

# WORLD'S BEST PURE AND CLEAN **GPH QUANTUM** CONSTRUCTION STEEL



With historically world's most innovative and Asia's first Quantum Technology at GPH ispat we are producing and marketing world's best GPH Quantum construction steel. We have reached new horizons of prosperity in the domestic construction industry while also taking Bangladesh to new heights of pride across the world.

☉ **GPH QUANTUM B500DWR** ☉



[www.gphispac.com.bd](http://www.gphispac.com.bd)



# GPH ISPAT

## With Quantum Technology

GPH Ispat has embarked on a new journey with the cutting-edge innovation in history of steel making and has proudly introduced Asia's first Quantum Electric Arc Furnace and Winlink Technology. A completely green, world class factory is the continuation of our enduring commitment to build the future Bangladesh.



# World's Best Pure and Clean GPH QUANTUM Construction Steel



The story of GPH Ispat is not an ordinary one. It all began with a vision. A vision for development.

Having belief in sustainable development GPH Ispat is continuously working for the development and people's welfare of the country. GPH Ispat has established the Asia's first Quantum EAF Technology based factory to enrich the steel sector in Bangladesh. GPH Ispat is one of the leading steel manufacturing company in Bangladesh that ensures the best quality of steel complying the national and international standards.

GPH Ispat has introduced first in Bangladesh the level 4 automation in steel manufacturing industry and ERP-enriched state-of-the-art technology with fully computerized integrated digital industry known as Industry 4.0. This makes it possible to produce the highest quality products using comparatively less energy. The main purpose of all our efforts are to bring you the world class construction Re-bar through advanced technology.

We have a big dream, a dream of building a new Bangladesh, and you are the companions in this dream.

## Vision

To provide the foundation for building the infrastructure of Bangladesh towards High-Income-Country (HIC) with the true GPH philosophy.

## Mission

The trusted brand of Bangladesh leading the steel sector with innovative products leveraging cutting edge technology.

## GPH QUANTUM Green Factory:

GPH Ispat established Asia's first Quantum EAF Technology based factory in Bangladesh with the following features to avoid any harm to the environment.

### 1. Exhaust Gas Purification Unit:

GPH QUANTUM green factory has highly sophisticated and advanced exhaust gas purification system to keep the environment clean and safe. The amount of carbon and dust emissions from the GPH QUANTUM factory is less than the amount set by the World Bank.

### 2. The largest Oxygen Plant of Bangladesh:

GPH Ispat's green factory has the largest oxygen plant in Bangladesh having capacity of 300MT/day. The liquid oxygen, nitrogen and argon produced in this plant meet the factory's own demand and the rest are marketed for the use in various hospitals and industrial establishments in the country.



COUNTRY'S LARGEST OXYGEN PLANT



EXHAUST GAS PURIFICATION UNIT

### 3. Water Treatment Plant with Zero Discharge Technology:

Only GPH Ispat factory in Bangladesh has its own water harvesting system and water treatment plant with zero discharge technology, so no water is wasted.

### 4. Own Substation:

The factory has a 230/33 KV GIS substation for uninterrupted power supply. The amount of electricity saved in this green factory, can be utilized in 1 lakh 92 thousand households per year.

### 5. Natural Gas Savings:

The amount of natural gas saved in the GPH QUANTUM factory can meet the gas demands of 35,000 households per year.



WATER TREATMENT PLANT



230/33 KV GIS SUBSTATION

## Why GPH QUANTUM technology is the best in making construction steel?

### 1. Completely Pure Steel:

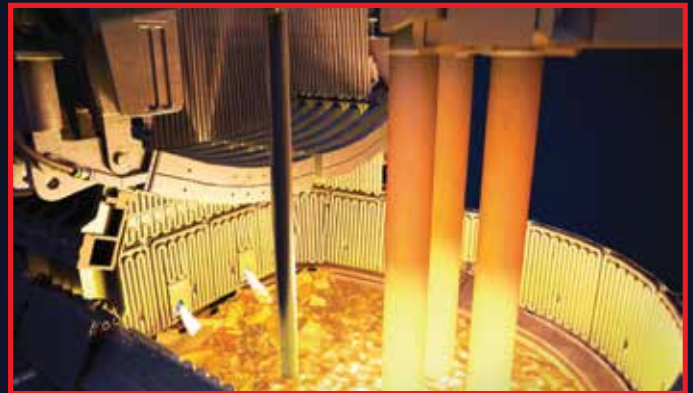
GPH QUANTUM Re-bar is completely inclusion free because it contains-

