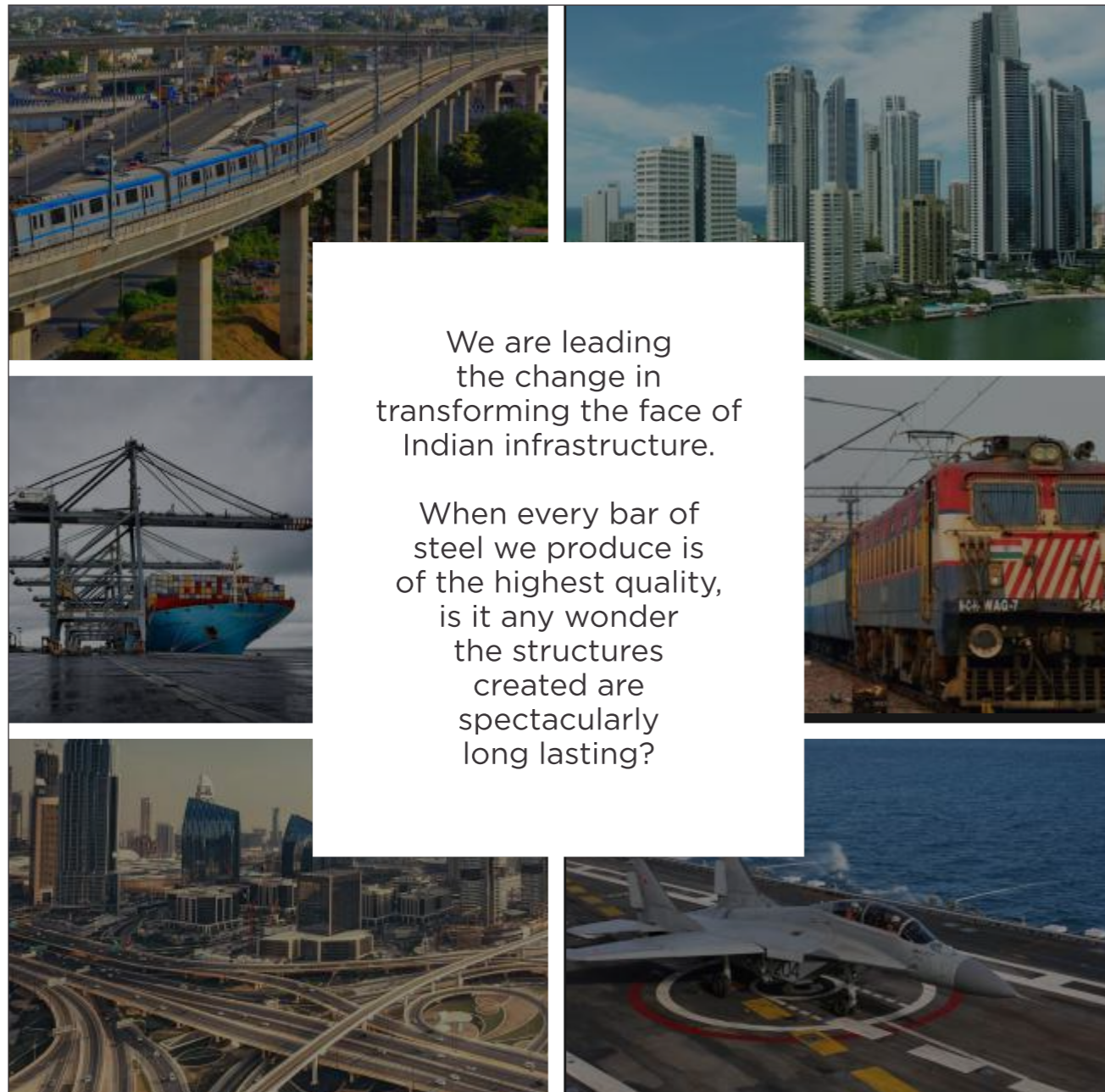


Backbone
of Infrastructure



We are leading the change in transforming the face of Indian infrastructure.

