

TATA TISCON



Solutions for your Business

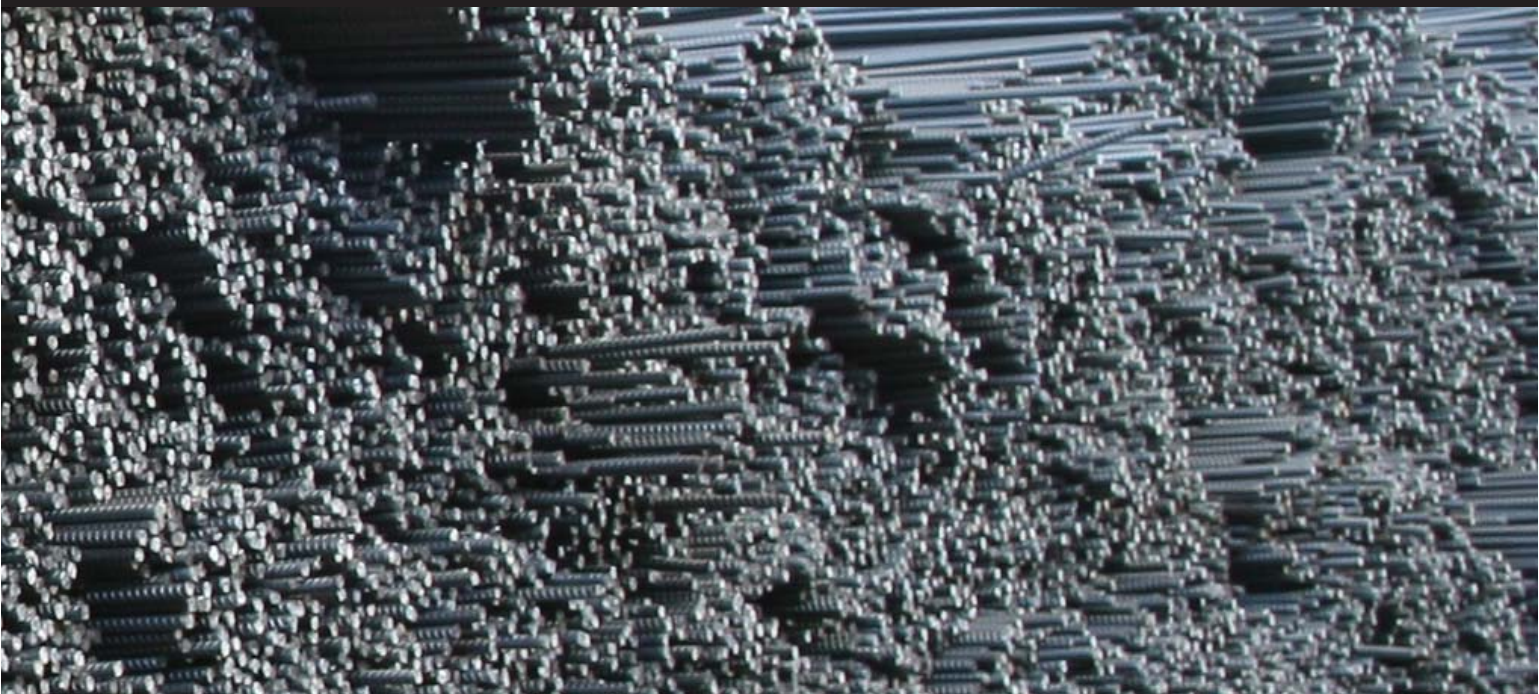
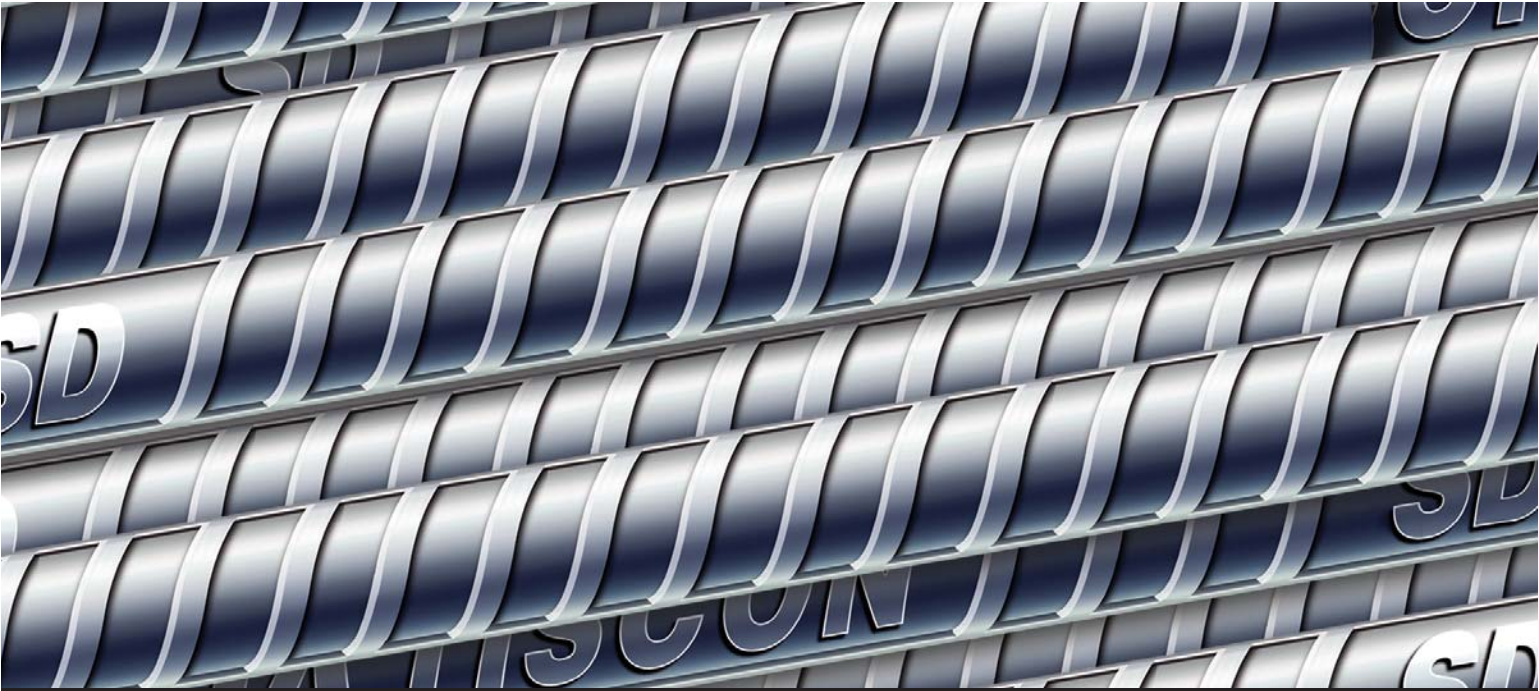
Profile of a trail-blazer

