 18, Konapara, Jatrabari, Dhaka

TAKEAL ED condition

Ref.: Letter; Dt. 7/10/2023

Date of Test: 9/10/2023

A MITS	-	1			-				,		1	-	T	1	•	Ī	,	·	ı»	2						No.	SI.		Project:	
ASTM A615M-16 Weight Requirements and Nominal Area of bars (Table A1.1)	1	1		•			1	1		1				ı					SSRM B500 DWR	SSRM B500 DWR	007M 0000 0417	SCOM BAND DW/R				Identification	rrog Mark	To Most	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
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												**************************************									0.617		Ng/in	train	Meidill	Mininh	Unit	Average		
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Conversion					**************************************																(78500 psi)	040	END	MPa	(XX)	Strenath	Yield or Proof	Average		
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	rengths are			ı													•					1 38						9	SAVST	
	forter: 1.0 MPa = 1.0 N/mm ² = 145 psi. Strengths are based on nominal area.			1			•	-						1					•	0		15	4	200 mm)	(G. length =		(,0)	(%)	Flondation	C COLLECTION.
	ninal area.				1			1	- 1								1					1				2	<u> </u>	77	Average	
																				000	Sat	Sat	Sati		S		Ž,		ш	THE THE TANK THE TANK

Countersigned by:

Bar desig/Nominal dia., mm

Nominal area, sq.mm

ASTM A615M-16 Tensile Requirements for Common Steel Grades

Grade 60 [420]

Grade 75

Grade 80

[520]

[550]

Actual dia. and TSYS ratio are provided for informative purpose only. These are not requirements of ASTM A615M-16. Area and weight of 8mm and 22m dia. bars are derived based on principle follwed for other sizes in Table A1.1 Measured unit weight shall not be less than 94% of the nominal weight. 8mm bar size is not covered in ASTM A615M-16.

0.888 | 1.578 | 2.466 | 2.98 | 3.853 | 4.834 | 6.313 | 7.99

491

Actual diameter is the diameter of a perfectly round plain bar having same mass per unit length.

Elongation in 8 in. [200 mm], min, % Tensile strength, min. psi [MPa]

Yield strength, min, psi [MPa]

75 000 [520]

80 000 [550]

60 000 [420]

10, 12, 16, 20 Bar Designation No. ASTM A615M-16 Weight Requirements and Nominal Area of bars (Table A1.1

16 20

22 380

6AhngC8Qt

Prof. Dr. Hasib Mohammed Ahsan, Test-in-Charge Dept. of Civil Engg., BUET, Dhaka-1000, Bangladesh

16 October 2023

Dr. Annesha Enam Test performed by:

Assistant Professor, Dept. of Civil Engg.,

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Sent by: Engr. Maksudul Karim, General Manager
Shahriar Steel Mills Ltd., 18, Konapara, Jatrabari, Dhaka. **TEST OF DEFORMED M.S. BARS [ASTM A 615M-16]**

Project:

Date of Test: 9/10/2023 Ref.: Letter; Dt. 7/10/2023

BRTC No.: 1103-02581/CE/23-24; Dt. 8/10/2023

Samples were received in UNSEALED condition

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Bar desig	ASTM A61	-	1	1	1	,		-		,	-	1	,	ω	N	_				NO.	ξ
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16 20 22 25	f hare (Tahio	1	1	1	-		-	-		1	1	-	-	12	120	12	mm	dia.	Nominal	Desig./	Bar
5	A441	ı	1	1	-	-	1		1	-	-	1	_	11.8	11.8	11.7	mm		dia.	bar	Actual
32		1	1	-	1	1	1	1	-	-	- (-	-	0.857	0.855	0.848	kg/m			Weight	Unit
28 32 36 A0 50 60															0.853		kg/m		Weight	Unit	Average
60 60							1	-						61.3	60.2	64.3	kN		Load	Proof	Yield or
4														540	535	570	MPa		Strength	Proof	Yield or
Conversion factor: 1.0 MPa = 1.0 N/mm ² = 145 psi. Strengths are based on nominal area						1	•								(79500 psi)	550	MPa	(YS)	Strength	Yield or Proof	Average
or: 1.0 MPa				7	1	1	1	-				1))	79.5	78.5	79.5	×			Load	Tensile
a = 1.0 N/mm ²	3		•	-	-	1	1	•	-			-	1	705	695	705	MPa			Strength	Tensile
= 145 psi. Stre			1			1	1		ī	1		ı	•		(102000 psi)	700	MPa	(TS)	Strength	Tensile	Average
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nal area.						•			ľ						5			,	8	2	Average
															1	1					