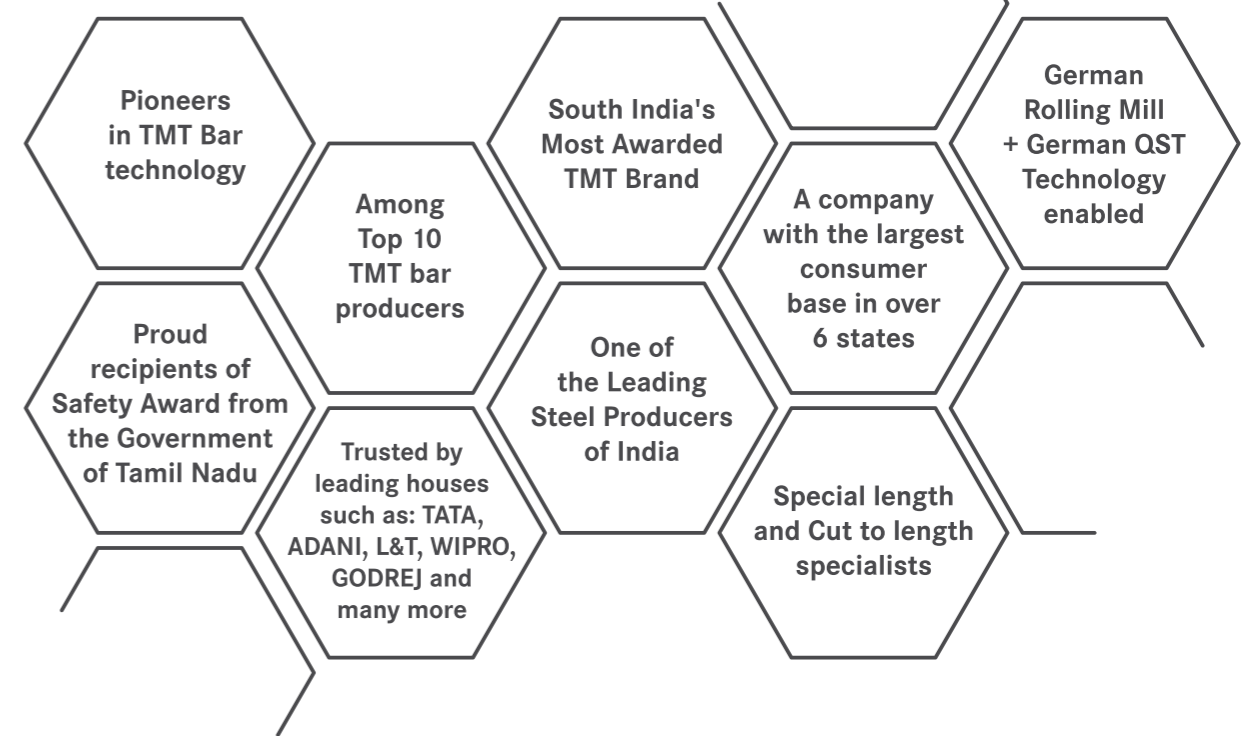
When every bar of steel we produce is of the highest quality, is it any wonder the structures created are spectacularly long lasting?

APPROVED BY

RESEARCH DESIGNS & STANDARDS ORGANISATION	MILITARY ENGINEERING SERVICE	INDIAN SPACE RESEARCH ORGANISATION	ENGINEERS INDIA LTD	NATIONAL HIGHWAYS AUTHORITY OF INDIA	NUCLEAR POWER CORPORATION OF INDIA LTD. (Kudankulam)
DELHI METRO RAIL CORPORATION LIMITED	CHENNAI METRO RAIL LIMITED	KOCHI METRO RAIL LIMITED	AWHO (ARMY WELFARE HOUSING ORGANISATION)	DGNP (V) DIRECTOR GENERAL NAVAL PROJECTS	BHARAT HEAVY ELECTRICALS LIMITED



proud that we are



Exceeding, Surpassing, Benchmarking-
Just some of the words associated
with our quality standards.



We craft our TMT Bars with great care and precision in South India's first, largest, fully-integrated and dedicated TMT Rebar plant spread over 200 acres with 0.5 million tons capacity.

Our TMT bars are manufactured in a single compound using advanced German Technology, Sophisticated machineries, Patented Slit Process and automation that demands the highest quality of raw material. This process ensures consistent quality across the entire length of bar and across the entire batch.

State of the art Robotic Tamper proof testing equipments ensure we deliver what we promise.

CERTIFIED BY



SLS: 375:2009



IS 2830;2012



IS 1786;2008



IS 2062;2011

DOUBLE
GERMAN
TECHNOLOGY

100 % Automatic
German Rolling Mill
+
Latest German Thermex
QST technology

BLOOM

Better
than
Billet

The heart of
high quality
steel bars.

The finest raw material is processed to form Blooms, which is the source of high quality TMT bars. Bloom of 12mtr length by 160 sq.mm., is used only by Select Steel Manufacturers. This results in better quality steel compared to secondary manufacturers using billets of 6 mtr 100sq.mm.

While the average billet size is 100 sq. mm and weigh 500 kg. Kamachi blooms are of 160sq.mm size and weighs 2500 kg.




