



TMT BARS







# MIGHTY GRIP

# EXCELLENT BOND

## Why grip between concrete & TMT bars is important in RCC

The grip around the ribs in TMT bars is an important aspect in RCC (Reinforced Cement Concrete) construction because it helps to provide better bonding between the concrete and steel reinforcement. The ribbed structure of TMT bars helps to improve the bond between the concrete and the steel by increasing the surface area in contact with the concrete. This increased surface area provides a greater mechanical interlock, resulting in a stronger bond between the two materials.

The ribbed structure also helps to reduce the bond slip, which occurs when the concrete and steel try to move relative to each other. This reduction in bond slip leads to a more stable structure, which is less likely to crack or deform under load.

Moreover, the ribs on the TMT bars provide additional reinforcement to the concrete, which helps to distribute the stresses evenly throughout the structure. This makes the structure more resistant to cracking and collapse, and increases its overall strength and stability.

In conclusion, the grip around the ribs in TMT bars is an important aspect in RCC construction because it improves the bond between the concrete and steel reinforcement, reduces bond slip, and provides additional reinforcement to the structure. All of these factors contribute to a stronger and more stable structure that is better able to withstand external loads and forces.





# WINGS OF STEEL

**Making the urban  
construction seismic resistant**

**Seismic reinforcement  
of RCC Buildings with  
ductile grade TMT Steel Bars**

## Futuristic urban development in India

India is experiencing rapid urbanization and as cities grow, there is a need for more vertical construction to accommodate the increasing population. This has led to a rise in high-rise buildings, and the strength and stability of these structures depend heavily on the use of Reinforced Cement Concrete (RCC). The primary components of RCC include TMT (thermo-mechanically treated) bars and cement, which play a crucial role in ensuring the stability of the structure.

TMT bars are high-strength steel bars used in construction as reinforcement in concrete structures. They are made by heating the steel and cooling it rapidly, which enhances its strength and toughness. TMT bars provide the necessary tensile strength to the concrete structure, making it more resistant to cracking and deformation.

Cement, on the other hand, acts as a binding material that holds the aggregate (sand, gravel, and rocks) together and provides the necessary compressive strength to the structure. The quality of cement used in the construction of RCC structures is of utmost importance as it affects the strength and durability of the structure.

Concludingly, the stability of RCC structures in growing Indian cities primarily depends on the use of High quality of TMT bars and cement. The use of these components ensures the strength and durability of the structures, making them safe for occupancy and capable of withstanding external forces such as earthquakes, wind, and rain for generations to come.