Measured	Nominal w	Nominal a	Bar desig.	
Measured unit weight shall not be less than 94% of the nominal we	eight, kg/m	area, sq.mm	/Nominal dia., mm	
oe less t	0.395	50.3	8	
han 94	0.617	79	10	
% of th	0.888	113	12	
e nomi	1.578	201	16	
201	2.466	314	20	
aht 8r	2.98	380	22	
m har	3.853	491	25	
3: 04:3	4.834	616	28	
00+00	6.313	804	32	
Voron	7.99	1018	36	
weight 8mm har size is not covered in ASTN	0.888 1.578 2.466 2.98 3.853 4.834 6.313 7.99 9.865 15.41	113 201 314 380 491 616 804 1018 1257 1963 2827	40	
M A615M-16	15.41	1963	50	
S	22.2	2827	60	

Actual diameter is the diameter of a perfectly round plain bar having same mass per unit length. Actual dia. and TSYS ratio are provided for informative purpose only. These are not requirements of ASTM A615M-16. ed based on principle follwed for other sizes in Table A1.1

ASTM A615M-16 Tensile Requirements for Comm

28, 32, 36, 40, 50, 60	25, 22	10, 12, 16, 20	Bar Designation No.	Elongation in 8 in. [200 mm], min, %	Yield strength, min, psi [MPa]	Tensile strength, min. psi [MPa]			The second secon
7	8	9			60 000 [420]	90 000 [620]	[420]	Grade 60	50 00 000
6	7	7			75 000 [520]	100 000 [690]	[520]	Grade 75	OIL OILES! OI BUE
6	7	7			80 000 [550]	105 000 [725]	[550]	Grade 80	

Countersigned, by: Dept. of Civil Engg., BUET, Dhaka-1000, Bangladesh Prof. Dr. Hasib Mohammed Ahsan, Test-in-Charge

2MEr7NB53

16 October 2023

Dr. Annesha Enam est performed by:

Assistant Professor, Dept. of Civil Engg., E

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Shahriar Steel Mills Ltd., 18, Konapara, Jatrabari, Dhaka.

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Samples were received in UNSEALED condition.

	9								50 60	36 40	32	25 28	20 22	16	10 12	800	Nominal area se mm	bar des
	9	sed on nomina	the are had	Conversion factor: $1.0 \text{ MPa} = 1.0 \text{ N/mm}^2 = 145 \text{ nsi}$ Strengths are based on nominal area	$= 10 \text{ N/mm}^2$	or: 1.0 MPa	Conversion factor						ars (Table /	Area of b	Nominal	ments and	ASIM A615M-16 Weight Requirements and Nominal Area of bars (Table A1.1)	ASIMA
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(Sep	(%)			Strength			Strength	Strength	Load	Tubiann		į	ב ב ב ב					_
	Elongation	(%)		Tensile	Strength	Load	Yield or Proof	ШШ	Proof	UNIT	vveignt	a cal	Nominal Naminal			aci di canon	ic	į
Ве	Average	Elongation	TS/YS	Average	Tensile	ensile	Average	-	Yield of	Average Yield or Yield or		, cinal				tification	,	Z
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Dept. of Civil Engg., BUET, Dhaka-1000, Bangladesh Prof. Dr. Hasib Mohammed Ahsan, Test-in-Charge

Countersigned by;

Elongation in 8 in. [200 mm], min, %

Yield strength, min, psi [MPa]

Tensile strength, min. psi [MPa]

60 000 [420]

75 000 [520]

ASTM A615M-16 Tensile Requirements for Common Steel Grades

Grade 60 [420]

Grade 75 [520]

Grade 80

[550]

Actual dia, and TSYS ratio are provided for informative purpose only. These are not requirements of ASTM A615M-16.