Bloom is 5 times
heavier than billets

Bloom is more
consistent



Slower heat loss of blooms
ensures higher uniform
quality across the bar

How Kamachi TMT Rebars are superior

	YOU GET		OTHERS	OTHERS	YOU GET
Surpasses minimum specified levels of Bureau of Indian Standards (BIS)	More Value for money with upto 7%-8% savings	 <p>SURPASSES STANDARDS</p>	 <p>INCONSISTENT IN QUALITY</p>	Barely qualifies the minimum requirements of BIS	Less value for money and no savings
Uses virgin Iron ore and deploys state of the art steel making and refining processes	Highly clean & homogenous steel quality	 <p>IRON ORE</p>	 <p>SCRAP</p>	Uses only scrap for steel melting without any secondary refining process	Uncertain chemical and mechanical properties due to inclusion of tramp elements
Steel is made using DRI – EIF – LRF – Concast Route	A highly controlled steel chemistry with very low levels of sulphur & phosphorus	 <p>BLOOM</p>	 <p>INGOT</p>	Presence of blowholes and uncontrolled chemical parameters	Variations in chemical composition leading to structural instability
Rebars are manufactured using High Yield Quenching and Self Tempering (MWE & Thermex) Technology perfected Thermex from Germany	High Strength and ductility due to fine grain multiphased composite structure	 <p>UNIFORM MICROSTRUCTURE</p>	 <p>NON-UNIFORM MICROSTRUCTURE</p>	No standardization in technology. Local outdated and unproven technology used.	Non-Uniform grain size and inconsistent steel quality
Provides precise and uniform parallel rib pattern engraved through computer controlled notch making machines	Excellent bond strength with concrete	 <p>UNIFORM RIB PATTERN</p>	 <p>NON - UNIFORM RIB PATTERN</p>	Uses conventional machines for engraving ribs and Uses rib design not recommended internationally	X'rib/non-uniform pattern which has low fatigue life and reduces bond strength with concrete
Surpasses UTS/YS (Ultimate Tensile Strength to Yield Strength) ratio with high percentage elongation	Superior earthquake resistant qualities due to high capability of absorbing energy	 <p>EARTHQUAKE RESISTANT</p>	 <p>NOT FOR SEISMIC ZONES</p>	Uses old technology leading to high variation in elongation	Much lower resistance to cyclic loading which is not recommended for seismic zones
Has predefined and transparent pricing	Fixed and uniform rates evidenced through a well displayed price list at our dealers shops	 <p>UNIFORM PRICES</p>	 <p>FLUCTUATION IN PRICES</p>	Cost are linked to raw material movement like scrap & ingot	Daily fluctuations in rates
South India's Most Awarded Brand	World Class Quality	 <p>TRUSTWORTHY</p>	 <p>QUESTIONABLE</p>	Are local / regional brands	Average quality

Welcome to the World Class Premium TMT BARS

As we look to the future, we have anticipated what will be required for our country to achieve lean steel structures that are the strongest and offer value for money.

Our Steel offers the widest range of strength allowing engineers to choose the right steel for the right place enabling significant advantage in construction.

All our grades of steel are produced using technology that gives them two desirable properties simultaneously, higher strength and higher ductility, thereby making it most suitable for earthquake resistant structures. Higher strength is achieved by the addition of certain alloying elements and keeping the percentage of carbon lower, ensuring the steel remains sufficiently ductile.

Ductility is the degree of plastic deformation before fracture or simply how much strain a material can withstand before fracture.

Unmatched benefits of **Fe500D**

Kamachi Fe500D TMT Rebars offer 20% higher strength than conventional steel (415MPa)

Here's how stronger steel benefits your construction:

Reduction of steel Consumption

Designing structures with Fe500D reduces the steel consumption by 5-6% with optimization using consistent primary steel.

Reduction in Bar Congestion

Using stronger grade steel means reduction in bar diameter that results in increased bar spacing as fewer rebars are needed.

Reduction in Labour Cost

Using lesser steel requires less labour and saves on labour cost.

Faster Construction

Less time is wasted on placing / tying of bars. And less weight on cranes improves construction efficiency.

It results in increased Floor Space index thus giving monetary benefit of extra space generated.

Fe550

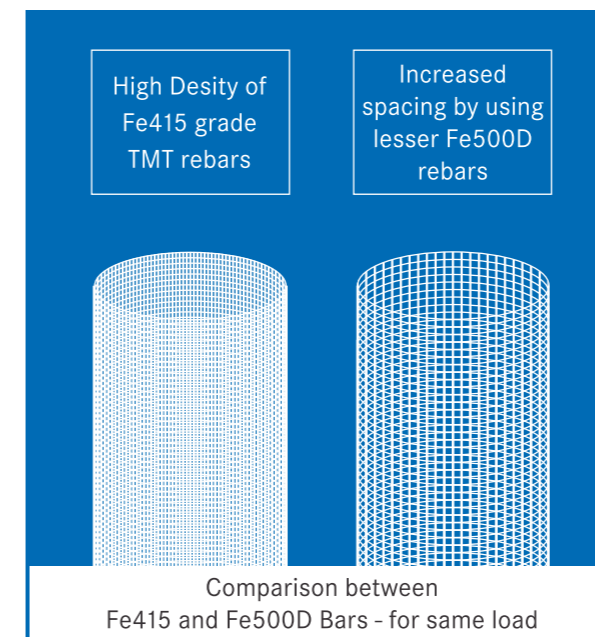
Minimum 5% higher strength than BIS standards and up to 30% more economical than ordinary TMT bars. Has excellent elongation, bend and re-bend properties and superior weldability

HCRM

Sea water, acidity in the air or salinity in ground water causes corrosion, weakening RCC structures. Kamachi Fe500D HCRM, with corrosion resistant elements Copper(Cu) and Chromium(Cr) present uniformly from the core to the surface, fights corrosion, maintains structural strength over time prolonging the life of RCC structures.

Fe600

Fe600 is a pioneering introduction by Kamachi. A steel strength of 600 MPa, 40% increase in load bearing capacity and up to 9% lower steel consumption makes our Fe600 the most economical TMT bars for new age high-rises. Better ductility due to extremely low sulphur and phosphorus content makes it strong enough to withstand heavy winds and jerk loads during earthquakes.



