

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 & Consultation

## STRENGTH OF MATERIALS LABORATORY

Sent by: Engr. Md. Maksudul Karim, General Manager (Plant) TEST OF DEFORMED M.S. BARS IBDS ISO 6935-2:2016

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

Date of Test: 13/3/2023 Ref.: Letter; Dt. 12/3/2023 BRTC No.: 1102-85850/CE/22-23; Dt. 12/3/2023

Samples were received in UNSEALED condition.

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-		•		•	•			•	-			-	ယ	2	•				Ş ,	SI.	
		_	_	-	-	1	r	-	r	r	-	_	SSRM B420 DWR	SSRM B420 DWR	SSRM B420 DWR				Identification	Frog Mark /	
		-	•	•	•		•				,	•	10	10	10	mm			dia.	Nominal	
		-		-	-	-	,	-	1	-	,	1	9.9	9.9	9.9	mm			dia.	Actual	
		1		- , , , , ,	-	-	-	-	-	-		-	0.603	0.601	0.600	kg/m	Length	Unit	Per	Mass	
					-	**************************************								0.601		kg/m	Length	Unit	Mass Per	Average	
						-	Turk miller						35.8	36.3	35.8	ΚN		Load	Proof	Yield or	
			•								<b>)</b>		453	459	453	MPa	Re	Strength	Proof	Yield or Yield or	
														455		MPa	Ren	Strength,	Yield	Average	
		-			7	-							50.4	50.9	50.4	KN			Load	Tensile	
	•	-	-	-		-		•	-	•	1		640	645	640	MPa	<b>7</b> 0		Strength	Tensile	
											•			640		MPa	<b>⊅</b> 0	Strength,	Tensile	Average	
								•						1.41						R <sub>m</sub> /R <sub>eH</sub>	
	,	•											28	26	28	= 5d)	(G.Jength	(%)	Elongation	Total	
		•		ľ	•						•			27			(%)	Elongation	Total	Average	
	•	•				-	-	-					Satisfactory	Satisfactory	Satisfactory		samples)	(Seperate	Test	Bend	
												•	•						Test	Rebend	

*22mm dia. bar is n	unit length	Nominal mass per	Nominal cross sect	Nominal bar dia., mm	BDS ISO 6935-2:201
22mm dia, bar is not covered in BDS ISO 6935-2:2016. Its properties are derived following the principle used for other bar sizes.	Permissible deviation, %	Nominal, kg/m	ominal cross sectional area, sq.mm	m	16 Weight Requirements, Nominal /
5-2:201	±8	0.222	28.3	6	lominal
6. Its p	±8	0.395	50.3	8	Area e
roperti	±6	0.616	78.5	10	tc. (Tal
es are	±6   ±5   ±5   ±5   ±4   ±4   ±4   ±4	0.887	113	12	ble 2).
derive	±5	1.21	154	14]	
d follo	#5	1.58	154   201   314	16	
wing t	±5	2.46	314	20	
he pri	±5	2.98 3.85	380	22*	
nciple	#	3.85	491	25	
used 1	¥	4.84	616	28	
for oth	#	6.31	804	32	
er bar	#	9.87	257	40	
Sizes.	#	15.42	1964	50	

Conversion factor: 1.0 MPa = 1.0 N/mm<sup>2</sup> = 145 psi. Strengths are based on nominal area.

Actual diameter of bars are shown for informative purpose only. It is not a requirement of BDS ISO 6935-2:2016. Actual diameter is the diameter of a perfectly round plain bar having same mass per unit length.

CEO DEI CAG	3-Z 168311	BDS 180 6933-2 Tellsile Requirements for Common Steel Glades	Common	oreel Gland	10
Steel	Yield S	Yield Strength, R .H, MPa	Duc	<b>Ductiliy Properties</b>	rties
Grade	Min.	Max.	Rm/ReH	Elongation,	n, % (min.)
			min.	Total	At Rm
B400C-R	400	•	1.15	7.1	
B400CWR	400	-	1.15	7.1	7
B500C-R	500		1.15	14	7
B500CWR	500		1.15	14	7
B600C-R	600		1.15	10	7
B450CWR	450	1.25 R et (min.)	1.15		7.5
B400DWR	400	1.3 R <sub>eH</sub> (min.)	1.25	17	8
B420DWR	420	1.3 R <sub>eH</sub> (min.)	1.25	16	80
RSOODWR	500	13 Ray (min.)	1 25	ಚ	00