Area and weight of 8mm and 22m dia. bars are derived based on principle follwed for other sizes in Table A1.

Measured unit weight shall not be less than 94% of the nominal weight. 8mm bar size is not covered in ASTM A615M-16.

2.98

491

3.853 4.834 6.313 7.99 9.865

804

1257

1963 2827

0.395

Nominal area, sq.mm

Actual diameter is the diameter of a perfectly round plain bar having same mass per unit length.

10, 12, 16, 20

Bar Designation No.

28, 32, 36, 40, 50, 60

15 October 2023

Dr. Annesha Enam Test performed by:

Assistant Professor, Dept. of Civil Engg., BUE

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Nominal weight kg/m	Nominal area, sq.mm	Bar desig./Nominal dia., mm	5M-16 Weight Require															SSRM	SSRM	SSRM				200		
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17.	804	28 32		1	1	1		_	1	-	-	-	-	-	1			2.474	2.477	2.457	kg/m			Weight	Unit	
201	1257	36 40							<u></u>										2.469		kg/m		Weight	Unit	Average	
1202		50 60							1	1	-	sed advatrad	rada da				100	183	183	183	kN		Load	Proof	Yield or	
				•						•				•	•).	000	580	580	580	MPa		Strength	Proof	Yield or	
		Convension racio: 1.0 mma = 1.0 mmm = 145 psi. Strengths are based on nominal area.	Conversion facto							-									(84000 psi)	580	MPa	(YS)	Strength	Yield or Proof	Average	
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ט		= 145 psi. stren	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		1	1		ı				ı	•		1	'		(i zooo pai)	(112000 pei)	770	MPa	(TS)	Strength	Tensile	Average	campies were received in olystated collaidon.
		gths are bar						,							1				<u>د</u> الا						SWST	
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		nal area.			1			'							•			ō	<u>,</u>				§ (Average	
																	Sati	Sau	001	Sati		s (્રે			

ASTM A615M-16 T

Actual diameter is the diameter of a perfectly round plain bar having same mass per unit length.

Actual dia. and TSYS ratio are provided for informative purpose only. These are not requirements of ASTM A615M-16. Area and weight of 8mm and 22m dia. bars are derived based on principle follwed for other sizes in Table A1. Measured unit weight shall not be less than 94% of the nominal weight. 8mm bar size is not covered in ASTM A615M-16

ominal weight, kg/m

0.395

0.617 | 0.888 | 1.578 | 2.466 | 2.98 | 3.853 | 4.834 | 6.313 | 7.99 | 9.865 |

Yield strength, min, psi [MPa] 90 000 [620] 100 000 [690] 105 000 [725] Yield strength, min, psi [MPa] 60 000 [420] 75 000 [520] 80 000 [550]	Facility of the street of the	Grade 60 [420]	Grade 75 [520]	Grade 80 [550]
	Tensile strength, min. psi [MPa] Yield strength, min, psi [MPa]	90 000 [620] 60 000 [420]	100 000 [690] 75 000 [520]	105 000 [7 80 000 [5:

25, 22

28, 32, 36, 40, 50, 60

Dept. of Civil Engg., BUET, Dhaka-1000, Bangladesh Prof. Dr. Hasib Mohammed Ahsan, Test-in-Charge

Countersigned by:

hBFF7B2GP

COL CAN

Dr. Annesha Enam Test performed by:

Assistant Professor, Dept. of Civil Engg., BU

It is also recommended that the test results be collected by a duly authorized person. samples are sent in a secure and sealed cover/packet/container under the signature of a competent authority. In order to avoid fradulent fabrication of test results, this report has been printed on a security Important Note: Samples as supplied to us have been tested. BRTC does not have any responsibility as to the representative character of the samples required to be tested. It is recommended that the



Mobile: 01819557964; PABX: (8802) - 55167100, 55167228-57 Ext. 7226, Info: http://brtc.ce.buet.ac.bd/#/home, Report verification: http://verify.ce.buet.ac.bd

Testing & Consu

STRENGTH OF MATERIALS LABORATORY

Sent by: Engr. Maksudul Karim, General Manager TEST OF DEFORMED M.S. BARS [ASTM A 615M-16]

Shahriar Steel Mills Ltd., 18, Konapara, Jatrabari, Dhaka

Project: Samples were received in UNSEALED condition.

