



# BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY (BUET)

## DEPARTMENT OF CIVIL ENGINEERING STRENGTH OF MATERIALS LABORATORY



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>

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

Sent by: Md. Moriruzzaman, Deputy General Manager, Sales & Marketing  
Elite Iron & Steel Ind. Ltd., Bade Kalmeswar, Board Bazar, Joydebpur, Gazipur.  
Project: ---

BRTC No.: 1103-24619/CE/23-24; Dt. 5/6/2024  
Ref.: Letter; Dt. 5/6/2024  
Date of Test: 8/6/2024

Samples were received in UNSEALED condition.

Sl. No.	Frog Mark / Identification	Bar Desig./ Nominal dia.	Actual bar dia.	Unit Weight	Average Unit Weight	Yield or Proof Load	Yield or Proof Strength	Average Yield or Proof Strength (YS)	Tensile Load	Tensile Strength	Average Tensile Strength (TS)	T.S/Y.S	Elongation (%)	Average Elongation (%)	Bend Test (Separate samples)
1	EIS B420 DWR	20	20.2	2.516	2.515	156	498	491	197	630	630	-	16	-	Satisfactory
2	EIS B420 DWR	20	20.2	2.510	2.515	152	483	(71000 psi)	200	640	630	1.28	16	16	Satisfactory
3	EIS B420 DWR	20	20.2	2.520	2.515	154	492	196	196	625	630	-	16	-	Satisfactory
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

ASTM A615M-16 Weight Requirements and Nominal Area of bars (Table A1.1)													
Bar desig./Nominal dia., mm	8	10	12	16	20	22	25	28	32	36	40	50	60
Nominal area, sq.mm	50.3	79	113	201	314	380	491	616	804	1018	1257	1963	2827
Nominal weight, kg/m	0.395	0.617	0.898	1.578	2.466	2.98	3.853	4.834	6.313	7.99	9.865	15.41	22.2

Measured unit weight shall not be less than 94% of the nominal weight. 8mm bar size is not covered in ASTM A615M-16. Area and weight of 8mm and 22m dia. bars are derived based on principle followed for other sizes in Table A1.1. Actual dia. and T.S/Y.S ratio are provided for informative purpose only. These are not requirements of ASTM A615M-16. Actual diameter is the diameter of a perfectly round plain bar having same mass per unit length.

ASTM A615M-16 Tensile Requirements for Common Steel Grades

Tensile strength, min. psi [MPa]	Grade 60 [420]		Grade 75 [520]	Grade 80 [550]
	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. %				
Bar Designation, No.	9	8	7	7
10, 12, 16, 20				
25, 28	7	7	6	6
36, 40, 50, 60				

Countersigned by:

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

Test performed by:

Dr. A.B.M. Badruzaman  
Professor, Dept. of Civil Engg., BUET

10 June 2024



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 fraudulent fabrication of test results, this report has been printed on a security paper. It is also recommended that the test results be collected by a duly authorized person.





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**TEST OF DEFORMED M.S. BARS [BDS ISO 6935-2:2016]**  
 Sent by: Md. Moniruzzaman, Deputy General Manager, Sales & Marketing  
 Elite Iron & Steel Ind. Ltd., Bade Kalmeswar, Board Bazar, Joydebpur, Gazipur.  
 Project: ---

BRTC No.: 1103-24619/CE/23-24; Dt. 5/6/2024  
 Ref.: Letter: Dt. 5/6/2024  
 Date of Test: 8/6/2024

Samples were received in UNSEALED condition.

Sl. No.	Frog Mark / Identification	Nominal dia.	Actual dia.	Mass Per Unit Length	Average Mass Per Unit Length	Yield or Proof Load	Yield or Proof Strength $R_{eH}$ (MPa)	Average Yield Strength, $R_{eH}$ (MPa)	Tensile Load	Tensile Strength $R_m$ (MPa)	Average Tensile Strength, $R_m$ (MPa)	$R_m/R_{eH}$	Total Elongation (%) (G length = 5d)	Average Total Elongation (%)	Bend Test	Rebend Test (Separate samples)
1	EIS B420 DWR	20	20.2	2.516	2.515	-	-	-	-	-	-	-	-	-	-	Satisfactory
2	EIS B420 DWR	20	20.2	2.510	-	-	-	-	-	-	-	-	-	-	-	Satisfactory
3	EIS B420 DWR	20	20.2	2.520	-	-	-	-	-	-	-	-	-	-	-	Satisfactory

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

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

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

\*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 is 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**

Steel Grade	Yield Strength, $R_{eH}$ (MPa)	Ductility Properties	
		$R_m/R_{eH}$ min.	Elongation, % (min.) Total At $R_m$
B400C-R	400	1.15	14
B400CWR	400	1.15	14
B500C-R	500	1.15	14
B500CWR	500	1.15	14
B600C-R	600	1.15	10
B450CWR	450	1.25 $R_{eH}$ (min.)	7
B400DWR	400	1.3 $R_{eH}$ (min.)	17
B420DWR	420	1.3 $R_{eH}$ (min.)	16
B500DWR	500	1.3 $R_{eH}$ (min.)	13

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

Test performed by:  
  
 Dr. A.B.M. Badruzzaman  
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