Countersigned by:

Prof. Dr. Hasib Mohammed Ahsan, Test-in-Charge

Dept. of Civil Engg., BUET

fMEB7nYbA



Dr/ Mohammad Neaz Murshed

Testiliperformed by:

Associate Professor, Dept. of Civil Engg., Bl

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 paper. 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 & Consultate Bureau of Researc

### STRENGTH OF MATERIALS LABORATORY

Sent by: Engr. Md. Maksudul Karim, General Manager (Plant)

Shahriar Steel Mills Ltd., Konapara, Jatrabari, Dhaka

TEST OF DEFORMED M.S. BARS IBDS ISO 6935-2:20161

BRTC No.: 1102-85850/CE/22-23; Dt. 12/3/2023

Date of Test: 13/3/2023 Ref.: Letter; Dt. 12/3/2023

Samples were received in UNSEALED condition.

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00000	•	-	-		-	,		•			•	•	သ	2	1				No.	SI.
	1	_		-	•	-	r	1	-	,		1	SSRM B420 DWR	SSRM B420 DWR	SSRM B420 DWR				Identification	Frog Mark /
	-		-	•	•	•	•			•	•	•	12	12	12	mm			dia.	Nominal
	_	-	1	-	-	-		,	-	-		-	11.8	11.8	11.9	mm			dia.	Actual
		-		7///					a	- )			0.856	0.853	0.868	kg/m	Length	Unit	Per	Mass
														0.859		kg/m	Length	Unit	Mass Per	Average
													51.7	51.3	53.1	kN		Load	Proof	Yield or
	•	•	•	*					•			<b>)</b>	458	454	470	MPa	Ref	Strength	Proof	Yield or
														461		MPa	Ren	Strength,	Yield	Average
					1	,	-						69	69	70.8	ΚŃ			Load	Tensile
			-	1	-			•	1	-	•	1	610	610	625	MPa	æ ₽		Strength	Tensile
		•												615		MPa	<i>7</i> 0	Strength,	Tensile	Average
		•						•			•			1.33			1			R <sub>m</sub> /R <sub>eH</sub>
	•		1						ı	•	•		23	23	22	= 5d)	(G.length	(%)	Elongation	Total
		•												23			(%)	Elongation	Total	Average
	•	1					•			-		•	Satisfactory	Satisfactory	Satisfactory		samples)	(Seperate	Test	Bend
															•				īest	Reben

ominal cross sectional area, sq.mm

Nominal bar dia., mm lominal mass per Nominal, kg/m 22mm dia. bar is not covered in BDS ISO 6935-2:2016. Its properties are derived following the pri 201 #5 iple used for other bar sizes 15.42

Conversion factor: 1.0 MPa = 1.0 N/mm<sup>2</sup> = 145 psi. Strengths are based on nominal area

Actual diameter is the diameter of a perfectly round plain bar having same mass per unit length Actual diameter of bars are shown for informative purpose only. It is not a requirement of BDS ISO 6935-2:2016.

BDS ISO 6935-2 Tensile Requirements for Common Steel Grades

Steel	Yield S	Yield Strength, ReH, MPa	Duo	<b>Ductilly Properties</b>	rties
Grade	Min.	Max.	Rm/Res	Elongation.	n, % (min.)
			ain.	Total	
B400C-R	400		1.15	71	7
B400CWR	400	-	1.15	**	
B500C-R	500		1.15	71	7
B500CWR	500		1.15	14	
B600C-R	600		1.15	0,	
B450CWR	450	1.25 R <sub>вн</sub> (min.)	1.15		7.5
B400DWR	400	1.3 R <sub>в</sub> н (min.)	1.25	17	8
B420DWR	420	1.3 R et (min.)	1.25	16	8
B500DWR	500	1.3 R <sub>eH</sub> (min.)	1.25	£t	8

Countersigned by:

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

4dfBdHB4m

Dr/ Mohammad Neaz Murshed Associate Professor, Dept. of Civil Engg., Bl Test berformed by: 16 March 2023

