



Client : Engr. Md. Tanjiddul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29926/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Professor Dr. Md. Aminul Islam

10 September 2024
MME 0130/2024-2025



wvgf7u5pc77

TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark	Sample No.	Bar Designation/ Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R_{eH}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R_m	Average Tensile Strength	R_m/R_{eH}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A_{gt}	Average Elongation at Maximum Force, A_{gt}	Bend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	%	(Separate Sample)
GPH QUANTUM B600D-R 12	1	12	11.91	0.874	0.875	71.40	632	626 (91000)	93.00	822	821 (119000)	1.30	20	15	12	9	Satisfactory
	2	12	11.90	0.877		70.80	626		93.00	822		1.31	12		8		Satisfactory
	3	12	11.93	0.873		70.10	620		92.40	817		1.32	12		8		Satisfactory

Rashed 11 SEP 2024
Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Weight Requirements and Nominal Cross-Sectional Area for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 2)

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.82	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±3	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)

Steel Grade	Upper Yield Strength		Ductility Properties		
	R_{eH}		R_m/R_{eH}	A	A_{gt}
	MPa			%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	---	1.15	14	7
B500C-R / B500CWR	500	---		10	
B600C-R	600	---		17	
B400D/R	400	1.3 x R_{eH} (min.)	1.25	16	
B420D/R	420			13	
B500D/R	500			10	
B600D/R	600	1.2 x R_{eH} (min.)			



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29927/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Professor Dr. Md. Aminul Islam

21 September 2024
MME 0131/2024-2025



0kgejuxpcvv

TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No	Bar Designation/ Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{el}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{el}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Average Elongation at Maximum Force, A _{gt}	Bend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	%	(Separate Sample)
GPH QUANTUM B600D-R 16	1	16	15.95	1.586	1.589	129.50	644	645 (93500)	168.50	838	838 (121500)	1.30	20	19	13	12	Satisfactory
	2	16	15.93	1.580		130.20	647		168.70	839		1.30	18		11		Satisfactory
	3	16	15.96	1.600		129.40	643		168.60	838		1.30	18		11		Satisfactory

Hashed 1 SEP 2024

Dr. H. M. Mamun Al Rashed
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Page 1 of 1

Weight Requirements and Nominal Cross-Sectional Area for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 2)

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	15	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.24	6.71	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{el}		R _m / R _{el}	A	A _{gt}
	MPa			%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	---	1.15	14	7
B500C-R / B500CWR	500	---		10	
B600C-R	600	---		17	
B400DWR	400	1.3 x R _{el} (min.)	1.25	16	8
B420DWR	420			13	
B500DWR	500			10	
B600D-R	600	1.2 x R _{el} (min.)			



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29929/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Professor Dr. Md. Aminul Islam

21 September 2024
MME 0132/2024-2025



qv2hvuq9cee

TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No	Bar Designation/ Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{el}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{el}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Average Elongation at Maximum Force, A _{gt}	Bend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	%	(Separate Sample)
GPH QUANTUM B600D-R 20	1	20	19.94	2.440	2.433	199.60	635	634 (92000)	251.00	799	797 (115500)	1.26	19	17	13	12	Satisfactory
	2	20	19.93	2.436		199.50	635		250.80	798		1.26	16		11		Satisfactory
	3	20	19.92	2.422		198.80	633		249.80	795		1.26	17		11		Satisfactory

Rashed 1 SEP 2024
Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Weight Requirements and Nominal Cross-Sectional Area for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 2)

Bar Designation/Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{el}		R _{el} /R _m	A	A _{gt}
	MPa			%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400C-WR	400	—	1.15	14	7
B500C-R / B500C-WR	500	—		10	
B600C-R	600	—		17	
B400DWR	400	1.3 x R _{el} (min.)	1.25	16	8
B420DWR	420			13	
B500DWR	500			10	
B600D-R	600	1.2 x R _{el} (min.)			