- **Scrap pre-heating process:** The GPH QUANTUM pre-heating chamber of the arc furnace heats the scrap to a temperature of 600-degree C. During this process, it removes the paint, rust, moisture and primary impurities present in the scrap.
- **Oxygen lancing and argon bottom purging:** GPH QUANTUM removes unnecessary carbon and phosphorus by oxygen lancing and bottom purging in the arc furnace, turning the heated mixture into a homogenized mixture.
- **Flat bath operation and bottom tapping:** PURE FLAT BATH OPERATION is done by preparing 70 MT HOT HEEL in GPH QUANTUM arc furnace having holding capacity of 150 MT, where the chemical reaction of carbon and oxygen creates FOAMY SLAG, and removes phosphorus and other impurities. 80 MT 100% slag free metal is collected into the ladle by tilting the furnace at a 4-degree angle through bottom tapping in a siphonic process.

The GPH QUANTUM Re-bar is much more earthquake resistant than other Re-bars in the market for its 100% refinement. So the engineers rely on GPH QUANTUM Re-bar for any mega structure.



PREHEATING CHAMBER



OXYGEN LANCING

FLAT BATH OPERATION &  
FAST BOTTOM TAPPING



## 2. Homogenized Chemical Mixture:

The chemical composition of GPH QUANTUM Re-bar is homogenized because-

- **Ladle Refining Furnace (LRF):** Harmful sulfur and other inclusions are removed by secondary refinement in LRF from the liquid metal coming from the QUANTUM arc furnace. The perfect homogenized chemical composition in GPH QUANTUM Re-bar is ensured by mixing the required chemical ingredients in LRF.
- **High Speed Continuous Casting Machine (CCM):** Closed casting is maintained at each level which protects the liquid steel from oxidizing and adding impurities (from the surrounding atmosphere) and maintains the quality of the steel.

So, the homogenized chemical properties are achieved in the Re-bar and the construction becomes stronger and safer.





### 3. Steel with High Ductility and Firm Bonding Strength:

- Billets made in CCM are directly rolled in the most advanced and latest high-speed rolling mill with Winlink technology. The GPH QUANTUM Re-bar is more ductile than any other Re-bar in the market due to Quantum and Winlink technology.
- The new generation housing-less free-floating rolling stands and Tungsten Carbide Rolls ensure the uniform diameter of the Re-bar, the relative rib area and proper transverse rib height that makes the construction more secure by establishing a strong bond between the concrete and the Re-bar.



CONTINUOUS CASTING MACHINE



HOUSING-LESS FREE FLOATING ROLLING STAND

#### 4. Uniform Strength , Corrosion Resistant and Superior Weldability:

- Fully automatic computerized Quenching Method ensures a uniform Martensite Ring in the Re-bar; that is why there is no strength variations from start to end.
- The right level of carbon equivalent ensures GPH QUANTUM re-bar's superior weldability (improved welding ability).
- 100% refining and automatic computerized quenching system creates a light anti-corrosive scale layer on the Re-bar surface which makes the Re-bar more corrosion resistant.



TMT QUENCHING BOX



HIGH SPEED TWIN CHANNEL



TUNGSTEN CARBIDE ROLL

#### 5. Shiny Surface:

- The use of more tungsten carbide rolls in the rolling process makes the surface of the GPH QUANTUM Re-bar shinier.