Date of Test: 9/10/2023 Ref.: Letter; Dt. 7/10/2023

BRTC No.: 1103-02581/CE/23-24; Dt. 8/10/2023

SI. Frog Mark / Bar Actual Unit Average Yield or Yield or Average Tield or Nominal dia. Weight Unit Proof Yield or Yield	Conversion factor: 1.0 MPa = 1.0 N/mm² = 145 psi. Strengths are based on nominal area.	are based on nomina	are ba	ngths	² = 145 psi. Strer	a = 1.0 N/mm	tor: 1.0 MP	Conversion fac	4				A1.1)	f bars (Tabl	ASTM A615M-16 Weight Requirements and Nominal Area of bars (Table A1.1)	ASTM A6
Frog Mark / Bar Actual Unit Average Yield or Yield or Average Vield or Average Vield or Vield or Average Vield or		T			-	1						1	1	1	1	1
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Frog Mark / Bar Identification Actual Desig./ Desig./ Dar Identification Unit Identification Average Vield or Proof Vield or			1	1	1				-			l	1	1	-	,
Frog Mark / Bar Identification Actual Desig /				1	1		1		•			-	-	-	1	1
Frog Mark / Bar Identification Actual Desig./		-	-	1	-		1				1	1	1	-	1	
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Frog Mark / Bar Identification Actual Desig /				1	1							1	-	1	•	-
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Frog Mark / Bar Desig./ Desig./ Nominal Identification Bar Desig./ De	358 730 17	730				358			530	259		3.825	24.9	25	SSRM B500 DWR	သ
Frog Mark / Bar Identification Actual Desig./	357 725 (105000 psi) 1.38 17 17	725 (105000 psi) 1.38	725 (105000 psi)	725		57	u	(76000 psi)	525	257	3.823	3.838	25.0	25	SSRM B500 DWR	N
Frog Mark / Bar Actual Unit Average Yield or Yield or Average Identification Desig / bar Weight Unit Proof Proof Yield or Proof Weight Load Strength Strength (YS) mm mm kg/m kg/m kN MPa MPa	354 720 725 17	720 725	720	720		354		525	520	254		3.807	24.8	25	SSRM B500 DWR	1
Frog Mark / Bar Actual Unit Average Yield or Yield or Average Identification Desig./ Desig./ Weight Unit Proof Proof Yield or Proof Weight Load Strength Strength (YS)	kN MPa MPa 200 mm)	MPa MPa	MPa	MPa		z		MPa	MPa	kN	kg/m	kg/m	mm	mm		
Frog Mark / Bar Actual Unit Average Yield or Yield or Average Identification Desig./ bar Weight Unit Proof Proof Yield or Proof Vield or Proof Street Constitution	(75) (G. length =			(TS)				(YS)	ungnanc	Load	Aveign		ola.	dia.		
Frog Mark / Bar Actual Unit Average Yield or Yield or Average	(%) Elo	Strength Tensile (%)	Strength	Strength		oad		Yield or Proof	Proof	Proof	Unit	Weight	bar	Desig./	Identification	No.
	S D	Tensile Average TS/YS Elongation	Tensile Average TS/YS	Tensile		nsile	Te	Average	Yield or		Average	Unit	Actual	Bar	Frog Mark /	SI.

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	ASTM A615M-16 Tensile Requirements for Common Steel Grades
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Actual dia, and TS/YS ratio are provided for informative purpose only. These are not requirements of ASTM A615M-16. Area and weight of 8mm and 22m dia. bars are derived based on principle follwed for other sizes in Table A1.

