AKİJISPAT

PRODUCT BROCHURE

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ABOUT US:

Akij Building Solutions focuses on one of the basic human needs of shelter and living. The company has its roots going down 20 years in working with these materials. Our journey with steel started in the year 2020 with a factory that has been involved in providing quality steel since 2009. AKIJ ISPAT started its operation both in corporate and enterprise business from 1st January 2023 after having the inclusion of new machineries in production line to supply high quality products to the customers.

AKIJ ISPAT produces steel bars to reinforce concrete in structures such as high-rise buildings, industrial plants, roads, bridges, culverts, flyovers etc. It uses high quality low carbon steel billets to produce quality assured strong and safe steel bars.



AGAINST NATURE BEING DEFENSIVE IS THE BEST STRATEGY

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In accordance with the intensity of seismic activities, observed over the vast period of time in different parts of the country, Bangladesh has been divided into four seismic zones, I to IV, with intensity of earthquake least in zone I and maximum intensity in zone IV.

Almost half of Bangladesh falls in zone III and IV, where the plate tectonic disturbances are prominent.

For buildings, utility services, and vital infrastructure, intensity ratings of earthquakes from 7 to 10 on Richter scale are important and potentiality of damage likely to be caused in case of severe earthquake is indicated here under:

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STRONG SHOCK

Overthrow of valuable objects from cupboards, fall of plaster, swinging of bulbs and ceiling fans, general panic, and minor but no real damage to the building.

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VERY STRONG SHOCK

Cracks in the walls, shatters old buildings and producing slight cracks in the ground.



EXTREMELY STRONG SHOCK

Uproots buildings, causing huge cracks in the ground and triggers landslides.

O EXTREME INTENSITY SHOCKS

Total destruction in the region.

Why Steel Rebars:

Properly designed steel structures can have high ductility, which is the key characteristic for resisting shock such as blasts or earthquakes. Steel bars are also used to improve the bond with concrete. The concept of reinforced concrete evolved due to the fact that steel and concrete act together as resisting force. Concrete has high compressive strength but low tensile strength. But, when it is used for columns, beams, girders, foundation, walls or floors, concrete must be reinforced to attain the necessary tensile strength.

TMT rebars, the heart and soul of every construction:

The heart and soul of a construction project are TMT rebars. It is the backbone of the whole structure. More attention is required while buying the TMT bars as once they are used, they become irreplaceable.

Thermo Mechanically Treated (TMT) rebars impart strength and ductility to RCC structure to withstand various kinds of loads impacting a building. These days a lot of focus is given in designing structures that have high earthquake resistance. TMT bars have high fatigue resistance to seismic loads due to its higher UTS/YS ratio. This makes them the most suitable for using in earthquake prone areas. Usage of TMT has enabled economy in design, construction of high risers with improved earthquake resistance along with added advantage of superior weldability, corrosion resistance, ductility and durability.

Why AKIJ ISPAT TMT Rebar :





Finest Raw Materials

Quality assured Steel Scraps, Pig Iron and Sponge Iron is used to produce steel billets. Ferro Silico Manganese, Ferro Silicon & Ferro Manganese are used to achieve desired chemical composition as standard. Then. the chemical per composition tested billets are being used as a raw material for manufacturing our rebars. If the chemical composition of billets are satisfactory and confirming to the requirements, the said billets are then utilized for further processing otherwise marked and returned.

Accuracy of Billet and Rebar

The strength together with ductility, weldability and bendability are the most essential quality requirements of rebars. Thus, yield strength, together with tensile strength, is the first requirement for reinforcement steel in standards. The grade of the steel is classified according to the specified minimum yield strength.

AKIJ ISPAT has a fully integrated steel plant where TMT Bars are produced directly from quality assured steel billets. Fully Integrated production process ensures accuracy of chemical and physical properties of finished products. Bv maintaining the perfect combination of chemical and physical properties according to the standards, we not only provide a high ultimate tensile strength to yield strength ratio but also make Akij ISPAT TMT rebars more ductile, bendable, weldable, resistant to earthquakes, and resistant to corrosion.

Advanced Processing Technologies

AKIJ ISPAT TMT rebars gain their strength from a computer controlled inline process of tempering and hardening. Which involves:

In a rolling mill, the heated billet goes through three stands – roughing, intermediate and finishing stands, where the rolling mill reduces the thickness and extends the overall length.