Range of TMT Rebars



Size range

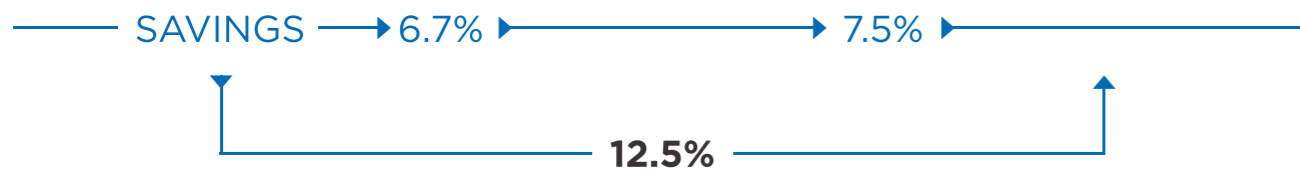
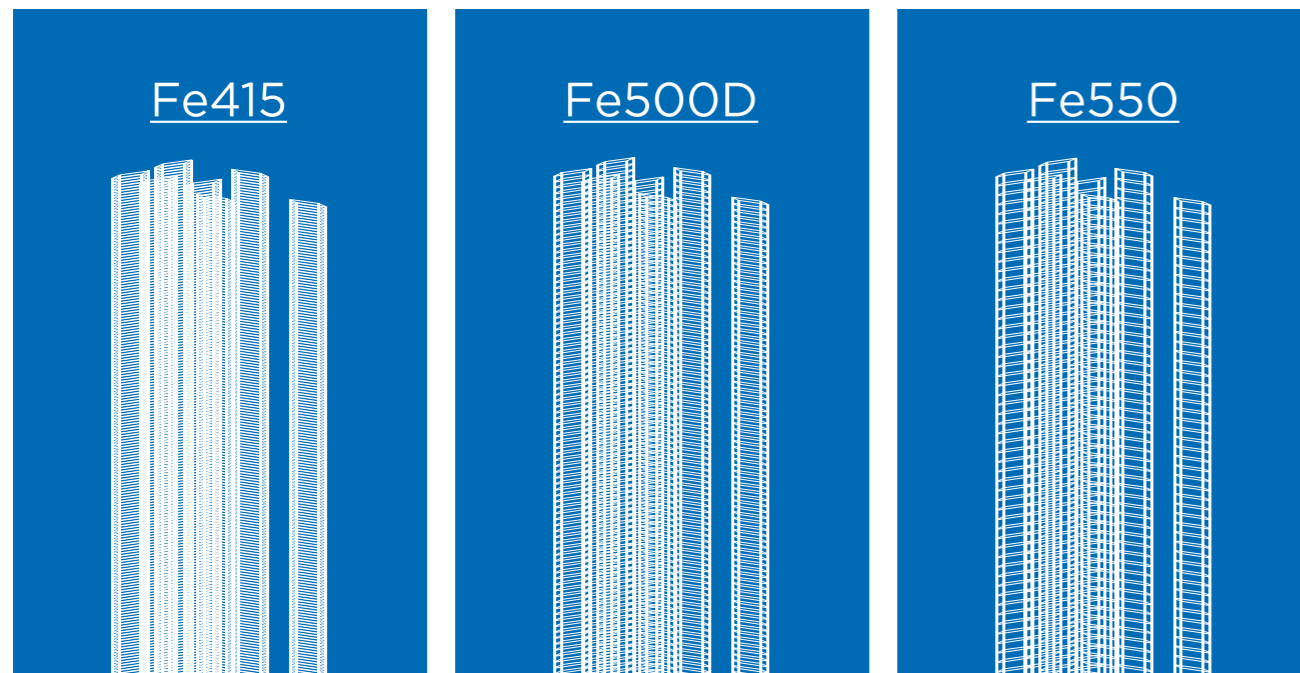
Kamachi TMT Rebars are available in the following sizes as per: 1786-2008 for Concrete Reinforcement

Dia (mm)	Min Weight (kg/mtr)	Nominal Weight (kg/mtr)	Max Weight (kg/mtr)	length Per Rod (mtr)	Typical Weight Per Rod (kg)
8	0.367	0.395	0.423	12	4.740
10	0.574	0.617	0.660	12	7.404
12	0.844	0.888	0.932	12	10.656
16	1.449	1.578	1.657	12	18.936
20	2.392	2.466	2.540	12	29.592
25	3.738	3.854	3.970	12	46.248
32	6.121	6.310	6.499	12	75.720
36	7.750	7.990	8.230	12	95.88
40	9.564	9.860	10.155	12	118.32

The rebars are delivered in standard length of 12mtr bundles ensuring ease in transportation. 55mm can be manufactured for specific bulk orders.