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 par It is also recommended that the test results be collected by a duly authorized person. 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



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Testing & Consultati

### STRENGTH OF MATERIALS LABORATORY

Sent by: Engr. Md. Maksudul Karim, General Manager (Plant) TEST OF DEFORMED M.S. BARS IBDS ISO 6935-2:20161

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

Date of Test: 13/3/2023 Ref.: Letter; Dt. 12/3/2023

BRTC No.: 1102-85850/CE/22-23; Dt. 12/3/2023

Samples were received in UNSEALED condition

	•	1	1			-	•	'	-	-		-	3	2	•				No.	SI.	
	1	-			T.	-	1	1	-1	• • • • • • • • • • • • • • • • • • •	-		SSRM B420 DWR	SSRM B420 DWR	SSRM B420 DWR				Identification	Frog Mark /	
•		-			•		•	•		,			16	16	16	mm			dia.	Nominal	
-	_	-	-						1	-	-		16.0	16.0	16.0	mm			dia.	Actual	
	-	\	7(()			7				-	-	) 	1.575	1.578	1.576	kg/m	Length	Unit	Per	Mass	
										IIII alkalkalkalkalk				1.576		kg/m	Length	Unit	Mass Per	Average	
						-		Manual Control					90.6	91.6	9.06	kN		Load	Proof	Yield or	
	•												451	456	451	MPa	ReH	Strength	Proof	Yield or	
	••			*\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\										453		MPa	70 ##	Strength,	Yield	Average	
			-			-	-						130	130	130	KN			Load	Tensile	
•	•	-	-			•		- I		-	-	•	645	645	645	MPa	<i>2</i> 0		Strength	Tensile	odilibies w
								•			•			645		MPa	<b>7</b> 0 ₃	Strength,	Tensile	Average	Ale lecela
								•						1.42						R <sub>m</sub> /R <sub>eH</sub>	ed III Olac
•	•									•		-	26	25	25	= 5d)	(G.length	(%)	Elongation	Total	Samples were received in ONSEALED COMMING.
								•			•			25			(%)	Elongation	Total	Average	IGNEROLI.
													Satisfactory	Satisfactory	Satisfactory		samples)	(Seperate	Test	Bend	
-	•				1				•										Test	Reben	

Nominal bar diamm	6	6   8   10	10	0 1 12	14	16	20	22*	25	28	32	40	50
Nominal cross sectional area, sq.mm	28.3	50.3	78.5	113	113   154   201   314   380	201	314	380	491	616	804	616 804 1257 1964	1964
Nominal mass per [Nominal, kg/m	0.222 0.3	0.395	0.616	0.887	1.21	1.58	2.46	2.98	3.85	4.84	6.31	9.87	2.46 2.98 3.85 4.84 6.31 9.87 15.42
unit length Permissible deviation, %	±8	8∓	±6	±6	±6   ±5   ±5   ±5   ±4   ±4   ±4   ±4	<b>±</b> 5	<b>±</b> 5	±5	±4	±4	<b>±4</b>	±4	±4
*22mm dia har is not covered in BDS ISO 6935-2:2016. Its properties are derived following the principle used for other bar sizes.	5.2.201	6 Is n	roperti	es are	derive	d follo	Wing	he pri	nciple	used	for ot	her ba	Sizes

Actual diameter is the diameter of a perfectly round plain bar having same mass per unit length Actual diameter of bars are shown for informative purpose only, it is not a requirement of BDS ISO 6935-2:2016.

BDS ISO 6935-2 Tensile Requirements for Common Steel Grades

Steel	Yield S	Steel   Yield Strength, R. H., MPa   Ductiliy Properti	Du	Ductiliy Properties	rties
Grade	Min.	Max.	Rm/ReH	Elongation,	n, % (min.)
			min.	Total	At R <sub>m</sub>
B400C-R .	400		1.15	14	
B400CWR	400		1.15	14	7
B500C-R	500		1.15	14	7
B500CWR	500		1.15	14	
B600C-R	600		1.15	10	7
B450CWR	450	1.25 R ен (min.)	1.15		7.5
B400DWR	400	1.3 R ен (min.)	1.25	17	8
B420DWR	420	1.3 R ен (min.)	1.25	16	8
B500DWR	500	1.3 R <sub>eH</sub> (min.)	1.25	13	8

Countersigned by:

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

Ej8j3HdbZ

Conversion factor: 1.0 MPa = 1.0 N/mm<sup>2</sup> = 145 psi. Strengths are based on nominal area.