Tata Steel began operations in Jamshedpur, more than 100 years ago. Starting as Asia's first integrated steel manufacturer, the Tata Steel Group has grown to be a global corporation and the sixth largest steel conglomerate in the world with about 30 million tonnes per annum (mtpa) of crude steel production capacity. It is geographically spread over 5 continents with manufacturing units in 26 countries. The Vision of the entity, the Tata Steel Group is "to be the global steel industry benchmark for Value Creation and Corporate Citizenship". The Group includes Corus, the second largest steel company in Europe; NatSteel, among the top steel makers in the Asia Pacific region and Tata Steel (Thailand).

This brochure presents Tata Steel's expertise as a world-class provider of long steel products.









Tata Steel Long Products— ride on excellence

The Long Product Group of Tata Steel offers a bouquet of world-class products covering rebars designed for different geographies and needs and carbon and alloy steel wire rods for a host of engineering applications. The rebars are made in the Merchant Mill and the New Bar Mill, while the wire rods are produced in the Wire Rod Mill. All the Mills draw their feedstock from the basic oxygen steel making unit which produces continuously cast billets. The Long Product Technology Group – a critical support service of the business – ensures seamless co-ordination among production, marketing and planning units. The sales and marketing wing has its pulse on the market and provides valuable consumer insight for product diversification, strategic planning and specific sales programmes.

Whether it's best-in-class products, value added services or delivery commitments, Tata Steel is the one partner for all your long product needs.



Tata Steel has earned the prestigious Quality Management Certificate from CARES, an independent, non-profit, UK certification authority for reinforcing steel.

Tata Tiscon— the unbeatable rebar

Tata Tiscon rebars are available in several categories: Tata Tiscon 500D, Tata Tiscon CRS and Tata Tiscon Super Ductile. Together, they comprehensively cover all applications for reinforcing steel bars. All Tata Tiscon rebars are made in accordance with the TMT process.





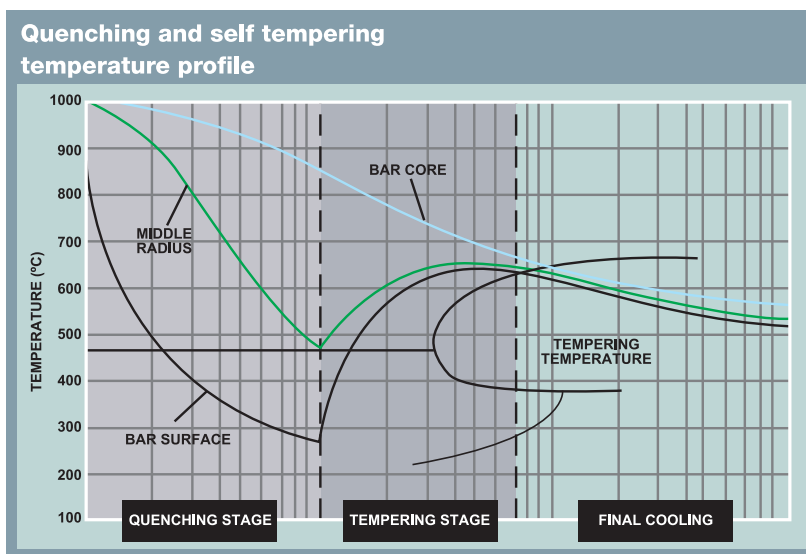
The TMT process

Tata Steel was the first in India to develop Thermo Mechanically Treated (TMT) rebars, using the latest technology from Tempcore, Belgium. The rebars are produced in state-of-the-art plants under the close supervision of high-calibre metallurgists and engineers. The basic steel is made from virgin iron ore through the blast furnace – basic steel making – secondary refining – billet casting route, with minimum impurities. They are rolled in fully automated mills from world renowned suppliers. Tata Tiscon rebars are hot rolled from steel billets and subjected to PLC controlled online thermo mechanical treatment in three successive stages.



