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

Client's Ref: Nil; 01/02/2024
BRTC Ref: 1103-16124/MME/2023-24; 05/03/2024
Sample Condition: Not Sealed

12 March 2024
MME 1101/2023-2024

d011seuyhlr

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

Bend Test (Separate Sample)	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 Facture, A	Elongation at Maximum Force, A_{gt}	Bend Test (Separate Sample)
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	
GPH QUANTUM B600D-R 12	1	12	11.92	0.876	0.873	70.80	626	627 (91000)	92.94	822	823 (119500)	1.31	13	16	9	Satisfactory
	2	12	11.89	0.871		70.90	627		93.39	826		1.32	20		11	Satisfactory
	3	12	11.90	0.873		71.06	628		93.00	822		1.31	14		11	Satisfactory

Dr. Md. Aminul Islam
Professor and Head

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 R_{eH} MPa		R_m/R_{eH}	Ductility Properties A %	A_{gt} %
	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_{eH} (min.)	1.25	17	8
B420DWR	420			16	
B500DWR	500			13	
B600D-R	600	1.2 x R_{eH} (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.

Department of MME, Old Academic Building, 1st Floor, BUET, Dhaka 1000 +880 1741 362 504 +880 2 5516 7228-57 Ext 7629 brtcmme@mme.buet.ac.bd

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

Client's Ref: Nil; 01/02/2024
BRTC Ref: 1103-16130/MME/2023-24; 05/03/2024
Sample Condition: Not Sealed

11 March 2024
MME 1106/2023-2024

6ykpbrukhlq

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 Facture, A	Elongation at Maximum Force, A_{gt}	Bend Test (Separate Sample)
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	
GPH QUANTUM B600D-R 16	1	16	15.96	1.570	1.569	127.00	632	633 (92000)	167.65	834	834 (121000)	1.32	25	21	10	Satisfactory
	2	16	15.95	1.568		127.63	635		167.85	835		1.32	20		10	Satisfactory
	3	16	15.95	1.568		126.96	631		167.35	832		1.32	20		10	Satisfactory

Dr. Md. Aminul Islam
Professor and Head

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 R_{eH} MPa		R_m/R_{eH}	Ductility Properties A %	A_{gt} %
	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_{eH} (min.)	1.25	17	8
B420DWR	420			16	
B500DWR	500			13	
B600D-R	600	1.2 x R_{eH} (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; 01/02/2024
BRTC Ref: 1103-16129/MME/2023-24; 05/03/2024
Sample Condition: Not Sealed

11 March 2024
MME 1105/2023-2024

znlnheu2hx6

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 Facture, A	Elongation at Maximum Force, A_{gt}	Bend Test (Separate Sample)
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	
GPH QUANTUM B600D-R 20	1	20	20.00	2.466	2.465	202.05	643	641 (80000)	260.05	828	829 (103000)	1.29	21	21	11	Satisfactory
	2	20	19.99	2.465		200.10	637		260.46	829		1.30	21		11	Satisfactory
	3	20	19.99	2.463		201.70	642		260.79	830		1.29	21		10	Satisfactory

Dr. Md. Aminul Islam
Professor and Head

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_{eH} MPa		R_m/R_{eH}	Ductility Properties A %	A_{gt} %
	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_{eH} (min.)	1.25	17	8
B420DWR	420			16	
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; 01/02/2024
BRTC Ref: 1103-16127/MME/2023-24; 05/03/2024
Sample Condition: Not Sealed

12 March 2024
MME 1104/2023-2024

gjx4bzuphnw

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

Bend Test (Separate Sample)	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 Facture, A	Elongation at Maximum Force, A_{gt}	Bend Test (Separate Sample)
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	
GPH QUANTUM B600D-R 25	1	25	24.81	3.795	3.804	313.50	639	637 (92500)	392.89	800	803 (116500)	1.25	17	17	10	Satisfactory
	2	25	24.87	3.812		316.21	644		397.32	809		1.26	16		11	Satisfactory
	3	25	24.84	3.806		308.82	629		392.24	799		1.27	17		12	Satisfactory

Dr. Md. Aminul Islam
Professor and Head

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	615	804	1257

Minimum Tensile Requirements for Steel Rebar (As Per BDS ISO 6935-2 2021 Table 6)					
Steel Grade	Upper Yield Strength R_{eH} MPa		R_m/R_{eH}	Ductility Properties A %	A_{gt} %
	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_{eH} (min.)	1.25	17	8
B420DWR	420			16	
B500DWR	500			13	
B600D-R	600	1.2 x R_{eH} (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.

Department of MME, Old Academic Building, 1st Floor, BUET, Dhaka 1000 +880 1741 362 504 +880 2 5516 7228-57 Ext 7629 brtcmme@mme.buet.ac.bd

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

Client's Ref: Nil; 01/02/2024
BRTC Ref: 1103-16126/MME/2023-24; 05/03/2024
Sample Condition: Not Sealed

12 March 2024
MME 1103/2023-2024

v4dnu2u6h39

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

Bend Test (Separate Sample)	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 Facture, A	Elongation at Maximum Force, A_{gt}	Bend Test (Separate Sample)
		mm	mm	kg/m	kg/m	kN	MPa	MPa (psi)	kN	MPa	MPa (psi)		%	%	%	
GPH QUANTUM B600D-R 32	1	32	32.06	6.337	6.324	515.18	641	634 (92000)	653.82	813	807 (117000)	1.27	19	17	11	Satisfactory
	2	32	31.97	6.300		504.73	628		646.28	804		1.28	16		9	Satisfactory
	3	32	32.05	6.335		509.02	633		647.30	805		1.27	16		10	Satisfactory

Dr. Md. Aminul Islam
Professor and Head

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 R_{eH} MPa		R_m/R_{eH}	Ductility Properties A %	A_{gt} %
	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_{eH} (min.)	1.25	17	8
B420DWR	420			16	
B500DWR	500			13	
B600D-R	600	1.2 x R_{eH} (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.

Department of MME, Old Academic Building, 1st Floor, BUET, Dhaka 1000 +880 1741 362 504 +880 2 5516 7228-57 Ext 7629 brtcmme@mme.buet.ac.bd