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29931/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Professor Dr. Md. Aminul Islam

28 September 2024
MME 0133/2024-2025



nv7c4u0kc65

TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation/ Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{el}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{el}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Average Elongation at Maximum Force, A _{gt}	Bend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	%	(Separate Sample)
GPH QUANTUM B600D-R 25	1	25	25.00	3.893	3.891	320.70	653	651 (94500)	401.20	817	816 (118500)	1.25	19	18	12	11	Satisfactory
	2	25	25.00	3.891		319.90	651		401.80	818		1.26	17		10		Satisfactory
	3	25	24.97	3.889		318.00	648		399.70	814		1.26	17		10		Satisfactory

Hashed 28 SEP 2024

Dr. H. M. Mamun Al Rashed
Professor and Head

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	+8	+8	+6	+6	+5	+5	+4	+4	+4	+4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

Steel Grade	Upper Yield Strength		Ductility Properties	
	R _{el}		A	
	MPa		%	
	Minimum	Maximum	Minimum	Minimum
B400C-R / B400CWR	400	---	1.15	7
B500C-R / B500CWR	500	---		
B600C-R	600	---		
B400DWR	400	1.3 x R _{el} (mm)	1.25	8
B420DWR	420			
B500DWR	500			
B600D-R	600	1.2 x R _{el} (mm)		



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29932/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Professor Dr. Md. Aminul Islam

11 September 2024
MME 0134/2024-2025



2lpbku40cjj

TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation/ Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{el}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{el}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Average Elongation at Maximum Force, A _{gt}	Bend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	%	(Separate Sample)
GPH QUANTUM B600D-R 28	1	28	27.82	4.770	4.769	375.90	610	612 (88500)	475.60	772	773 (112000)	1.27	17	17	10	10	Satisfactory
	2	28	27.83	4.771		378.90	615		476.50	774		1.26	20		11		Satisfactory
	3	28	27.81	4.767		375.90	610		475.00	771		1.26	15		9		Satisfactory

Hashed 11 SEP 2024

Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{el}		R _m /R _{el}		A _{gt}
	MPa		%		%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	---	1.15	14	7
B500C-R / B500CWR	500	---		10	
B600C-R	600	---		17	
B400DWR	400	1.3 x R _{el} (min.)	1.25	16	8
B420DWR	420			13	
B500DWR	500			10	
B600D-R	600	1.2 x R _{el} (min.)			



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29933/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Professor Dr. Md. Aminul Islam

21 September 2024
MME 0135/2024-2025



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TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No	Bar Designation/ Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{elt}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{elt}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Average Elongation at Maximum Force, A _{gt}	Bend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	%	(Separate Sample)
GPH QUANTUM B600D-R 32	1	32	31.88	6.176	6.236	503.90	626	629 (91155)	648.10	806	807 (117035)	1.29	14	14	10	10	Satisfactory
	2	32	31.84	6.234		504.20	627		647.90	805		1.29	14		10		Satisfactory
	3	32	32.01	6.298		509.30	633		652.20	811		1.28	13		9		Satisfactory

H. M. Mamun Al Rashed
Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Weight Requirements and Nominal Cross-Sectional Area for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 2)

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{elt}		R _m /R _{elt}	A	A _{gt}
	MPa			%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	---	1.15	14	7
B500C-R / B500CWR	500	---		10	
B600C-R	600	---		17	
B400DWR	400	1.3 x R _{elt} (min.)	1.25	16	8
B420DWR	420			13	
B500DWR	500			10	
B600D-R	600	1.2 x R _{elt} (min.)			