Tata Steel takes credit for being the first integrated steel company outside Japan to have won the Deming Application Prize for Excellence in Total Quality Management.

Quenching The hot rolled bar leaving the final mill stand is rapidly quenched by a special water spray system. This hardens the surface of the bar to a depth, optimized for each section through formation of martensitic rim while the core remains hot and austenitic.



Self-tempering When the bar leaves the quenching box, the core remains hot compared to the surface, allowing heat to flow from the core to the surface, causing tempering of the outer martensitic layer into a structure called “tempered martensite”. The core still remains austenitic at this stage.

Atmospheric cooling This takes place on the cooling bed where the austenitic core is transformed into ductile ferrite-pearlite structure. Thus the final structure consists of an optimum combination of a strong outer layer (tempered martensite) with a ductile core (ferrite-pearlite). This gives Tata Tiscon its unique combination of higher strength and ductility.



Tata Tiscon 500D—strength you can count on

Tata Tiscon 500D, the higher strength rebar from Tata Steel has been specially created for high strength applications. It is ideal for dams, bridges, high-rises or any critical structure where high yield strength is required without compromising on the elongation properties.



Tata Tiscon 500D is made to latest BIS 2008 standard for lower harmful impurities of sulphur and phosphorus.



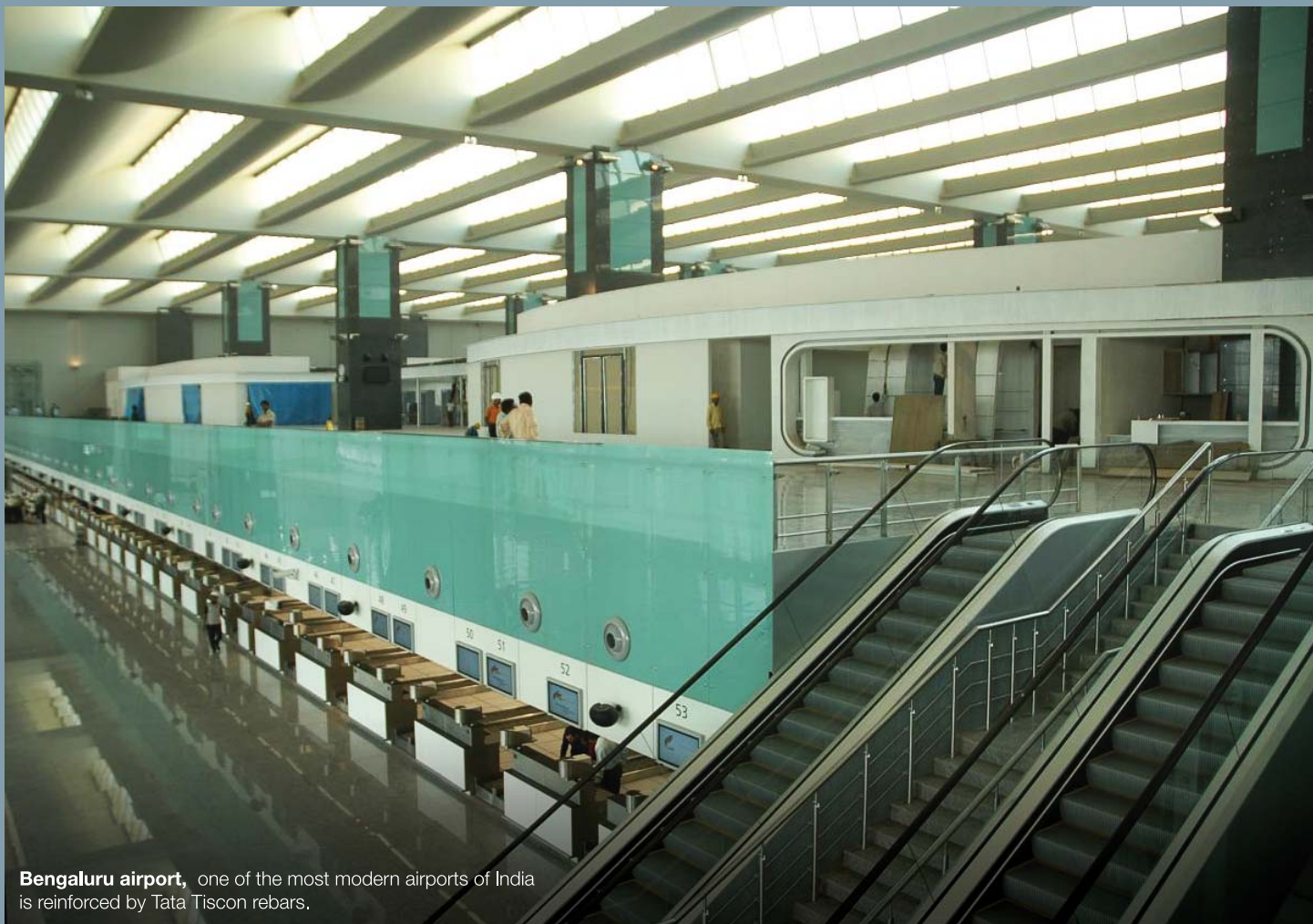
	IS : 1786 Fe 500D	Tata Tiscon 500D* (Typical values)
Chemical Properties		
%Carbon (max)	0.250	0.25
%Sulphur (S) (max)	0.040	0.035
%Phosphorus (P) (max)	0.040	0.035
%S&P (max)	0.075	0.070
Mechanical Properties		
Yield Stress-YS (N/mm ²) (min)	500	520
% Elongation (min)	16.0	18
Ultimate Tensile Stress-UTS (N/mm ²) (min)	565	580