### **Unique rib pattern**

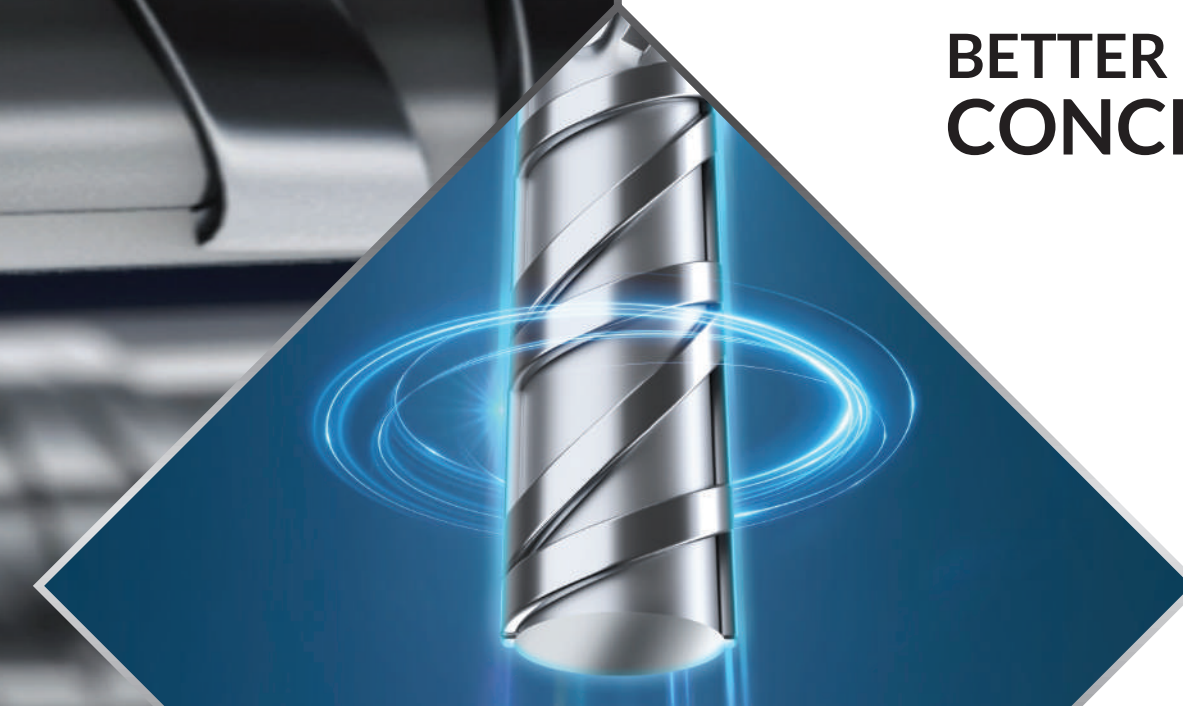
The "Z" ribs in TMT bars are considered better because they provide better bonding between the concrete and the steel reinforcement. The "Z" shape of the ribs creates a greater surface area in contact with the concrete, which results in a stronger mechanical interlock and better bond between the two materials.

The "Z" ribs also help to reduce bond slip, which occurs when the concrete and steel try to move relative to each other. This reduction in bond slip leads to a more stable structure, which is less likely to crack or deform under load.

Additionally, the "Z" ribs provide additional reinforcement to the concrete, which helps to distribute the stresses evenly throughout the structure. This makes the structure more resistant to cracking and collapse, and increases its overall strength and stability.

**BETTER BONDING WITH  
CONCRETE & STEEL**

**STRONGER  
MECHANICAL  
INTERLOCK**



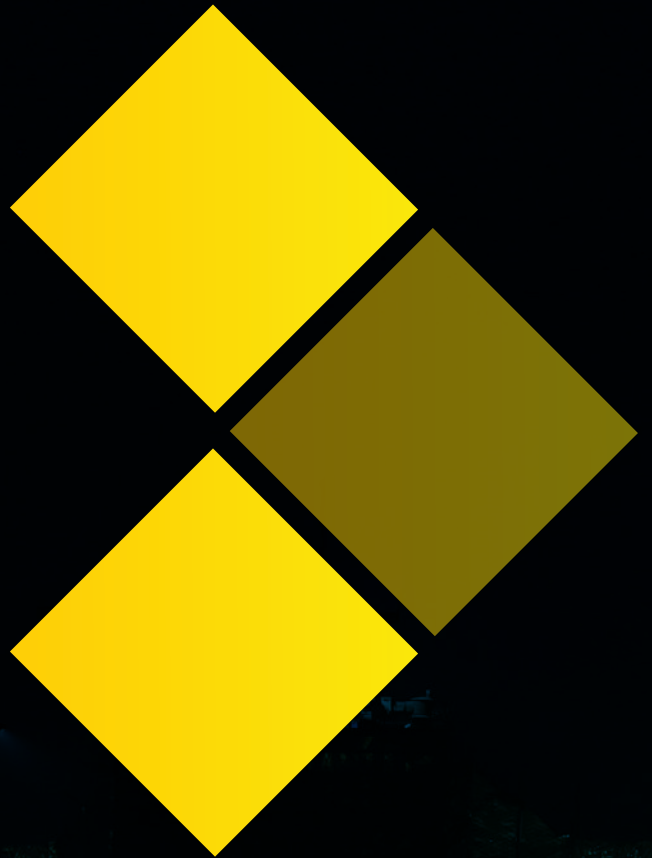


# Group Credentials

Our is a 20-Year-old leading conglomerate and industrial powerhouse with a dominant presence in Steel and Power. Applauded for its consistency and reputation earned across years of hard work & innovating ideas steered by an experienced and visionary team. Our Young and exuberant team believes in leading from the front and focuses diligently to expand its business organically. Sigma Group is all set to take a leap forward with its innovative & disruptive marketing to scale new heights.