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29894/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Mr. Humayun Kabir, Assistant Professor

14 September 2024
MME 0115/2024-2025



pz5azu1dcee

TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation/ Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{eh}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{eh}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Bend Test	Rebend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	(Separate Sample)	(Separate Sample)
GPH B500 DWR 8	1	8	7.93	0.388	0.389	26.84	534	537 (78000)	36.43	725	727 (105500)	1.36	24	26	10	Satisfactory	Satisfactory
	2	8	7.96	0.390		27.06	538		36.62	729		1.36	29		10	Satisfactory	Satisfactory
	3	8	7.95	0.390		27.09	539		36.54	727		1.35	25		10	Satisfactory	Satisfactory

H. M. Mamun Al Rashed
14 SEP 2024

Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Weight Requirements and Nominal Cross-Sectional Area for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 2)

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	804	1257

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{eh}		R _m / R _{eh}	A	A _{gt}
	MPa			%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	---	1.15	14	7
B500C-R / B500CWR	500	---		10	
B600C-R	600	---		17	
B400DWR	400	1.3 x R _{eh} (min.)	1.25	16	8
B420DWR	420			13	
B500DWR	500			10	
B600D-R	600	1.2 x R _{eh} (min.)			

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29896/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Mr. Humayun Kabir, Assistant Professor

14 September 2024
MME 0116/2024-2025



lezcpu54c66

TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation/ Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{el}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{el}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Bend Test	Rebend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	(Separate Sample)	(Separate Sample)
GPH QUANTUM B500 DWR 10	1	10	9.92	0.607	0.606	41.52	529	533 (77500)	55.30	704	706 (102500)	1.33	23	24	10	Satisfactory	Satisfactory
	2	10	9.92	0.607		41.96	534		55.53	707		1.32	24		12	Satisfactory	Satisfactory
	3	10	9.90	0.604		41.98	535		55.53	707		1.32	25		12	Satisfactory	Satisfactory

Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Weight Requirements and Nominal Cross-Sectional Area for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 2)

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{el}		R _m / R _{el}	A	A _{gt}
	MPa			%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	---	1.15	14	7
B500C-R / B500CWR	500	---		10	
B600C-R	600	---			
B400DWR	400	1.3 x R _{el} (min.)	1.25		17
B420DWR	420			16	
B500DWR	500			13	
B600D-R	600	1.2 x R _{el} (min.)		10	

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

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Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29898/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Mr. Humayun Kabir, Assistant Professor

14 September 2024
MME 0117/2024-2025



e9wfzux7cdd

TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation/ Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{eh}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{eh}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A _g	Elongation at Maximum Force, A _{gt}	Bend Test	Rebend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	(Separate Sample)	(Separate Sample)
GPH QUANTUM B500 DWR 12	1	12	12.09	0.902	0.902	60.76	537	535 (77500)	81.70	722	720 (104500)	1.34	28	26	12	Satisfactory	Satisfactory
	2	12	12.09	0.901		60.48	535		81.44	720		1.35	25		13	Satisfactory	Satisfactory
	3	12	12.09	0.902		60.33	533		81.37	719		1.35	25		11	Satisfactory	Satisfactory

H. M. Mamun Al Rashed
4 SEP 2024

Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Weight Requirements and Nominal Cross-Sectional Area for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 2)

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.81	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{eh}		R _m / R _{eh}	A	A _{gt}
	MPa			%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	---	1.15	14	7
B500C-R / B500CWR	500	---		10	
B600C-R	600	---		17	
B400DWR	400	1.3 x R _{eh} (mm)	1.25	16	8
B420DWR	420			13	
B500DWR	500			10	
B600D-R	600	1.2 x R _{eh} (mm)		10	

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29899/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Mr. Humayun Kabir, Assistant Professor

14 September 2024
MME 0118/2024-2025



r1qugud0ckk

TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation/ Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{el}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{el}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Bend Test	Rebend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	(Separate Sample)	(Separate Sample)
GPH QUANTUM B500 DWR 16	1	16	16.06	1.590	1.590	106.14	528	528 (76500)	140.87	701	701 (101500)	1.33	26	24	12	Satisfactory	Satisfactory
	2	16	16.05	1.588		106.50	530		140.70	700		1.32	24		11	Satisfactory	Satisfactory
	3	16	16.07	1.592		106.06	527		141.03	701		1.33	23		13	Satisfactory	Satisfactory