*(Typical Values for 90%)

High Ductility	No Cold Twisting	Higher and Uniform Strength
Elongation 18-25%*	No residual stress	Yield strength 500 N/mm ²

*(Typical values for 90%)

All typical values are indicative only and not guaranteed



Bengaluru airport, one of the most modern airports of India is reinforced by Tata Tiscon rebars.



Nuclear power plants at Kalpakkam, Kota and Trombay, 50,000 metric tonnes of Tata Tiscon rebars have gone into reinforcing the buildings.

Advantages of Tata Tiscon 500D

Higher bond strength Higher bond strength is developed between the rebar and the surrounding concrete. The design and profile of the rib and its replication throughout the length of the rebar by using automated milling machines, result in uniform and precise ribs, leading to uniform strength.

More economy Tata Tiscon 500 rebars are higher in strength and elongation. This helps you economise on steel consumption without sacrificing safety.



Excellent bendability Due to the controlled process of manufacturing rebars under Tempcore technology, the tough outer surface and the soft core of Tata Tiscon 500D result in a rebar with excellent values of bendability. The rebar can be bent around mandrels much smaller than those specified in IS 1786, which has an obvious advantage in the construction sites.

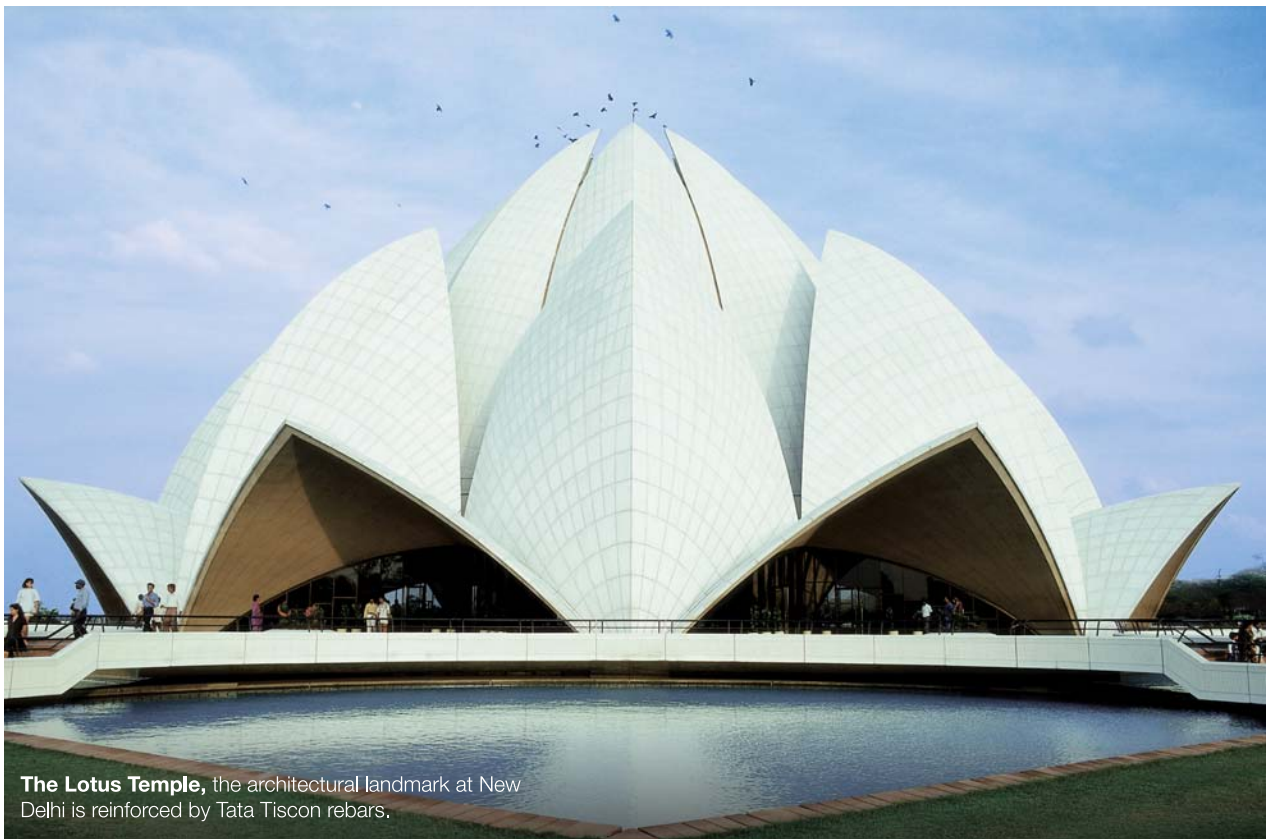
Superior weldability Tata Tiscon 500D is produced with low carbon and carbon equivalent. The higher strength property is imparted by precisely controlling the parameters of thermo mechanical treatment to ensure superior weldability. It can be butt-welded or lap-welded using simple welding practices with ordinary rutile coated electrodes of matching strength. Generally, no pre and post welding treatment is required.