Dr. Mohammad Neaz Murshed

Associate Professor, Dept. of Civil Engg., Bl

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#### STRENGTH OF MATERIALS LABORATORY

Sent by: Engr. Md. Maksudul Karim, General Manager (Plant) TEST OF DEFORMED M.S. BARS [BDS ISO 6935-2:2016]

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

Date of Test: 13/3/2023

Ref.: Letter; Dt. 12/3/2023

BRTC No.: 1102-85850/CE/22-23; Dt. 12/3/2023

Samples were received in UNSEALED condition.

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-			-			l.		,	•	•				ယ	2	1				<u>R</u>	SI.	
		-	_	7	1			1			-	-	I	SSRM B420 DWR	SSRM B420 DWR	SSRM B420 DWR				Identification	Frog Mark I	
		-	•	-				•	•				•	20	20	20	mm			dia.	Nominal	
	_	•	1	-	-	,				•	-	-	,	19.9	19.9	19.9	mm			dia.	Actual	
	7	1	-		N-VV			-	\	(£	-		-	2.443	2.439	2.443	kg/m	Length	Unit	Per	Mass	
								* (** T)	000000000000000000000000000000000000000						2.442		kg/m	Length	Unit		Average	
														149	148	146	ΚN		Load	Proof	Yield or	
		•												476	473	466	MPa	ReH	Strength	Proof	Yield or	
															472		MPa	Ref	Strength,	Yield	Average	
			-	-	1		-	-	\$ 600 CE					205	205	203	KN			Load	Tensile	
3			1						•			•	•	650	650	645	MPa	æ.		Strength	Tensile	
												•			650		MPa	⊅0 ∃	Strength,	Tensile	Average	
															1.38	)					R <sub>m</sub> /R <sub>eH</sub>	
	•		•							•				23	3 &	23	= 5d)	(G.length	(%)	Elongation	Total	
												•			Š.	}		(%)	Elongation	Total	Average	
	•	•					•							Salisiaciony	Satisfactory	Satisfactory		samples)	(Seperate	Test	Bend	
	•																			Test	Keben	

BDS ISO 6935-2:2016 Weight Requirements, Nominal Area etc. (Table 2). Nominal bar dia., mm ominal mass per Nominal, kg/m mm dia. bar is not covered in BDS ISO 6935-2:2016. Its proper minal cross sectional area, sq.mm 6.31 9.87 1964 15.42

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

BUS 150 693	5-Z lensiii	BDS ISO 6935-2 Tensile Requirements for Common Steel Glades	Common	Steel Grad	65
Steel	Yield S	Yield Strength, R .H, MPa	Du	<b>Ductiliy Properties</b>	rties
Grade	Kin.	Max.	Rm/R#	Elongation,	n, % (min.)
			3.	Total	At Rm
B400C-R	400	-	1.15	14	7
B400CWR	400		1.15	14	7
B500C-R	500		1.15	14	7
B500CWR	500	-	1.15	14	7
B600C-R	600	-	1.15	10	
B450CWR	450	1.25 R eн (min.)	1.15		7.5
B400DWR	400	1.3 R ен (min.)	1.25	17	8
B420DWR	420	1.3 R ен (min.)	1.25	16	8
BroomB	500	13 P (min )	125	3	**

Countersigned by:

Dept. of Civil Engg., BUET

Prof. Dr. Hasib Mohammed Ahsan, Test-in-Charge

9G2tA7CQ2

Conversion factor: 1.0 MPa = 1.0 N/mm² = 145 psi. Strengths are based on nominal area



Dr. Mohammad Neaz Murshed Test performed by:

Associate Professor, Dept. of Civil Engg., Bl

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### STRENGTH OF MATERIALS LABORATORY

TEST OF DEFORMED M.S. BARS IBDS ISO 6935-2:20161 Sent by: Engr. Md. Maksudul Karim, General Manager (Plant) Shahriar Steel Mills Ltd., Konapara, Jatrabari, Dhaka.