## 6. Quality Consistency:

- For quality control we have 2000 KN Automatic Universal Testing Machine, Universal Hardness Testing Machine, Profilometer, Bend-rebend Testing Machine, X-ray Fluorescence Spectrometer (XRF), Microscope, Impact Testing Machine, Bond Testing, Ring Testing, Macro Etching and Wet Chemical Lab. Moreover, we have advanced M12 Spectrometer from Germany. At each stage of production, the state-of-the-art GPH lab is rigorously controlled by these testing machines to maintain the quality of the Re-bar.



Every stage of GPH QUANTUM Re-bar production such as scrap processing and charging, melting, refining, casting and rolling processes are integrated and uninterrupted.

The use of world class technology ensures perfect homogenized chemical properties, uniform strength, superior ductility and bendability.

That is why GPH QUANTUM Re-bar guarantees safe and strong structure.



RING TESTING



RING TESTING MICROSCOPE



BOND TESTING

UNIVERSAL HARDNESS TESTING MACHINE



MICROSCOPE



AUTOMATIC FINE POLISHING MACHINE



CHARPY IMPACT TESTING MACHINE



MACRO ETCHING SETUP



UNIVERSAL TESTING MACHINE

## Results Of Actual Dimensions, Rib Geometry, Tension, Bend, Re-bend And Chemical Composition Test Of Grade B500DWR Quantum Re-bar at Gph Ispat Limited:

Nominal Bar Diameter, D	Nominal Cross Sectional Area Under Test	Actual Diameter	Actual Mass per Unit Length	Rib Geometry				Mechanical Properties								Quality	Tested chemical composition of Quantum rebar															
				Transverse Rib Height	Longitudinal Rib Height	Transverse Rib Spacing	Relative Rib Area, $f_R$	Yield or Proof Load	Yield or Proof Strength (YS)	Tensile Load	Tensile Strength (TS)	TS/YS	% Total Elongation at Maximum Force, Agt	% Total Elongation After Fracture, A	Bend Test		Re-Bend Test	C%	Si%	Mn%	P%	S%	CEV									
(mm)	(mm <sup>2</sup> )	(mm)	(kg/m)	(mm)	(mm)	(mm)		(KN)	(MPa)	(KN)	(MPa)		(Gauge Length =200 mm)	(Gauge Length h=5D mm)																		
8	50.27	7.90	0.385	0.70	0.76	5.95	0.045	27	540	34	685	1.27	10.5	23.5	Satisfactory	Satisfactory	PASSED	0.29	0.18	0.82	0.019	0.020	0.49									
8	50.27	7.93	0.387	0.72	0.75	5.95	0.048	27	545	35	690	1.27	10.5	23.0	Satisfactory	Satisfactory	PASSED	0.30	0.25	0.84	0.021	0.021	0.50									
10	78.54	9.92	0.606	0.83	0.93	6.70	0.052	42	535	54	685	1.28	10.0	22.0	Satisfactory	Satisfactory	PASSED	0.29	0.23	0.81	0.018	0.018	0.49									
10	78.54	9.89	0.603	0.90	0.89	6.70	0.054	43	545	55	700	1.28	10.5	22.5	Satisfactory	Satisfactory	PASSED	0.30	0.18	0.85	0.020	0.026	0.50									
12	113.1	11.90	0.872	1.02	1.10	8.10	0.059	62	550	79	700	1.27	11.0	23.0	Satisfactory	Satisfactory	PASSED	0.28	0.21	0.82	0.019	0.021	0.48									
12	113.1	11.93	0.877	1.03	1.06	8.10	0.061	62	545	79	700	1.28	10.5	22.0	Satisfactory	Satisfactory	PASSED	0.29	0.22	0.81	0.018	0.027	0.49									
16	201.06	15.91	1.559	1.13	1.11	10.70	0.062	108	535	139	690	1.29	11.5	23.0	Satisfactory	Satisfactory	PASSED	0.30	0.22	0.83	0.015	0.019	0.50									
16	201.06	15.92	1.562	1.13	1.08	10.70	0.065	109	540	140	695	1.29	11.0	23.5	Satisfactory	Satisfactory	PASSED	0.29	0.18	0.86	0.019	0.025	0.49									
20	314.16	19.89	2.438	1.52	1.43	13.70	0.071	168	535	218	695	1.30	10.5	23.5	Satisfactory	Satisfactory	PASSED	0.29	0.23	0.85	0.021	0.029	0.49									
20	314.16	19.91	2.442	1.45	1.56	13.70	0.07	170	540	220	700	1.30	11.5	22.5	Satisfactory	Satisfactory	PASSED	0.28	0.20	0.88	0.026	0.027	0.49									
25	490.88	24.83	3.8	2.05	2.15	16.55	0.072	270	550	353	720	1.31	10.5	22.0	Satisfactory	Satisfactory	PASSED	0.29	0.19	0.83	0.022	0.020	0.49									
25	490.88	24.85	3.806	2.10	2.05	16.55	0.075	265	540	346	705	1.31	10.0	22.5	Satisfactory	Satisfactory	PASSED	0.28	0.23	0.88	0.025	0.023	0.49									
28	615.75	27.91	4.799	2.30	2.20	18.60	0.077	339	550	443	720	1.31	11.0	21.5	Satisfactory	Satisfactory	PASSED	0.29	0.24	0.90	0.016	0.020	0.50									
28	615.75	27.92	4.804	2.25	2.30	18.60	0.076	336	545	440	715	1.31	10.5	22.0	Satisfactory	Satisfactory	PASSED	0.29	0.21	0.86	0.023	0.022	0.49									
32	804.25	31.83	6.241	2.40	2.90	21.10	0.082	438	545	583	725	1.33	11.0	20.5	Satisfactory	Satisfactory	PASSED	0.30	0.22	0.92	0.022	0.026	0.51									
32	804.25	31.84	6.248	2.45	3.00	21.10	0.083	434	540	579	720	1.33	10.5	21.0	Satisfactory	Satisfactory	PASSED	0.30	0.25	0.90	0.018	0.019	0.51									
40	1256.64	39.67	9.696	2.85	3.57	27.65	0.085	679	540	911	725	1.34	10.0	20.0	Satisfactory	Satisfactory	PASSED	0.30	0.19	0.92	0.022	0.022	0.51									
40	1256.64	39.69	9.705	2.95	3.65	27.65	0.081	691	550	924	735	1.34	10.5	20.0	Satisfactory	Satisfactory	PASSED	0.31	0.22	0.95	0.019	0.023	0.53									
50	1963.5	49.80	15.28	3.60	3.90	34.10	0.089	1080	550	1443	735	1.34	10.5	20.0	Satisfactory	Satisfactory	PASSED	0.31	0.26	1.01	0.018	0.022	0.54									
50	1963.5	49.78	15.266	3.55	4.00	34.10	0.088	1090	555	1463	745	1.34	10.0	20.5	Satisfactory	Satisfactory	PASSED	0.32	0.25	1.05	0.021	0.023	0.56									