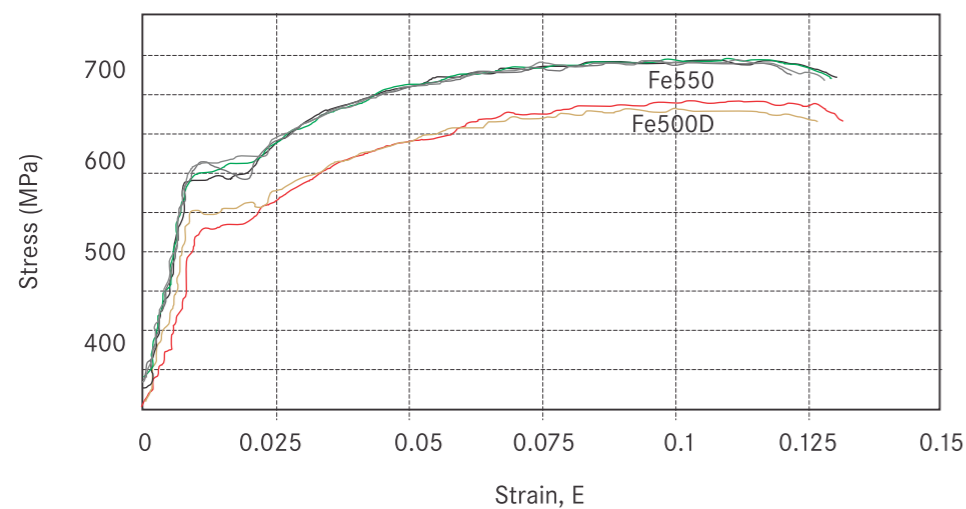
*Mentioned values observed typical of 90% of heats

Constructing the same structure with 3 different grades of steel
G+22 Storeys +2 Basements (Zone-4)



Stress Strain Curve Comparison of Fe500D & Fe550

STRESS STRAIN CURVE KAMACHI TMT REBARS FOR IS 1786 FE550 AND FE500D



Fe550, Yield Strength (N/mm ²) Min	- 550MPa (BIS)	Typical Values - 580 MPa
% Elongation (Min)- 10 Guarantee	- 16%	Typical Values - 18%
Fe500D, Yield Strength (N/mm ²) Min	- 500MPa (BIS)	Typical Values - 525 MPa
% Elongation (Min)- 16.0 Guarantee	- 18%	Typical Values - 20%



BEAM DESIGN WITH M30

230x450 Beam Reinforcement saving 415 / 550 - 24% 500D / 550 - 11%

800x1800 Beam Reinforcement Saving 415 / 550 - 27% 500D / 550 - 14%

Chemical & Mechanical Properties of TMT rebars

REBAR GRADE (%)	BIS 550	Kamachi 550 Typical Values	BIS FE 500D	Kamachi 500D Typical Values	Kamachi FE 500D HCRM* Typical Values	BIS FE 600	Kamachi FE 600 Typical Values
Carbon	0.30	0.25	0.25	0.20-0.25	0.15	0.30	0.25
Silicon		0.15-0.25		0.15-0.25	0.35		0.15-0.25
Manganese		0.55		0.90-1.00	0.70 - 1.00		0.95-1.05
Sulphur (MAX)	0.055	0.050	0.040	0.035	0.040	0.040	0.035
Phosphorus (MAX)	0.055	0.050	0.040	0.040	0.090	0.040	0.040
Sulphur + Phosphorus (MAX)	0.100	0.100	0.075	0.070	0.130	0.075	0.075
Carbon Equivalent (CE) MAX	0.50	0.40	0.50	0.31-0.36	0.53	0.42	0.42
Copper					0.20 - 0.30		
Chromium					0.40 - 0.50		
Yield Stress (N/mm ²) MIN	550	580	500	525	525	600	630
Elongation (MIN)	10	18	16	18	18	10	11
Ultimate Tensile Strength (N/mm ²) MIN	585	680	565	600	600	660	670
UTS/YS Ratio	1.06	1.17	1.10	1.15	1.15	1.06	1.06

* Kamachi Fe500D HCRM as per IS 1786:2008, Note. 3 of Cl.4.2

The Technical Detail

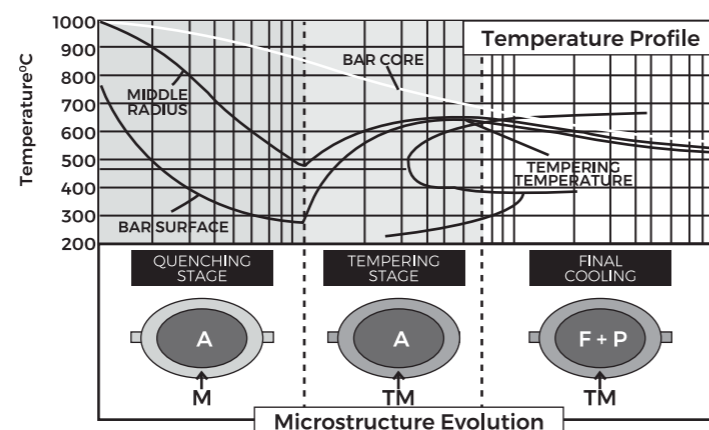
Kamachi TMT Fe500D Rebars are Thermo Mechanically Treated (TMT) Steel Bars Produced through advance QST (Quenching and Self Tempering) Process.

