WE HAVE
RAISED THE BAR

Presenting the all new ...

Double RIB • Double STRENGTH
• Double SAFETY

RATHI SHAKTIMAN EXCEL
DOUBLE RIB • DOUBLE STRENGTH • DOUBLE SAFETY

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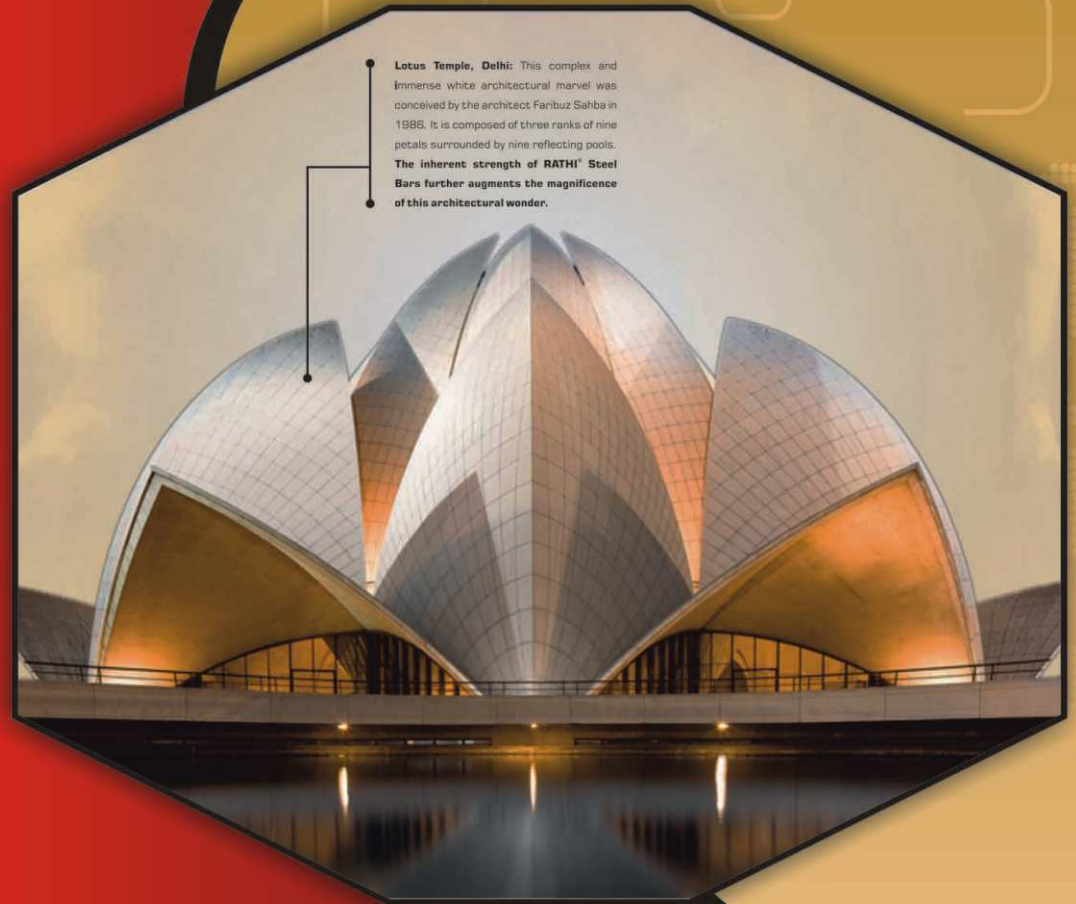
RATHI SHAKTIMAN EXCEL
DOUBLE RIB • DOUBLE STRENGTH • DOUBLE SAFETY



Lotus Temple, Delhi: This complex and immense white architectural marvel was conceived by the architect Fariburz Sahba in 1986. It is composed of three ranks of nine petals surrounded by nine reflecting pools. **The inherent strength of RATHI® Steel Bars further augments the magnificence of this architectural wonder.**

Rooted in History. Routed Towards Tomorrow and Beyond

RATHI, a name that is at the core of numerous landmarks, infrastructural marvels and millions of homes for over six decades, now introduces **RATHI® SHAKTIMAN® EXCEL** Construction Steel Bars.

•This has been done in keeping with its mission to produce steel bars that are technologically superior, earthquake resistant, cost-effective and are the basis of structures that will last for the generations to come.

Growing from Strength to Strength. Every Day. Every Moment.