At Sigma our operations range from manufacturing of reinforcement steel TMT Bars, Billets and inhouse solar power plant to generate 100 MW Power. Our core management team consists of veterans from the industry and are supported & assisted by a team of experienced supervisors & technicians who have ample industry working experience. Each of the members brings valuable business insight to the overall operational and management process.

Sigma Group has now forayed and has launched its own brand of Internationally adhered European earthquake standard (B500C) equivalent XD550D TMT Bars under the brand name SIGMA GRIPLOCK. In a very small span of few months from the launch SigmaGriplock has cornered the sizable market share around its Target Market. Our Integrated facilities are optimized with an installed capacity to manufacture 300000 TPA OF TMT Bars



# Why us?

- State Of Art Integrated Steel Plant
- Fully Automated Production Process
- Griptech Technology For Max Bonding
- Adhering To British Earthquake Standard (B500c)
- 30 Yr Old Legacy with dominance in Steel & Power
- Dynamic Leadership with Management Excellence





## Our Edge

Our state-of-the-art manufacturing facility is equipped with advanced machinery and equipment that enables us to produce TMT bars of the highest quality. We adhere to strict quality control measures to ensure that our products meet and exceed industry standards

Our team of experienced professionals includes engineers, technicians, and support staff who are dedicated to delivering the best products and services to our customers. We pride ourselves on our customer-centric approach and strive to build long-term relationships with our clients.

In addition to our comprehensive range of TMT bars, we also offer a variety of value-added services, including technical support and on-site assistance. We are committed to meeting the diverse needs of our customers and helping them achieve their construction goals.

At Sigma we are constantly innovating and seeking new ways to improve our products and services. We are dedicated to delivering excellence in all that we do, and we look forward to working with you on your next construction project

High tensile to  
yield strength  
ratio



Superior bond  
strength best in  
the class



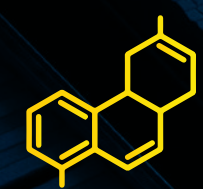
Superior Corro-  
sion Resistance



Uniform diameter  
across the cross  
section



Excellent bend-  
ability & workabil-  
ity



Minimized sulfur  
& phosphorus  
composition

# CUTTING EDGE MANUFACTURING PROCESS

- Sponge Iron Kilns
- Steel Melt Shop
- Automatic Block Mill
- Rolling Mill
- Quench tempered Inline Steel Making
- Automatic Bar Bending, Bundling & Loading
- Internationally Acclaimed Lab
- Online Real Time Quality Monitoring



# Production Process

Sigma Griplock pursues a very adherent production process from the first step which involves following steps

Raw material preparation: The raw materials, including iron ore, coal, and limestone, are mined and then crushed and blended to create a uniform composition.

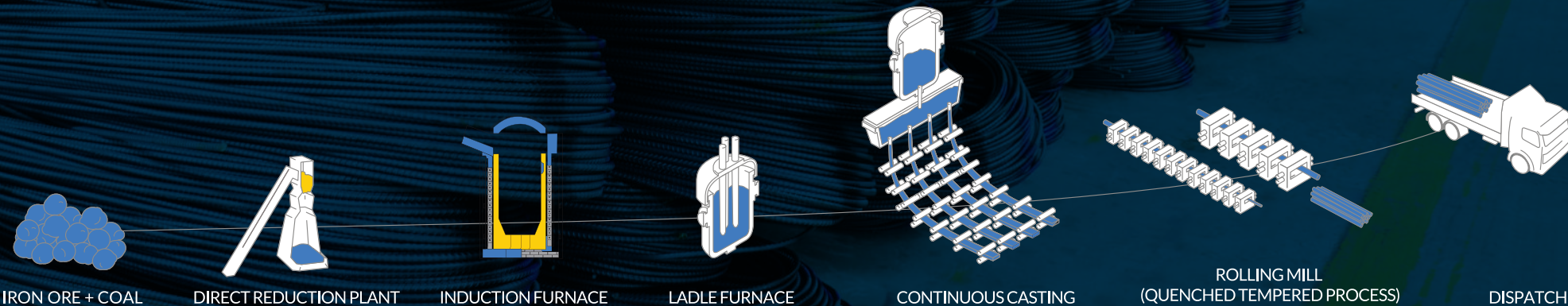
Melting: The raw materials are then melted in the induction furnace to create molten steel. The temperature of the steel is carefully controlled to ensure that the desired chemical composition is achieved.