BRTC No.: 1102-85850/CE/22-23; Dt. 12/3/2023 Ref.: Letter; Dt. 12/3/2023

Date of Test: 13/3/2023

Samples were received in UNSEALED condition.

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		-	+		•		•			•		•	•	3	2	7				No.	SI.	
1		•		•	•		п	3	-	1		•		SSRM B420 DWR	SSRM B420 DWR	SSRM B420 DWR				Identification	Frog Mark /	
•		•	•	•	-			•					1	25	25	25	mm			dia.	Nominal	
ı		1	1	1	-		-	•	-		-	-	•	24.8	24.8	24.7	mm			dia.	Actual	
1		-	-/	-	7					â		_	1	3.785	3.780	3.761	kg/m	Length	Unit	Per	Mass	
															3.775		kg/m	Length	Unit	Mass Per	Average	
					1				solution of the second					227	227	221	kN		Load	Proof	Yield or	
•	The second second		•											463	463	451	MPa	Re	Strength	Proof	Yield or Yield or	
		•						86							459		MPa	Ren	Strength,	Yield	Average	
		-	1	1	T			-						314	314	311	<u>*</u>			Load	Tensile	
•		-	-		-						•		•	640	640	635	MPa	<i>2</i> 0 ≡		Strength	Tensile	Serial Lines
									•			•			635		MPa	.20 ∋	Strength,	Tensile	Average	0.000.
									•			•			1.38						R <sub>m</sub> /R <sub>eH</sub>	
							•		•		-			19	19	18	= 5d)	(G.length	(%)	Elongation	Total	Campion more records in one of the container
												•			79			(%)	Elongation	Total	Average	
•		•					•				•		•	Satisfactory	Satisfactory	Satisfactory		samples)	(Seperate	Test	Bend	
				,							•		0	•		1				Test	Reben	

BDS ISO 6935-2:2016 Weight Requirements, Nominal Area etc. (Table 2).

unit	Nomi	Nomi	Nomi
unit length	nal mass per	nal cross sectio	nal bar dia., mm
Permissible deviation, %	Nominal, kg/m	ional area, sq.mm	ā
#8	0.222	28.3	6
±8	0.395	50.3	8
_±6	0.616	78.5	10
±6	0.887	78.5   113   154   201   314   380   491   616   804   1257   1964	12
±5	1.21	154	14
±5	1.58	201	16
<b>±</b> 5	2.46	314	20
±5	2.98	380	22*
±5 ±4	3.85	491	25
±4	8 3.85 4.84	616	28
#4	6.31	804	32 40
<b>4</b> 4 4 4	9.87	1257	40
#	15.42	1964	50

"22mm dia. bar is not covered in BDS ISO 6935-2:2016. Its properties are derived following the principle used for other bar sizes.

Actual diameter of bars are shown for informative purpose only. It is not a requirement of BDS ISO 6935-2:2016.

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

BDS ISO 6935-2 Tensile Requirements for Common Steel Grades

Yield S	trength, R ы, MPa		tilly Prope	rties
Min.	Max.	Rm/R	Elongatio	n, % (min.)
		min.	Total	A
400		1.15	14	
400		1.15	14	7
500		1.15	14	
500		1.15	14	
600		1.15	10	7
450	1.25 R eн (min.)	1.15		7.5
400	1.3 R <sub>ен</sub> (min.)	1.25	17	8
420	1.3 R ен (min.)	1.25	16	8
500	1.3 R <sub>eн</sub> (min.)	1.25	£1	8
	Yield S Min. 400 400 500 500 600 450 420 500	Wield Strength, R at, MPa           Min.         Max.           400            500            600            450         1.25 R at (min.)           400         1.3 R at (min.)           420         1.3 R at (min.)           500         1.3 R at (min.)	Strength, R et, MPa  Max. R m/R  min  115  1.15	Ductil

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

51 6138 FYFN Conversion factor: 1.0 MPa = 1.0 N/mm<sup>2</sup> = 145 psi. Strengths are based on nominal area

16 March 2023
Test performed by:

Dr. Mohammad Neaz Murshed Associate Professor, Dept. of Civil Engg., Bl

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 par 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