QST process includes hot rolling of the blooms in the most modern bar mill followed by Water quenching, self tempering and atmospheric cooling. During quenching, the temperature of the rebar drops at faster rate at the periphery leading to a harder surface. While the high temperature core gets cooled slowly, the thermal stress generated during quenching is relieved by the heat released from the core during the next step called self Tempering. Finally atmospheric cooling at the cooling bed leads to a strong casing and a core in the rebars giving it significant strength and ductility.

This is the reason for the unique combination of steel with a hard periphery known as martensite and the core with soft phases of Ferrite and Pearlite.

Metallurgical Aspect:

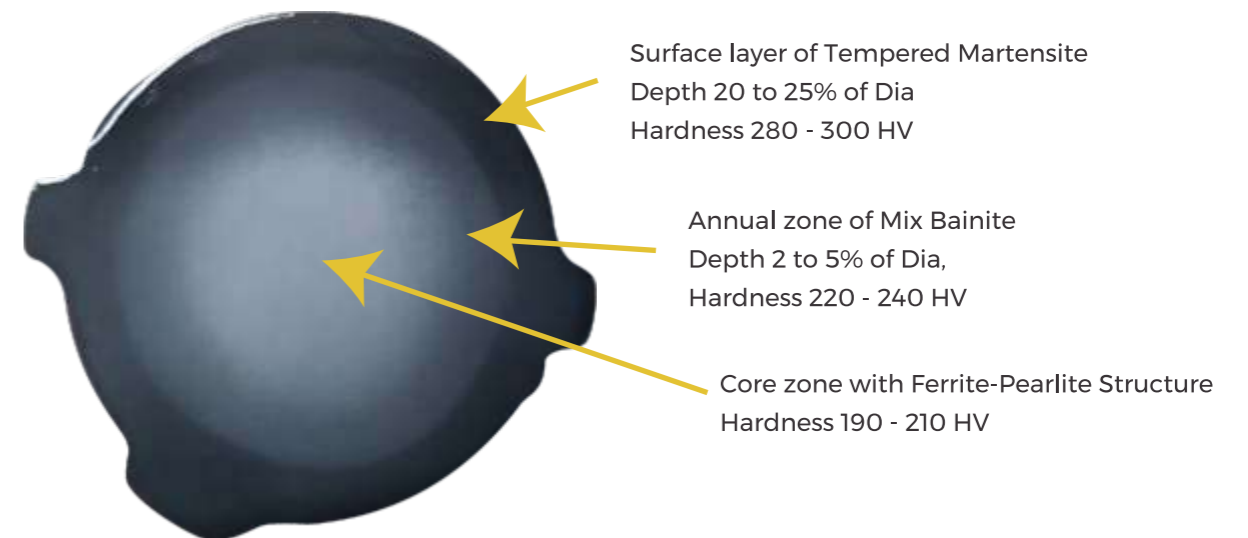
Steel can attain a wide variety of properties by altering its microstructure, which depends on its chemical composition as well as the thermal treatment it is subjected to. Rebar has a combination of different microstructures which provides it both strength and ductility. At the Periphery, it has a hard phase called Martensite. Although the outer layer is quenched, the inner core of the cross section is still hot and it is in austenitic phase at higher temperature. As the bar cools, heat flows from the centre of the bar to its surface, leading to varying cooling rate across its cross section. The process known as self tempering. Thus it exhibits a variation in microstructure in the cross section, having strong and tough martensite in the surface layer of the bar, an intermediate layer of Martensite and Bainite, and the core attains a soft Ferrite and pearlite microstructure. Any thermal stress generated in Martensite during quenching is relieved in this process. Once this process is over, the TMT bars are subjected to atmospheric cooling. This is done in order to equalise the temperature difference between the soft inner core and the tough exterior. The inner core remains soft giving the TMT bar superior ductility. This unique manufacturing technique and the absence of cold stress make the rebar corrosion-resistant and boosts its weldability.



Thus we can see high level of engineering and equipment with sophisticated controls are required to produce Thermo Mechanically Treated (TMT) Bars to achieve the above properties.

This QST process delivers greater tensile strength to the rebars as well as higher elongation. This improves the bend/re-bend properties of the rebars, thus making it safe from natural calamities such as an earthquake. The Thermal stability of Kamachi TMT bars is safe due to low sulphur, which makes them safe from fire accidents. The special ribbed design of the TMT bars forms a stronger bond with concrete or cement.

Kamachi is equipped with level 2 automation systems for achieving the above microstructure and the desired mechanical properties. The advanced control systems in mills also help in attaining desired dimensional accuracy and consistency.