Rashed 14 SEP 2024

Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Weight Requirements and Nominal Cross-Sectional Area for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 2)

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{el}		R _m / R _{el}	A	A _{gt}
	MPa			%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	---	1.15	14	7
B500C-R / B500CWR	500	---		17	
B600C-R	600	---		10	
B400DWR	400	1.3 x R _{el} (min.)	1.25	16	8
B420DWR	420			13	
B500DWR	500			10	
B600D-R	600	1.2 x R _{el} (min.)		10	

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

020439



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29902/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Mr. Humayun Kabir, Assistant Professor

14 September 2024
MME 0119/2024-2025



xz5urug6cvv

TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation/ Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{el}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{el}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Bend Test	Rebend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	(Separate Sample)	(Separate Sample)
GPH QUANTUM B500 DWR 20	1	20	19.99	2.463	2.465	172.54	549	549 (79500)	225.81	719	719 (104500)	1.31	22	23	13	Satisfactory	Satisfactory
	2	20	20.01	2.468		172.59	549		226.04	720		1.31	23		13	Satisfactory	Satisfactory
	3	20	19.99	2.464		172.62	549		225.58	718		1.31	23		14	Satisfactory	Satisfactory

Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Weight Requirements and Nominal Cross-Sectional Area for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 2)

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{el}		R _m / R _{el}	A	A _{gt}
	MPa			%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	---	1.15	14	7
B500C-R / B500CWR	500	---		10	
B600C-R	600	---		17	
B400DWR	400	1.3 x R _{el} (min.)	1.25	16	8
B420DWR	420			13	
B500DWR	500			10	
B600D-R	600	1.2 x R _{el} (min.)		10	

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29904/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Mr. Humayun Kabir, Assistant Professor

14 September 2024
MME 0120/2024-2025



9wrt2uzycll

TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation/ Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{eh}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{eh}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Bend Test	Rebend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	(Separate Sample)	(Separate Sample)
GPH B500 DWR 22	1	22	21.99	2.981	2.981	210.36	553	548 (79500)	274.00	721	718 (104000)	1.30	21	22	11	Satisfactory	Satisfactory
	2	22	21.99	2.982		207.43	546		271.94	715		1.31	21		11	Satisfactory	Satisfactory
	3	22	21.98	2.979		207.02	545		272.66	717		1.32	23		12	Satisfactory	Satisfactory

H. Rashed 14 SEP 2024

Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

Steel Grade:	Upper Yield Strength		Ductility Properties		
	R _{elt}		R _m /R _{elt}	A	A _{gt}
	MPa			%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	---	1.15	14	7
B500C-R / B500CWR	500	---		10	
B600C-R	600	---			
B400DWR	400	1.3 x R _{elt} (min.)	1.25		17
B420DWR	420			16	
B500DWR	500			13	
B600D-R	600	1.2 x R _{elt} (min.)		10	



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29905/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Mr. Humayun Kabir, Assistant Professor

14 September 2024
MME 0121/2024-2025



y7xu2u3ecll

TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation/ Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{el}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{el}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A _{gt}	Elongation at Maximum Force, A _{gt}	Bend Test	Rebend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	(Separate Sample)	(Separate Sample)
GPH QUANTUM B500 DWR 25	1	25	24.97	3.844	3.843	263.72	537.00	532 (77000)	356.31	726.00	725 (105000)	1.35	21	21	13	Satisfactory	Satisfactory
	2	25	24.97	3.843		255.97	521.00		355.34	724.00		1.39	20		10	Satisfactory	Satisfactory
	3	25	24.96	3.842		263.59	537.00		356.05	725.00		1.35	21		11	Satisfactory	Satisfactory

Dr. H. M. Mamun Al Rashed
Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Weight Requirements and Nominal Cross-Sectional Area for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 2)