Casting: The liquid steel is then poured into a continuous casting machine, where it is cooled and solidified into a long, continuous strand of steel.

Hot rolling: The continuous strand of steel is then fed through a series of hot rolling mills, where it is subjected to high temperatures and pressures to reduce its thickness and increase its strength.

Thermo-mechanical treatment: The hot-rolled steel is then subjected to thermo-mechanical treatment, which involves heating it to a high temperature and then rapidly cooling it. This process helps to improve the strength and ductility of the steel.

Cooling and cutting: The TMT bars are then cooled and cut to the desired length. They may also be subjected to additional processing, such as surface finishing or testing, before they are ready for use





Chemical Properties

Constituent	BIS Fe 500	Sigma Fe 500	BIS Fe 550	Sigma Fe 550	BIS Fe 550 D	Sigma Fe 550 XD
Carbon	0.3	0.25	0.30	0.25	0.25	0.23
Sulphur	0.055	0.045	0.055	0.045	0.04	0.035
Phosphorus	0.055	0.045	0.05	0.04	0.04	0.035
Manganese		> = 0.60		> = 0.60		> = 0.60
Sulphur+ Phosphors	0.105	0.09	0.1	0.08	0.075	0.07

Mechanical Properties

Parameter ( MIN)	BIS Fe 500	Sigma Fe 500	BIS Fe 550	Sigma Fe 550	BIS Fe 550 D	Sigma Fe 550 XD
Yield strength ( N/mm2)	500	510	550	560	550	565
Ultimate Tensile Strength (N/mm2)	545	585	585	600	600	610
Elongation ( %)	12	16	10	15	14.5	16

Available in Fe500, Fe500D, Fe 550, Fe550XD

Weight Tolerance as per 1786:2008

Size MM	BIS Standard Kg/Mtr.			Sigma Values Kg/Mtr.
	MIN	AVG	MAX	
8	0.367	0.395	0.423	0.375 to 0.400
10	0.574	0.617	0.660	0.580 to 0.620
12	0.844	0.888	0.932	0.850 to 0.910
16	1.501	1.580	1.659	1.510 to 1.600
20	2.396	2.470	2.544	2.400 to 2.510
25	3.734	3.856	3.964	3.750 to 3.910
28	4.685	4.830	4.975	4.700 to 4.900
32	6.121	6.310	6.499	6.184 to 6.436

Ductility & Flexibility

Ductility is a measure of a material's ability to deform under stress before breaking. In construction, ductility is important because it allows a material to absorb energy and deform, rather than break, when subjected to loads and stresses.

In Sigma Griplock TMT Bars ductility is achieved through the thermo-mechanical treatment process, which involves heating the bars to high temperatures and then rapidly cooling them. This process enhances the microstructure of the bars, making them more uniform and reducing the formation of brittle inclusions. As a result, Sigma Griplock TMT Bars bars are more ductile, more resistant to corrosion, and have higher tensile strength compared to other types of steel bars.

TMT BARS ALONE CAN PREVENT damage to a civil structure during an earthquake:

- Improved tensile strength
- Increased ductility
- Better bond with concrete
  - Improved corrosion resistance
  - Seismic design