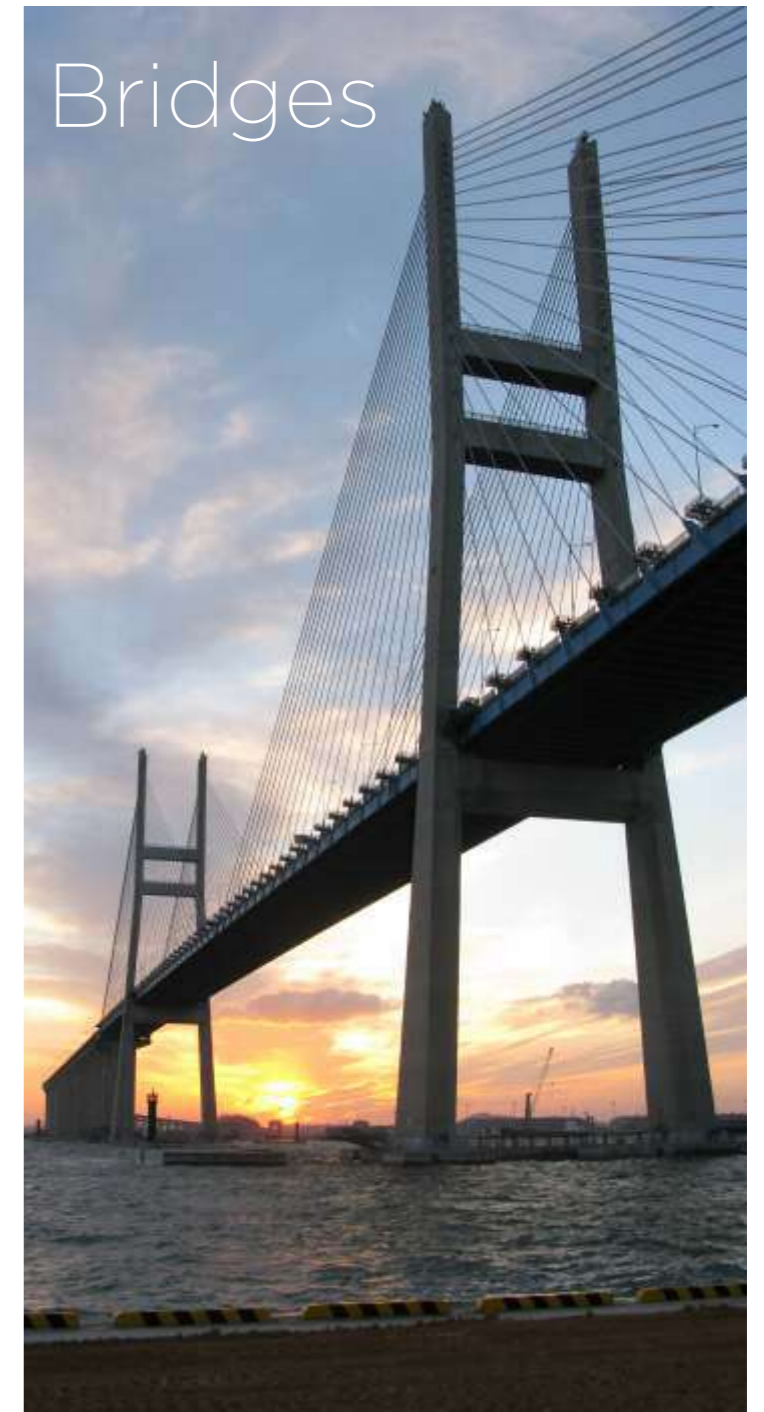
Mechanical Properties

Kamachi is a integrated steel producer. Thus it ensures clean steel with very low levels of detrimental sulphur and phosphorous and low ppm of gaseous contents. Thus the TMT produced has negligible internal defects and impurities.

Our Kamachi TMT Rebars can be used in extreme environments like marine, coastal and saline conditions as well as in the high seismic zones.

Applications of Fe500D, Fe500D HCRM

With an ever growing demand for stronger infrastructure Kamachi TMT Rebars finds extensive use in a variety of modern construction.



Key highlights of our plant

Rolling Mill

Our plant is amongst the most modern across the world. Equipped with the latest technologies and infrastructure they produce the finest quality steel and TMT rebars.

Some of the key features of our plants are:

- › Hot Charging.
- › Side Pusher type Reheating Furnace.
- › High Pressure water de-scaling facility.
- › Vertical & Horizontal stand high speed continuous mill.
- › Inter stand tension control rolling.
- › Online rapid water quenching unit by Thermex.
- › Cooling bed of movable rack design.
- › 360° uniform air-cooling of TMT rebars.
- › Automatic mill shears for head/tail cropping, dividing, sampling or scrapping, and cutting-to-length.
- › Automatic bundling & tying facilities for rolled product in straight length.
- › Level 2 Mill automation and control.
- › Special Length specialists - upto 33 meters single length cut on the fly.





Our Process

Kamachi Fe 500D TMT Rebars are manufactured using unique iron processing, Steel making and rolling process, which makes them stronger, safer and more ductile than any other TMT rebars, thus ensuring utmost quality.

A rebar is not a rebar if it's not TMT

Thermo mechanical processing, also known as Thermo-Mechanical Treatment (TMT), is a metallurgical process that integrates work hardening and heat treatment into a single process, while the quenching process produces high strength bars from low carbon steel. The process presses the surface layer of the bar, which pressurises and deforms the crystal structure of the intermediate layers, and simultaneously begins to temper the quenched layers using the heat from the bar's core.

High Quality output from MWE & Thermex technology

Our rebars are manufactured using patented international technology. The rebar mill is from MWE Germany and the QST (Quenching and self Tempering) technology from Thermex employ state-of-the-art technology to ensure highest quality.

These techniques employ a special split style nozzle cooling process for producing fine grain multi phase composite rebar with superior strength and ductility.