Higher corrosion resistance The precise control of the

thermo mechanical treatment process, results in a uniform and thick tempered martensitic rim, completely free from internal stresses. The martensitic rim improves the corrosion resistance of Tata Tiscon 500D as well as its fatigue strength.

Close dimensional tolerances Tata Tiscon 500D is supplied with mass/metre on the negative side of the specified tolerance on a weighted average basis. This further reduces consumption because of extra-length per mass.

Superior seismic resistance Due to its unique combination of strength and ductility, Tata Tiscon 500D can adequately support a seismic design. When evaluated for resistance to seismic loads on column joints in a RCC structure, the energy dissipation was found to be almost same for each cycle indicating very high and uniform ductility maintained under such loads.



Tata Tiscon CRS— the corrosion fighter



Tata Tiscon CRS (Corrosion Resistance Steel) rebars is a breakthrough innovation by Tata Steel to help builders fight the deadly menace of corrosion. Wherever there is salinity in the air, along the coastline, in sea water, in ground water or

where there are acid particles in the air, corrosion strikes like a virus. It eats into RCC structures like buildings, bridges, dams, industrial plants and more.

Tata Tiscon CRS rebars with their unique protective chemistry, keep corrosion at bay and protect the life of concrete structures. It is available in the following diameters: 8, 10, 12, 16, 20, 22, 25, 28, 32, 36 and 40 mm, in grade IS 1786, Fe 500.

Tata Tiscon CRS-mechanical properties

	IS : 1786 Fe 500D	Tata Tiscon Fe 500 CRS * (Typical values)
Mechanical Properties (min.)		
Yield Stress-YS (N/mm ²)	500	520
% Elongation	16	16
Ultimate Tensile Stress-UTS (N/mm ²) (min)	565	580

*(Typical Values for 90% of batches)



Tata Tiscon CRS process technology

Tata Tiscon CRS rebars are produced, using a judicious selection of corrosion resistant elements (Cu, P & Cr) complemented by a special Thermo Mechanical Treatment (TMT) route.

The microstructure resulting from the TMT process, leads to higher corrosion resistance on account of:

- being free from torsional stresses:
- presence of self-tempered lath martensitic layer on surface known to inhibit corrosion attack and
- homogeneous distribution of corrosion resistant elements from core to surface



Chemical composition of Tata Tiscon CRS, %

C	S	P	CRE
0.15	0.04	0.12	0.5
max.	max.	max.	min.

Advantages of Tata Tiscon CRS



The Thyagaraja Indoor Stadium, New Delhi. Tata Tiscon has been used in various structures that are being built for the 2010 Commonwealth Games.

- Longer life due to superior corrosion resistance
- High yield strength, coupled with good ductility and bendability
- No extra precaution required in material handling and transportation
- No maintenance during fabrication
- Ideally suited to poor working conditions at site
- No extra precaution during welding
- Can be bent and rebent around very small mandrels





Bombay Stock Exchange, one of the largest stock exchange in the world, is reinforced by Tata Tiscon rebars.

Tata Tiscon Super Ductile rebars – innovation in seismic damage control



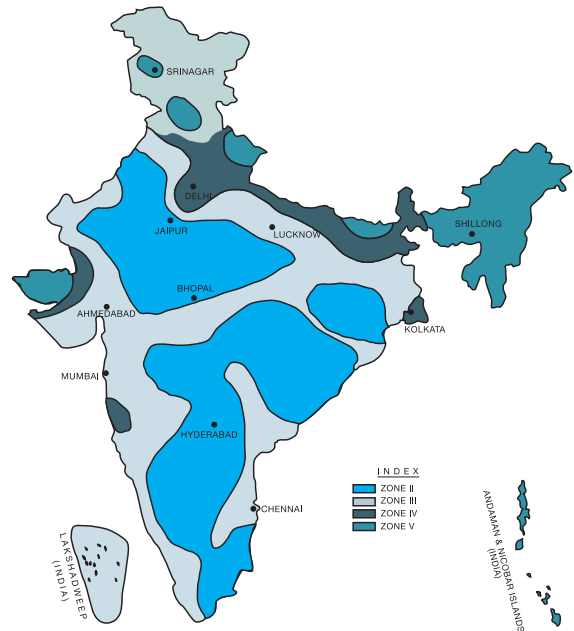
With 54% of the Indian landmass on the highly active Himalayan and Eurasian plates, earthquakes have become a fact of life in India – causing enormous damage and loss

of life. Though earthquakes cannot be predicted, the damage they cause can be prevented.