**Nominal Weight, Dimension and Dimensional Tolerances of GPH B500DWR QUANTUM Re-bar as per BDS ISO 6935-2:2016:**

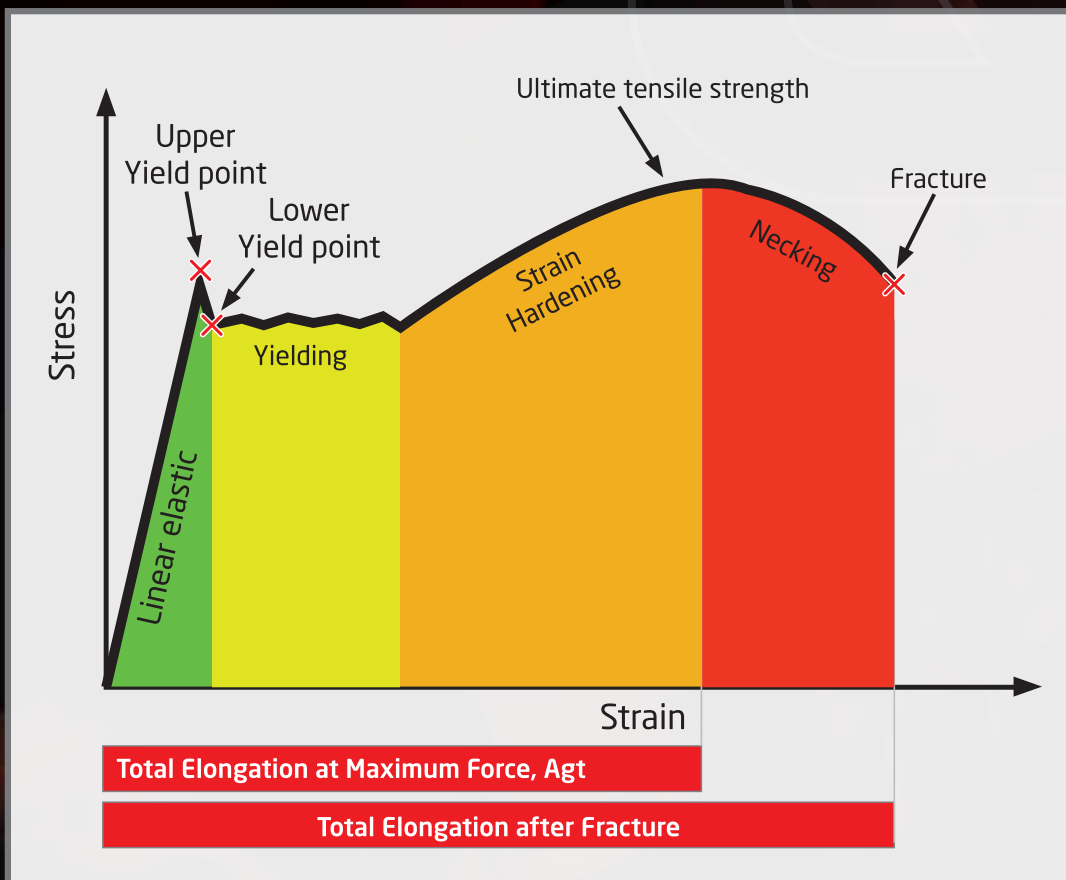
Nominal Diameter	Nominal Weight	Permissible Tolerance	Cross-sectional Area	Length (Per ton)		Ton and Piece Count (1 pc=12 meter approx.)
mm	Kg/m	%	mm <sup>2</sup>	m	ft	no of re-bar
8	0.395	±8	50.3	2534.31	8314.66	211 (1 ton)
10	0.617	±6	78.5	1621.96	5321.38	135 (1 ton)
12	0.888	±6	113	1126.36	3695.40	94 (1 ton)
16	1.58	±5	201	633.58	2078.67	53 (1 ton)
20	2.47	±5	314	405.49	1330.35	34 (1 ton)
25	3.85	±4	491	259.51	851.42	22 (1 ton)
28	4.84	±4	616	206.88	678.75	18 (1 ton 45 kg)
32	6.31	±4	804	158.39	519.67	14 (1 ton 60 kg)
40	9.86	±4	1257	101.37	332.59	9 (1 ton 65 kg)
50	15.42	±4	1964	64.88	212.86	6 (1 ton 110 kg)