Weasured unit weight shall not be less than 94% of the nominal weight. 8mm bar size is not covered in ASTM A615M-16.

0.617 | 0.888 | 1.578 | 2.466 | 2.98 | 3.853 | 4.834 | 6.313 | 7.99 | 9.865

491 25 28

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Actual diameter is the diameter of a perfectly round plain bar having same mass per unit length

Bar desig /Nominal dia., mm

50.3

	Grade 60	Grade 75	Grade 80
	[420]	[520]	[550]
Tensile strength, min. psi [MPa]	90 000 [620]	100 000 [690]	105 000 [725]
Yield strength, min, psi [MPa]	60 000 [420]	75 000 [520]	80 000 [550]
Elongation in 8 in. [200 mm], min, %			
Bar Designation No.			
10, 12, 16, 20	9	7	7
25, 22	8	7	7
28 32 36 40 50 60	7	6	6

Prof. Dr. Hasib Mohammed Ahsan, Test-in-Charge Dept. of Civil Engg., BUET, Dhaka-1000, Bangladesh Countersigned by:

ierXMfJQn

15 October 2023

Dr. Annesha Enam Test performed by:



Assistant Professor, Dept. of Civil Engg., BU

Important Note: Samples as supplied to us have been tested. 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 the signature of a competent authority. In order to avoid fradulent fabrication of test results, this report has been printed on a securit it is also recommended that the test results be collected by a duly authorized person.



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Testing & Co Bureau of R

STRENGTH OF MATERIALS LABORATORY BRTC No.: 1103-02581/CE/23-24; Dt. 8/10/2023

TEST OF DEFORMED M.S. BARS [ASTM A 615M-16]

Sent by: Engr. Maksudul Karim, General Manager Shahriar Steel Mills Ltd., 18, Konapara, Jatrabari, Dhaka.

d in TINSEALED condition

Ref.: Letter; Dt. 7/10/2023

Date of Test: 9/10/2023

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Frog Mark / Bar Actual Unit Average Yield or Average Tensile Identification Desig./ bar Weight Unit Proof Proof Yield or Proof Load Nominal dia. Weight Load Strength Strength Strength Load SSRM B500 DWR 32 32.0 6.326 419 520 625 SSRM B500 DWR 32 32.0 6.318 6.335 417 520 (75500 psi) 625 SSRM B500 DWR 32 32.1 6.362 425 530 (75500 psi) 625							-	-		CO C	c
Frog Mark / Bar Actual Unit Average Yield or Average Tensile Identification Desig./ bar Weight Unit Proof Proof Yield or Proof Load Nominal dia. Weight Load Strength Strength Strength (YS) MB SSRM B500 DWR 32 32.0 6.326 419 520 (75500 psi) 625 SSRM B500 DWR 32 32.0 6.318 6.335 417 520 (75500 psi) 625	Ö			530	425		6.362	32.1	32	SSRM B500 DWR	ו נג
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Actual diameter is the diameter of a perfectly round plain bar having same mass per unit length. Actual dia, and TSVS ratio are provided for informative purpose only. These are not requirements of ASTM A615M-16. Area and weight of 8mm and 22m dia. bars are derived based on principle follwed for other sizes in Table A1.1

AST

Grade 60 Grade 75	Grade 60	Grade 75	Grade 80
	[420]	[520]	[550]
Tensile strength, min. psi [MPa]	90 000 [620]	90 000 [620] 100 000 [690] 105 000 [725]	105 000 [725]
Yield strength, min, psi [MPa]		60 000 [420] 75 000 [520] 80 000 [550]	80 000 [550]
Elongation in 8 in. [200 mm], min, %			
Day Decimation No			

Bar Designation No.

10, 12, 16, 20

Countersigned by:

Dept. of Civil Engg., BUET, Dhaka-1000, Bangladesh Prof. Dr. Hasib Mohammed Ahsan, Test-in-Charge



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Dr. Annesha Enam Test performed by:

Assistant Professor, Dept. of Civil Engg

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