For the first time in India, Tata Steel has developed Tata Tiscon Super Ductile rebars, ideally suited for use in earthquake prone areas (zones II, III, IV and V indicated in the map). The distinguishing feature of Tata Tiscon Super Ductile rebars is its capacity to absorb large amounts of energy released during earthquakes, without catastrophic failures which might happen in case of ordinary rebars.

An essential construction characteristic for earthquake zones is that the rebars should bend without breaking. Structural designs take into account yield strength of rebars, factoring in all dead, live loads and safety limits.

Frequent tremors on the ground and its amplitude may generate stresses that exceed the yield strength of the rebars. To prevent the collapse of buildings, it is necessary that even when the stress exceeds the yield strength, it should not exceed the tensile strength. This has been made possible with Tata Tiscon Super Ductile rebars, designed to have a much higher UTS/YS ratio compared to ordinary rebars. In other words, they can be plastically deformed to a much larger extent without crossing their ultimate tensile strength.



Tata Tiscon Super Ductile rebar properties

PROPERTIES	BIS 1786	BIS 1786	(U.K.) B.S. 4449 / 2005		AUS / NEWZEALAND AS NZS 4671 / 2001		TATA TISCON SD
	Fe 500	Fe 500D	500B	500C	500N	500E	Fe 500SD
Y.S Min.	500	500	500	500	500	500	520
Y.S Max.	N.S	N.S	650	650	650	650	650
UTS Min.	8 % Higher to Y.S	10 % Higher to Y.S	8 % Higher to Y.S	15 % Higher to Y.S	8 % Higher to Y.S	15 % Higher to Y.S	15 % Higher to Y.S
UTS Max.	N.S	N.S	N.S	35 % Higher to Y.S	N.S	40 % Higher to Y.S	40 % Higher to Y.S
UTS / YS Min.	1.08	1.10	1.08	1.15	1.08	1.15	1.15
% Total Elongation	12.0 Min	16.0 Min	N.S	N.S	N.S	N.S	18
% Elongation upto max. Stress	N.S	5	5	7.5	5	10	6

E.Q. Zone: Earthquake Zone N.S. : Not Specified N2: 120 PPM Max



The Bandra Worli Sea Link, a landmark in the Indian construction industry has been built using large volumes of Tata Tiscon rebars

Precision-manufactured Tata Tiscon Super Ductile rebars

Tata Tiscon Super Ductile rebars are manufactured through iron ore - blast furnace basic oxygen furnace – billet casting route with precise control over several parameters.

Chemistry Tata Tiscon Super Ductile rebars are made to a unique chemistry with critical control over carbon, sulphur, phosphorus and other alloying elements. Carbon equivalent is maintained at a lower range to facilitate good weldability. Billets are cast with electromagnetic stirring to eliminate harmful segregation.

Rolling The billets are rolled in most advanced mills for maintaining very narrow range of temperatures and other

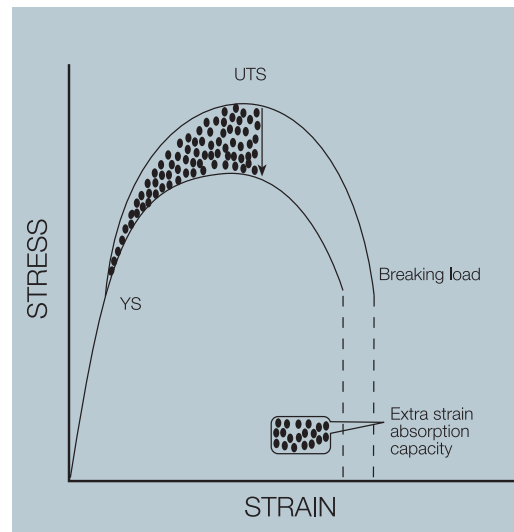
rolling parameters which are critical for making rebars super ductile. The rebars also have very close dimensions, prominent rib pattern and surface finish.

Thermo Mechanical Treatment The Tempcore TMT online quenching process is adopted after rolling, with automated control of water pressure, nozzle angle and the rate of water flow. For Tata Tiscon Super Ductile rebars, it is very important to have a critical balance between chemistry and quenching parameters, essential in developing the desired properties.