Once the hot rolled bar exits the final finishing rolling stand it is instantly passed through a water quenching system where water sprays cause the surface of the rebars to cool and harden quickly. While this rapid cooling makes the surface hard, it leaves the inner core hot and malleable.

– After the bars pass through the quenching system, the core remains hot and continues to pass this heat to the outer surface, the process is called self-tempering and turns the outer layer into Tempered Martensite. Then, the bars are left with special cooling beds to cool down on their own. This makes the hot core cool down to room temperature slowly.



Stringent Quality Control and Assurance

AKIJ ISPAT TMT rebars are being produced through 3 stage Quality Control Process (Quality assured Raw Materials, Quality Control at the Induction Furnace, and Quality Assurance of Finished TMT rebars) which include the use of the latest testing types of equipment.

Competitive Price

AKIJ ISPAT not only ensures quality assured TMT rebars but also provides competitive pricing for its customers.

Features of AKIJ ISPAT TMT Rebar :

Great Ductility, Bendability and Weldability

AKIJ ISPAT TMT rebars undergo monitored processing to achieve high ultimate tensile strength to yield strength ratio (UTS/YS \geq 1.25) which makes AKIJ ISPAT TMT rebars more ductile and compatible against seismic/earthquake loads. Besides our rebars contains controlled lowest limit of carbon element which ensures better bendability and weldability.

With great ductility, bendability & weldability comes assured safety & longevity

Ensures superior bonding with concrete

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Resistant to Earthquakes

Most of the casualties occur due to the collapse of structures during major earthquakes. Engineers' only option for avoiding or minimizing the loss of property and lives is to design earthquake-resistant structures that undergo large deformations and damage but do not collapse.

Earthquake resistance could be achieved by conceiving of sound structural form and configuration being done by the architects and the structural engineers, who would proportion the member sizes. If the configuration is not sound, the structure becomes easily vulnerable to an earthquake.

The capacity design procedure for the earthquake-resistant Reinforced Cement Concrete (RCC) structures is effective when actual member capacities do not greatly exceed the assumed design capacities. Moreover, RCC members are expected to undergo large inelastic deformations for adequate seismic energy dissipation. Since flexural capacity and post-yield behavior of RCC members are largely controlled by steel reinforcing bars, the steel rebars must contain certain special requirements on their properties, such as yield strength (YS), ultimate tensile strength to yield strength ratio (UTS/YS ratio), and elongation, which are sensitive to the method of rebar manufacturing. Akij Ispat maintains uniformity and produces rebars as per standards for the mentioned properties (YS, UTS/YS, and Elongation).

• EMF (ELONGATION AT MAXIMUM FORCE)

Elongation at maximum force or EMF is a property by the virtue of which TMT Bars will undergo an elongation before developing a stress/strain that would eventually lead to the breaking of bar.

Higher the ductility in the bars, longer is the elongation and vice versa. Construction practices and code worldwide look out for Maximum elongation at Maximum force as one of the most vital features to certify whether TMT rebar is ductile or not.



Superior bonding strength with Concrete

Due to having a uniform and precise transverse rib pattern crafted with a CNC notching machine, AKIJ ISPAT TMT rebars provide the best bonding with concrete. The angular transverse and longitudinal ribs design and rib depth make the concrete tough enough to provide long-lasting structures.

Resistant to Corrosion

Properly stored AKIJ ISPAT TMT rebars display nearly no rusting over the time due to nonexistence of residual stress.

Applications of AKIJ ISPAT TMT Rebars

In constructing Roads & Bridges, Dams, High-Rise apartments, Industrial Structures, Flyovers etc.



DWR Specification

"DWR" in the context of rebar likely refers to "Deformed with Ribs". Deformed reinforcement bars (rebar) have surface irregularities and patterns to enhance the bond with concrete. The presence of ribs or deformations on the surface of the rebar provides several advantages: Improved **Bonding**, Enhanced **Strength**, Prevention of **Slippage**, Better Load Distribution, Adherence to Standards etc.

Improved Bonding: The deformations on the rebar surface create a mechanical bond with the surrounding concrete. This mechanical bond is crucial for the effective transfer of stresses between the concrete and the steel reinforcement.

Enhanced Strength: The deformations increase the surface area of the rebar, improving its grip within the concrete. This, in turn, enhances the overall strength of the reinforced concrete structure.