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{el}		R _{el} /R _{gt}	A	A _{gt}
	MPa			%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	---	1.15	14	7
B500C-R / B500CWR	500	---		17	
B600C-R	600	---		16	
B400DWR	400	1.3 × R _{gt} (min.)	1.25	13	8
B420DWR	420			10	
B500DWR	500			10	
B600D-R	600	1.2 × R _{gt} (min.)		10	



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29908/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Professor Dr. Fahmida Gulshan

01 October 2024
MME 0122/2024-2025



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TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation / Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{el}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{el}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Bend Test	Re-bend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	(Separate Sample)	(Separate Sample)
GPH B500DWR 28	1	28	27.91	4.502	4.687	353.40	574	570 (82672)	454.32	738	733 (106313)	1.29	17	17	10	Satisfactory	Satisfactory
	2	28	27.84	4.780		348.45	566		448.79	729		1.29	19		10	Satisfactory	Satisfactory
	3	28	27.85	4.781		351.33	571		450.02	731		1.28	16		10	Satisfactory	Satisfactory

Hashed 01 OCT 2024

Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Weight Requirements and Nominal Cross-Sectional Area for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 2)

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±3	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{el}		R _e /R _{el}	A	A _{gt}
	MPa		%	%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	---	1.15	14	7
B500C-R / B500CWR	500	---		10	
B600C-R	600	---		17	
B400DWR	400	1.3 x R _{el} (min.)	1.25	16	8
B420DWR	420			13	
B500DWR	500			10	
B600D-R	600	1.2 x R _{el} (min.)		10	



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29913/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Professor Dr. Fahmida Gulshan

01 October 2024
MME 0123/2024-2025



dvjheug9c1l

TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation / Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{el}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{el}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Bend Test	Re-bend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	(Separate Sample)	(Separate Sample)
GPH QUANTUM B500DWR 32	1	32	31.94	6.289	6.281	445.76	554	555 (80496)	577.91	719	719 (104282)	1.30	18	17	13	Satisfactory	Satisfactory
	2	32	31.90	6.272		446.65	555		579.00	720		1.30	18		10	Satisfactory	Satisfactory
	3	32	31.92	6.283		446.30	555		578.09	719		1.30	16		10	Satisfactory	Satisfactory

Hashed 01 OCT 2024
Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{el}		R _m /R _{el}	A	A _{gt}
	MPa		%	%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	—	1.15	14	7
B500C-R / B500CWR	500	—		10	
B600C-R	600	—		17	
B400DWR	400	1.3 x R _{el} (min.)	1.25	16	8
B420DWR	420			13	
B500DWR	500			10	
B600D-R	600	1.2 x R _{el} (min.)			



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29917/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Professor Dr. Fahmida Gulshan

01 October 2024
MME 0124/2024-2025



jd5ckukccq

TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation / Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{eh}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{eh}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Bend Test	Re-bend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	(Separate Sample)	(Separate Sample)
GPH B420DWR 10	1	10	9.92	0.606	0.608	36.39	463	462 (67007)	51.46	655	654 (94855)	1.41	25	27	11	Satisfactory	Satisfactory
	2	10	9.94	0.609		36.25	462		51.48	655		1.42	27		12	Satisfactory	Satisfactory
	3	10	9.93	0.608		36.16	460		51.19	652		1.42	28		13	Satisfactory	Satisfactory

Rashed 01 OCT 2024
Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{eh}		R _m /R _{eh}	A	A _{gt}
	MPa			%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	—	1.15	14	7
B500C-R / B500CWR	500	—		10	
B600C-R	600	—		17	
B400DWR	400	1.3 x R _{eh} (min.)	1.25	16	8
B500DWR	500			13	
B600D-R	600	1.2 x R _{eh} (min.)		10	



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29918/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Professor Dr. Fahmida Gulshan