Advantages of Tata Tiscon Super Ductile rebars

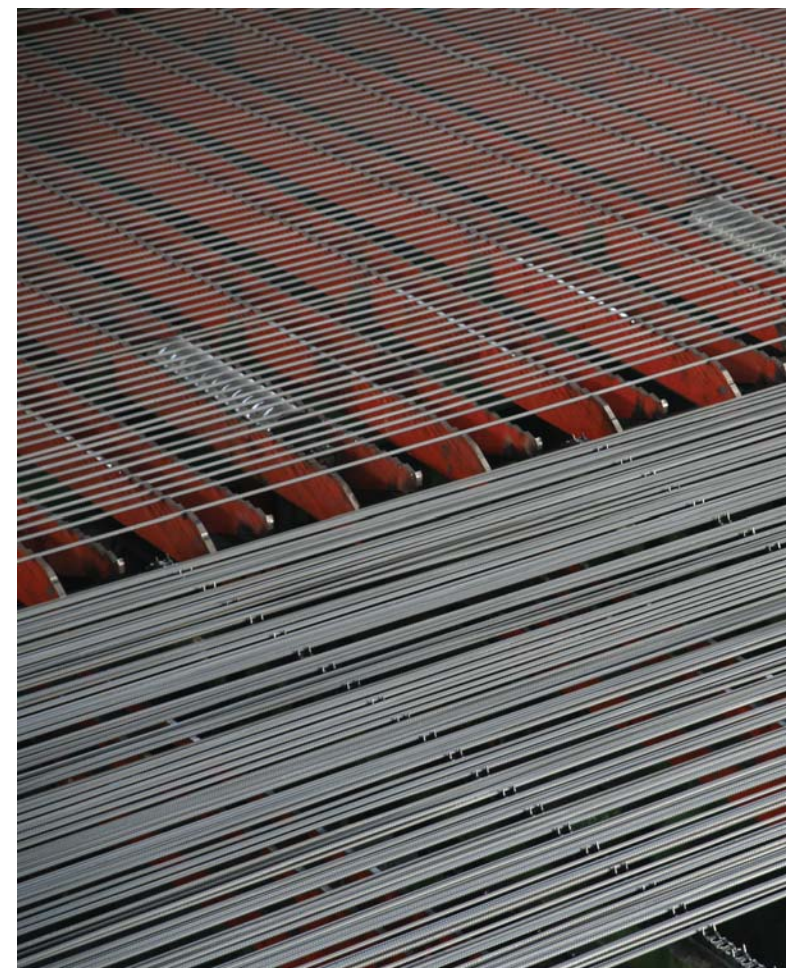
Superior mechanical properties Tata Tiscon Super Ductile rebars are available in Fe 500D with a minimum characteristic yield strength of 500 MPa as specified in BIS 1786 which means structural designing need not incorporate any deviation from the standard characteristic strength assumptions. In fact, the UTS and ductility being greater than specified in the standard, the rebars ensure enhanced safety during earthquakes. Due to higher UTS but same characteristic yield strength, rebars acquire more bendability resulting in ease of work at sites. Moreover, the bent portion retains higher residual ductility.



Better bond strength The rib pattern of Tata Tiscon Super Ductile rebars are specially designed to bond best with concrete.

High energy absorption capacity Tata Tiscon Super Ductile rebars have a higher UTS/YS ratio. This ensures that rebars when stressed beyond yield strength, as it may happen during an earthquake, will absorb the stress easily and to a much higher extent without any danger of sudden and catastrophic rupture.

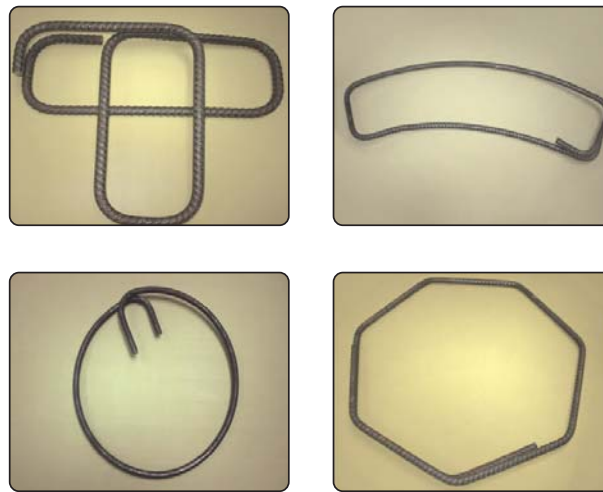
Super ductility. In Tata Tiscon Super Ductile rebars, the uniform elongation is more focused on high value, and maintained at a very high value, compared to some of the international specifications. Hence Tata Tiscon Super Ductile rebars can undergo plastic deformations to a large extent without necking and thus resist ultimate breakage.





The Tata Tiscon Readybuild Customised Rebar Solution customises the lengths of the rebars and bends them at required angles, in accordance with the given project's specification. The fast and efficient service caters to every kind of reinforcement requirement, redefines concepts of time and inventory management, and reduces material wastage.

The just-in-time delivery service provided by the Tata Tiscon Readybuild Customised Rebar Solution is currently available in select markets and will be rolled out across the country shortly.



Tata Tiscon service edge

Reliable Steel Programme

Tata Steel's Reliable Steel Programme removes even the slightest delay in the delivery of steel, negating completely the chances of project overrun. The entire supply chain has been re-arranged so that On-Time and In-Full (OTIF) supply of material is guaranteed.