Prevention of Slippage: The ribs or deformations help prevent the slippage of the rebar within the concrete. This is important for maintaining the structural integrity and stability of the construction.

Better Load Distribution: The irregularities on the rebar's surface facilitate better load distribution between the concrete and the reinforcement. This ensures that the load-bearing capacity of the reinforced concrete structure is optimized.

Adherence to Standards: Deformed rebar often complies with international standards and codes for construction materials, ensuring that the reinforced concrete structures meet safety and performance requirements.

Shining Surface

The glossy surface of rebar is achieved through some technical steps like Hot Rolling, Quenching, Tempering etc. Special Surface Treatment is to achieve a glossy or smooth surface, manufacturers may apply additional treatments. This can involve processes like pickling or coating with materials that enhance the appearance and protect against corrosion.

The glossy surface is not just for aesthetics; it also serves practical purposes. A smooth surface helps with the adherence of concrete during construction and improves the bond between the rebar and the surrounding material. Additionally, a polished finish can contribute to the rebar's resistance to corrosion over time.

Hot Rolling: Rebar is initially produced by hot rolling. This involves heating the steel billets to extremely high temperatures and then passing them through a series of rollers. The intense heat makes the steel malleable, and the rollers shape it into the desired form.

Quenching: After the hot-rolling process, the rebar is often quenched in water or air. This rapid cooling helps to harden the steel and sets its internal structure.

Tempering: Following quenching, the rebar may undergo a tempering process. This involves reheating the steel to a lower temperature, allowing it to attain the desired balance of hardness and toughness.

Surface Treatment: To achieve a glossy or smooth surface, manufacturers may apply additional treatments. This can involve processes like pickling or coating with materials that enhance the appearance and protect against corrosion.

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Quality Assurance

At every juncture of the production process, the cutting-edge Akij Ispat laboratory is meticulously overseen by these testing machines, experienced & skilled quality control personnels to ensure the impeccable quality of the rebar. **Bend Testing Machine Universal Testing Machine (UTM) Spectrometer for Steel Test Quality Assured Products,**

X-Ray Fluorescence Machine (XRF)

That's ensure maximum safety from any disaster like earthquake.

Product types & their Specification:

1. AKIJ ISPAT B500 DWR

- Standard comply to : BDS/ISO 6935-2: 2016; ASTM A 615/A 615M
- Yield Strength (YS) : 500 MPa (Min) 72,500 psi.
- Tensile Strength (TS) : 625 MPa (Min) 90,625 psi.

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2. AKIJ ISPAT B420 DWR

- Standard comply to : BDS/ISO 6935-2: 2016, ASTM 1786
- Yield Strength (YS) : 420 MPa (Min) 60,900 psi.
- Tensile Strength (TS) : 525 MPa (Min) 76,125 psi.

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8 mm	10 mm	12 mm	16 mm	20 mm	22 mm	25 mm	28 mm	32 mm	40 mm
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←			I	Bar Leng	th: Max. 12	meter or 39	0.4 feet		>

Elongation standards followed by AKIJ ISPAT TMT Rebar:

Steel Grade	Minimum % Total Elongation After Fracture	Minimum % Elongation at Maximum Force
B420 DWR	16	8
B500 DWR	14	8

Dimensions, Mass per Unit Length and Permissible Deviations of AKIJ ISPAT TMT Bar:

Nominal Bar Diameter	Permissible Deviation	Nominal Cross Sectional Area	Mass pe	er Unit Length
d (mm)	0/	A (mm ²)	Requirements	Permissible Deviation
a (mm)	70	A (mm²)	kg/m	%
08	±2	50.3	0.395	± 8
10	±2	78.5	0.617	± 6
12	±2	113	0.888	± 6
16	±2	201	1.58	± 5
20	±2	314	2.47	± 5
22	±2	380	2.98	± 5
25	±2	491	3.85	± 4
28	±2	616	4.84	± 4
32	±2	804	6.31	± 4
40	±2	1257	9.86	± 4

Chemical Compositions that are being followed by

AKIJ ISPAT B500 DWR :

Elements	Specified maximum value in %
С	0.32
Si	0.55
Mn	1.8
Р	0.04
S	0.04
CEV	0.61

AKIJ ISPAT B420 DWR :

Elements	Specified maximum value in %
С	0.3
Si	0.55
Mn	1.5
Р	0.04
S	0.04
CEV	0.56



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