01 October 2024
MME 0125/2024-2025



vllb2u10c33

TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation / Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{el}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{el}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Bend Test	Re-bend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	(Separate Sample)	(Separate Sample)
GPH B420DWR 12	1	12	11.97	0.883	0.885	50.91	450	449 (65121)	73.57	651	650 (94275)	1.45	32	31	16	Satisfactory	Satisfactory
	2	12	11.98	0.895		50.84	450		73.51	650		1.44	32		11	Satisfactory	Satisfactory
	3	12	11.98	0.895		50.57	447		73.40	649		1.45	28		12	Satisfactory	Satisfactory

Rashed 01 OCT 2024

Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Weight Requirements and Nominal Cross-Sectional Area for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 2)

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±5	±8	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{el}		R _m /R _{el}	A	A _{gt}
	MPa		%	%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	—	1.15	14	7
B500C-R / B500CWR	500	—		10	
B600C-R	600	—		17	
B400DWR	400	1.3 x R _{el} (min.)	1.25	16	8
B420DWR	420			13	
B500DWR	500			10	
B600D-R	600	1.2 x R _{el} (min.)			



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29920/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Professor Dr. Fahmida Gulshan

01 October 2024
MME 0126/2024-2025



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TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation / Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{el}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{el}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Bend Test	Re-bend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	(Separate Sample)	(Separate Sample)
GPH B420DWR 16	1	16	15.99	1.576	1.575	87.53	435	432 (62656)	127.14	632	630 (91373)	1.45	31	37	14	Satisfactory	Satisfactory
	2	16	15.96	1.574		86.61	431		126.35	628		1.46	38		16	Satisfactory	Satisfactory
	3	16	15.99	1.577		86.48	430		126.65	630		1.47	41		15	Satisfactory	Satisfactory

Rashed 01 OCT 2024
Dr. H. M. Mamun Al Rashed
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Page 1 of 1

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±4	±4	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{el}		R _m / R _{el}	A	A _{gt}
	MPa			%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	---	1.15	14	7
B500C-R / B500CWR	500	---		10	
B600C-R	600	---		17	
B400DWR	400	1.3 x R _{el} (min.)	1.25	16	8
B420DWR	420			13	
B500DWR	500			10	
B600D-R	600	1.2 x R _{el} (min.)		10	

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29921/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Professor Dr. Fahmida Gulshan

01 October 2024
MME 0127/2024-2025



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TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation / Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{el}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{el}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Bend Test	Re-bend Test
		mm	mm	kg/m	kg/in	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	(Separate Sample)	(Separate Sample)
GPH B420DWR 20	1	20	19.95	2.452	2.453	144.54	460	461 (66862)	210.10	669	671 (97320)	1.45	24	24	17	Satisfactory	Satisfactory
	2	20	19.94	2.450		145.14	462		210.64	670		1.45	24		14	Satisfactory	Satisfactory
	3	20	19.97	2.467		144.50	460		211.67	674		1.47	24		14	Satisfactory	Satisfactory

Hashed 01 OCT 2024

Dr. H. M. Mamun Al Rashed
Professor and Head

Page 1 of 1

Weight Requirements and Nominal Cross-Sectional Area for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 2)

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	+8	+8	+6	+6	+5	+5	+4	+4	+4	+4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)

Steel Grade	Upper Yield Strength		R _m /R _{el}	Ductility Properties	
	R _{el}			A	A _{gt}
	MPa			%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	---	1.15	14	7
B500C-R / B500CWR	500	---		17	
B600C-R	600	---		10	
B400DWR	400	1.3 x R _{el} (min.)	1.25	16	8
B420DWR	420			13	
B500DWR	500			10	
B600D-R	600	1.2 x R _{el} (min.)		10	



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29923/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Professor Dr. Fahmida Gulshan

01 October 2024
MME 0128/2024-2025



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TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation / Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{el}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{el}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Bend Test	Re-bend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	(Separate Sample)	(Separate Sample)
GPH B420DWR 25	1	25	24.94	3.834	3.836	211.82	432	436 (63237)	314.65	641	643 (93259)	1.48	25	24	15	Satisfactory	Satisfactory
	2	25	24.94	3.834		216.63	441		317.55	647		1.47	23		14	Satisfactory	Satisfactory
	3	25	24.94	3.836		213.06	434		314.22	640		1.47	23		15	Satisfactory	Satisfactory