**Mechanical Properties of GPH B500DWR QUANTUM Re-bar as per BDS ISO 6935-2:2016:**

Steel Grade	Ductility Class	International Standard	Yield Strength		Tensile Strength	Elongation at Max force, EMF	TS/YS	Elongation after Fracture	Bend Test	Re-Bend Test	Rib Geometry			
			(Min)	(Max)	(Min)	Gauge Length=200 mm		Gauge Length=5D mm	Mandrel Diameter (mm)	Mandrel Diameter (mm)	Transverse Rib Height, mm	Longitudinal Rib Height, mm	Rib Spacing, mm	Relative Rib Area*
B500 DWR	D	BDS ISO 6935-2:2016	72500 Psi (Min)	94250 Psi (Max)	90625 Psi (Min)	8% (Min)	1.25 (min.)	13% (Min)	≤16mm: 3D 16mm<D≤32mm: 6D 32mm<D≤50mm: 7D	≤16mm: 5D 16mm<D≤25mm: 8D 25mm<D≤50mm: 10D	0.065D (min.)	0.15D (max.)	D<10: 0.5D-1.0D D≥10: 0.5D-0.8D	6 < D ≤ 12 f <sub>R</sub> ≥ 0.040 D > 12 f <sub>R</sub> ≥ 0.056
			500 MPa (Min)	650 MPa (Max)	625 MPa (Min)									

\*Note: Relative rib area as per BS 4449-2005+A3:2016



**Figure: Typical Stress -Strain Curve of Low Carbon Steel**

**GPH QUANTUM B500DWR follows these standards:**

- BDS ISO 6935-2:2016 (Bangladesh Standard)
- IS 1786:2008 (Indian Standard)

## Bond Performance:

As per BS 4449:2005, The characteristics of relative rib area ( $f_R$ ) is as follows:

$$6 < d \leq 12 \quad f_R \geq 0.040$$

$$d > 12 \quad f_R \geq 0.056$$

Results are obtained from fully automatic re-bar surface geometry measurement device (Profilometer)

ECM Datensysteme RM-303

Made: Germany

Row	Diameter		Rib Height			Rib dist.c (mm)	Inclination		Row dist.e (mm)	Head width (mm)	Rib. length (mm)	Long.rib. Height (mm)	Relative rib area $f_R$
	Nom. (mm)	Real (mm)	Center (mm)	1/4 Pnts (mm)	3/4 Pnts (mm)		Alpha (°)	Beta (°)					
1	16.0	15.94	1.53	1.44	1.22	10.5	55	66	2.43	1.20	24.9	1.06	+82.1%
2			1.59	1.39	1.50	10.5	53	64	2.43	1.30	25.3	0.97	
Mean			1.56	1.42	1.36	10.5	54.0	65	$\Sigma$ 4.86	1.25	RL.W	1.02	