Tata Steel, known for its superior product quality and continuous improvement, will become one of the best service providers in the steel business with its Reliable Steel Programme.

Advantage of the Reliable Steel Programme

- On-Time and In-Full (OTIF) delivery
- Manages sudden changes in steel requirements
- Reduces inventory levels at sites

Advantages of the Tata Tiscon Readybuild Customised Rebar Solution

Reliability of steel and supply Tata Tiscon rebars from the Tata Tiscon Readybuild Customised Rebar Solution are made from 100% virgin steel. The supply of raw material, according to a given schedule is guaranteed. There is no question of delay due to non availability of steel.

Better site productivity There is a reduced involvement of labour, used for handling, cutting and bending. This makes site management much easier. Projects get a competitive edge due to the enhanced speed of construction.

Better quality construction The Tata Tiscon Readybuild Customised Rebar Solution is fully automated and rebars are fabricated to IS standards. The machines guarantee a precision that is impossible to achieve manually. The accuracy with which the rebars are cut and bent leads to easier fabrication on site.

Reduced wastage Wastage of materials is averted as

human error is done away with, with the help of the machines at the plant. As a result, the cost of disposing waste material on site is also reduced.

Less time taken The time taken to complete the project is reduced as the entire process is comparatively error-free, being mostly automated.

Reduced project cost

1. Inventory and storage cost is negligible due to just in time delivery system.
2. Labour cost is reduced as the entire cut and bend process is limited to ordering the material according to specification.
3. Wastage of materials is averted as human error is done away with to a large extent. Thus the cost of disposing waste material on site is also reduced.

TATA STEEL OFFICES (LONG PRODUCTS)

For further details contact

Chief of Marketing & Sales

Tata Steel Limited

Tata Centre 43 Jawaharlal Nehru Road Kolkata 700 071

Phone 91 33 6550 8186/76 Fax 91 33 2288 1640

e-mail tatatiscon@tatasteel.com

NORTH ZONE	EAST ZONE	WEST ZONE	SOUTH ZONE
<p>New Delhi: 1st Floor, Jeevan Tara Building, 5, Sansad Marg, New Delhi 110 001, Phone: 011 2334 2646/2648, Fax: 011 2334 3196.</p> <p>Chandigarh: SCO16, 1st Floor Sector 26, Madhya Marg, Chandigarh 160 019, Phone: 0172 279 1047/0932, Fax: 0172 279 2426.</p> <p>Kanpur: 16/97, Navroz Building, The Mall, Kanpur 208 001, Phone: 0512 237 5679, 231 287000, Fax: 0512 231 6631.</p> <p>Jaipur: C084 Prithviraj Road, C-Scheme, Jaipur 302 001 Phone: (0141) 5112902 Fax: (0141) 41 412906</p>	<p>Kolkata: 43, Jawaharlal Nehru Road, Kolkata 700 071, Phone: 033 6550 8157/8166, Fax: 033 2282 1687.</p> <p>Bhubaneshwar: C/o, Rungta Agencies P.O., Rasulgarh 751 010, Phone: 0674 2585765, Fax 0674 258 0968.</p> <p>Jamshedpur: 191, Burma Road, Burma Mines, Jamshedpur 831 007, Phone: 0657 227 0901/0995, Fax: 0657 227 0685.</p> <p>Guwahati: C/o Rungta Agencies, Meena Bhawan, Kanchan Road, Ulubari, Guwahati 781 007, Phone: 0361 252 3093, 245 4161, Fax: 0361 252 6582.</p> <p>Patna: Boring Canal Road, Patna 800 001, Phone: 0612 222 5624, 551 0338/0329, Fax: 0612 2232044.</p>	<p>Mumbai: 3rd Floor, New India Assurance Building, 87, M.G. Road, Fort, Mumbai 400 001, Phone: 022 2267 5669/5945, Fax: 022 2261 9902.</p> <p>Indore: 316/317 City Centre, 570, M.G. Road, Indore 452 001, Phone: 0731 645 0690, 253 8685, Fax: 0731 253 5951.</p> <p>Nagpur: Museum Road, Civil Lines, Nagpur 440 001, Phone: 0712 253 3209, 252 2209, 561 1812, Fax: 0712 253 7078.</p> <p>Ahmedabad: 2nd Floor, Premchand, House Annexe, Ashram Road, Ahmedabad 380 009, Phone: 079 6661 2605, 2600, 603, Fax: 079 6661 2604.</p>	<p>Chennai: 2nd Floor, El Dorado Building, 112 Nungambakkam, High Road, Chennai 600 034, Phone: 044 669 60011, Fax: 044 2826 9101.</p> <p>Bengaluru: 2nd Floor, A Wing, Jubilee Building, 45, Museum Road, Bengaluru 560 025, Phone: 080 2532 5517/18/19, Fax: 080 2532 5527.</p> <p>Secundrabad: 6th Floor, Surya Towers, 104, Sardar Patel Road, Secundrabad 500 003, Phone: 040 5526 1050, Fax: 040 2781 2418.</p>

Disclaimer – the buildings shown in the brochure are not exclusively built with Tata Tiscon rebars