1. QUENCHING

The hot rolled bar leaves the finishing mill stand at 900° Celsius which is rapidly quenched in a water box. This is a chamber where water is made to impinge on the surface of the rebar at high pressure by split style nozzle with microprocessor based controlled cooling process. The quenching converts the steel's surface layer to martensite and causes it to shrink. The shrinkage pressurizes the core helping to form the correct crystal structures, while the core remains hot and austenitic.

2. SELF-TEMPERING

The bar leaves the quench box with a temperature gradient through its cross-section. As the bar cools, heat flows from the bar's centre to its surface so that the bar's heat and pressure correctly tempers an intermediate ring of martensite and bainite.

3. ATMOSPHERIC COOLING

Finally, the slow cooling after quenching automatically tempers the austenitic core to ferrite and pearlite on the cooling bed. The bar now has a strong, tough and tempered martensite surface layer, an intermediate layer of tough martensite and a refined, ferrite and pearlite core, giving it the ductile property we are known for.

4. TEMPERATURE CONTROL

A key element to our quality control is identifying and removal of low temperature blooms which may result in low / uneven physical properties in the re-bar. The system automatically activates interlocks through PLC ensuring only the right raw material is rolled to become Kamachi TMT re-bars.



A look at our Lab

Tamper Proof Testing Equipment

Kamachi has the latest state of art testing equipment to ensure an almost Zero defect product. The facilities include –

- › Optical Emission Spectrometers
- › Setmagan Testing Machines
- › 2000kN Universal Testing Machines
- › Hardness Testers
- › Bend and Rebend Testing Machines
- › Impact Testing Machines
- › Wet Analysis Laboratory
- › Optical Microscopes
- › Salt Spary Chamber
- › Alternate Immersion Testing Machine

We ensure accurate quality checks with continual Research and Development for product up-gradation.

Besides the latest computerized machines, our skilled employees are trained to monitor quality 24x7 to produce the finest TMT Bars.

Readymade Money Savers



Readymade Steel – Quality, Reliability, Speed and Efficiency.

The application of technology to any process achieves accurate control on all required parameters. Processing steel at the job site is hard, disorganized and less productive. The emerging trend is to shift steel processing to service centers, which offer a controlled environment. Readymade steel processed at our factory saves money through reduction of time and manpower. Readymade steel accelerates construction time and helps construction firms tide over scarcity of skilled labour, stringent timelines and quality standards while adhering to health and safety guidelines.

ADVANTAGES OF READYMADE STEEL

Time Saving

Elimination of onsite labour with delivery of customized readymade steel coordinated to construction requirements saves processing time.

Zero Wastage

There is no wastage of steel as there is no onsite processing. The customer only pays of the actual steel used, blueprint weight, saving on waste, processing and freight.

Avoid Theft

Material is ordered and delivered as per need eliminating the need for storage. There is no loss due to theft of stored steel.

Robot Technology

Advanced robotic technology is used in the processing of steel. This helps achieve accurate control over all required parameters for superior quality.

Precision Bending Avoids Re-bending

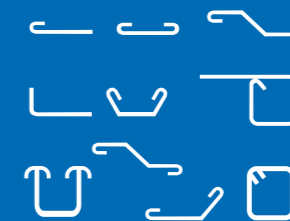
The steel bars are bent using the latest technology in a controlled factory environment. This achieves absolute accuracy.

Any Shape/ Any Design

Mechanized processing enables us to customize shapes and designs as per requirement. This provides absolute freedom of design.

Available in all shapes

Available Sizes 8 to 36 mm



Awards and Recognitions



INDIAN POWER BRAND



INDIA'S NO.1 BRAND



INDIA'S MOST PROMISING BRAND 2015



WORLD'S GREATEST BRANDS

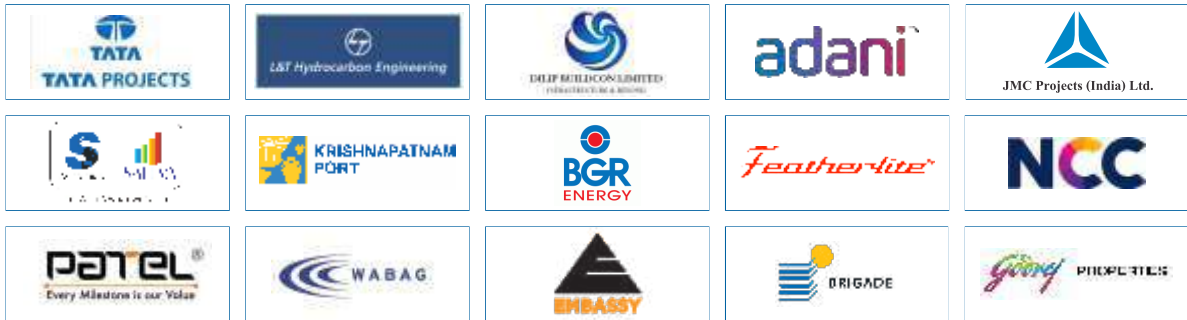


SAFETY AWARD



INDIA'S MOST PROMISING BRAND 2017

Trusted by



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