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Dr. H. M. Mamun Al Rashed
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Page 1 of 1

Weight Requirements and Nominal Cross-Sectional Area for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 2)

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.83	6.31	9.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)

Steel Grade	Upper Yield Strength		Ductility Properties			
	R _{el}		R _m /R _{el}	A	A _{gt}	
	MPa		%	%	%	
	Minimum	Maximum	Minimum	Minimum	Minimum	
B400C-R / B400CWR	400	---	1.15	14	7	
B500C-R / B500CWR	500	---		10		
B600C-R	600	---		17		
B400DWR	400	1.3 x R _{el} (min.)	1.25	16		8
B420DWR	420			13		
B500DWR	500	1.2 x R _{el} (min.)		10		
B600D-R	600					

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.



Client : Engr. Md. Tanjidul Islam
Sr. Manager, Quality Control
GPH Ispat Limited

Client's Ref: Nil; 28/08/2024
BRTC Ref: 1103-29925/MME/2024-25; 28/08/2024
Sample Condition: Not Sealed
Test Performed by: Professor Dr. Fahmida Gulshan

01 October 2024
MME 0129/2024-2025



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TEST OF DEFORMED M.S. REBAR (Test Method BDS ISO 6935-2 2021)

Frog Mark/ Identification	Sample No.	Bar Designation / Nominal Diameter, d	Actual Diameter	Mass per Unit Length	Average Unit Weight	Upper Yield Load	Upper Yield Strength, R _{el}	Average Upper Yield Strength	Tensile Load	Tensile Strength, R _m	Average Tensile Strength	R _m / R _{el}	Elongation after Fracture (G.L. 5d)	Average Elongation after Fracture, A	Elongation at Maximum Force, A _{gt}	Bend Test	Re-bend Test
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	(Separate Sample)	(Separate Sample)
GPH B420DWR 32	1	32	32.04	6.330	6.326	375.73	467	466 (67588)	534.58	665	665 (95000)	1.42	21	22	16	Satisfactory	Satisfactory
	2	32	32.05	6.331		373.85	465		534.93	665		1.43	20		11	Satisfactory	Satisfactory
	3	32	32.01	6.317		374.58	466		534.43	665		1.43	24		13	Satisfactory	Satisfactory

Hashed 01 OCT 2024

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Page 1 of 1

Weight Requirements and Nominal Cross-Sectional Area for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 2)

Bar Designation Number/Nominal Bar Diameter, mm	6	8	10	12	16	20	25	28	32	40
Nominal Mass per Unit Length, kg/m	0.222	0.395	0.617	0.888	1.58	2.47	3.85	4.84	6.31	7.86
Permissible Variation of Nominal Mass per Unit Length, %	±8	±8	±6	±6	±5	±5	±4	±4	±4	±4
Nominal Cross-Sectional Area, mm ²	28.3	50.3	78.5	113	201	314	491	616	804	1257

Please Note: The client supplied the sample and the result given herewith corresponds to the sample tested only. The Department of Materials and Metallurgical Engineering of BUET takes no responsibility regarding the misidentification, if any, of the sample.

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)

Steel Grade	Upper Yield Strength		Ductility Properties		
	R _{el}		R _m /R _{el}	A	A ₅₀
	MPa			%	%
	Minimum	Maximum	Minimum	Minimum	Minimum
B400C-R / B400CWR	400	—	1.15	14	7
B500C-R / B500CWR	500	—			
B600C-R	600	—		10	
B400DWR	400	1.3 x R _{el} (min.)	1.25	17	8
B420DWR	420			16	
B500DWR	500			13	
B600D-R	600	1.2 x R _{el} (min.)		10	