AUTOMATIC RIB MEASUREMENT MACHINE



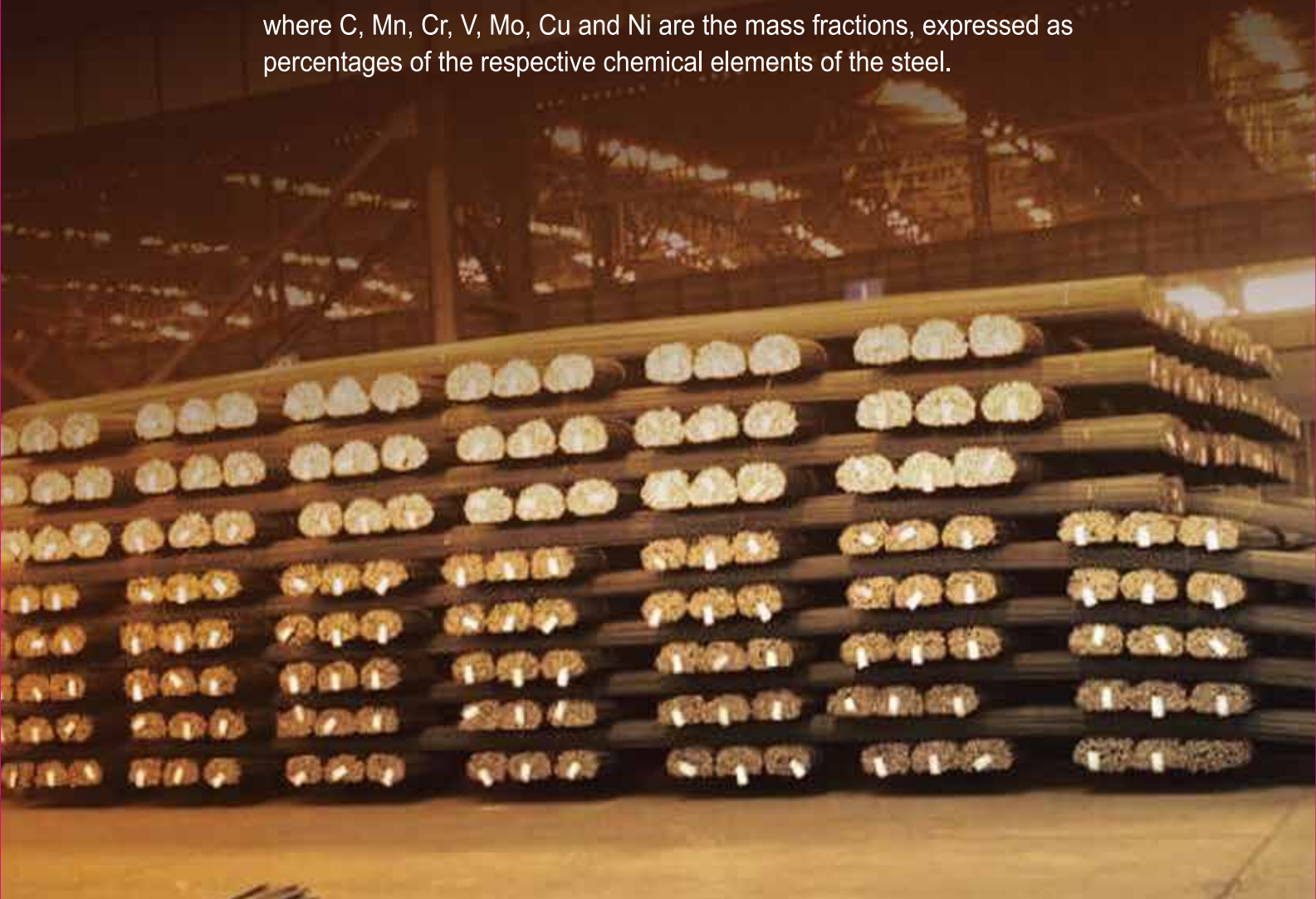
## Chemical Composition of Product Analysis as per International Standard:

Element	BDS ISO 6935-2: 2016 (All Max)
C%	0.35
Si%	0.60
Mn%	1.88
P%	0.048
S%	0.048
N%	0.014
CEV%	0.66

Carbon Equivalent Value, CEV will be calculated using below equation,

$$CEV = C + \frac{Mn}{6} + \frac{(Cr + V + Mo)}{5} + \frac{(Cu + Ni)}{15}$$

where C, Mn, Cr, V, Mo, Cu and Ni are the mass fractions, expressed as percentages of the respective chemical elements of the steel.



# The Bangladesh We Want to Build

GPH's journey is based on its determination to build Bangladesh on a strong and solid foundation. Our country will be witnessing world class factories, huge buildings, international standard roads, highways, flyovers, bridges, tunnels and many other facilities. An outstanding installation will be made in this country, which will attract tourists from home and abroad. A stadium will be built where the Olympic or World Cup will be held. We want to build this better Bangladesh with you.





# GPH QUANTUM Re-bar

Ensures strength, flexibility, unparalleled quality and an unbreakable bond with cement that forms the foundation of your installation.

Through our corporate, branch offices, dealers and retailers, GPH Re-bars are available all over the country at the right size and price. All of these ensure your faith in GPH, which is our capital.

## Sales and Marketing Division:

### Corporate:

Dhaka: 01730 087702, 01730 085582, 01730 087711,  
01730 087782, 01730 087730, 01730 087781,  
01730 087741, 01711 991942  
Chattogram: 01730 087715

### Trade:

Dhaka Region: 01313 050910, 01730 087707  
Chattogram Region: 01714 289121  
Sylhet & Cumilla Region: 01709 637594  
Rajshahi & Rangpur Region: 01313 408813  
Khulna & Barisal Region: 01313 050923  
Mymensingh Region: 01313 408809



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