RATHI® SHAKTIMAN® EXCEL comes to you with the strength of:

- 2 state-of-the-art manufacturing plants in North India, with more in the pipeline
- Installed capacity of over 2.5 lac tonnes per annum
- In-house capacity of producing MS billets as raw material for producing high quality steel bars
- An integrated network of 900 dealers
- Global associations with Hennigsdorfer Stahl Engineering GmbH, Germany
- Global Quality Certifications for its products and manufacturing process such as IS:1786/1985, Grade Fe 415 Fe 500 ISO 14000 and ISO 9001

Delhi Metro Rail Corporation, Delhi: When completed, as envisaged by the year 2021, it will cover a total stretch of 245 Kms. The tremendous success of DMRC is the proof of its foremost quality. **The absolute strength of RATHI® Steel Bars provides the endurance to this moving superior technological and structural marvel.**

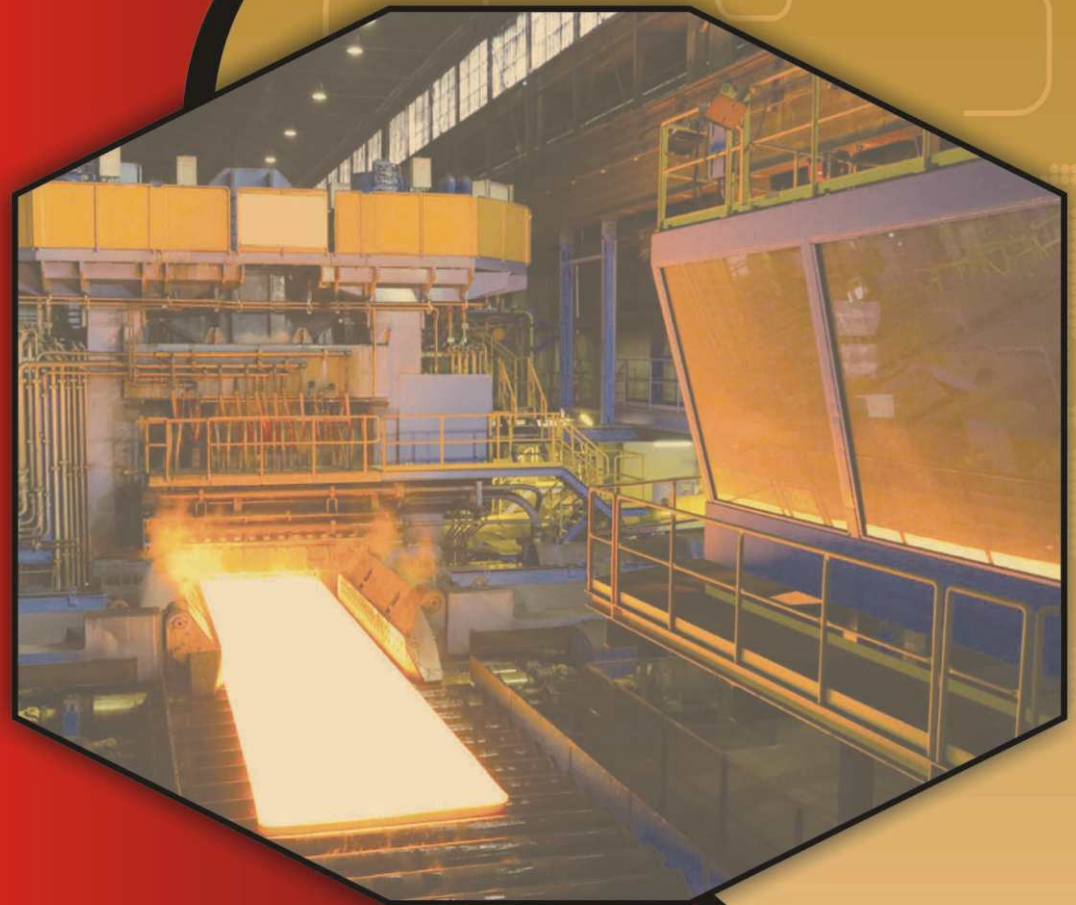
Many Firsts on the Journey to Excellence.

- For more than 60 years, RATHI has continued to set the standards for excellence and innovation in the steel industry with many firsts.
- FIRST to win exclusive rights from TOR Isteg Steel Corporation, Germany to manufacture and market its TOR steel in North India
- FIRST to produce TOR steel in India
- FIRST to set new product parameters. With its extra strength, RATHI® reduces steel consumption by 25% and reduces cost by up to 40%
- FIRST to install Natural Gas Fired Reheating Furnaces.
- FIRST to set up Mini Steel Plant in North India
- FIRST to introduce the concept of Branded Retailing of steel through exclusive RATHI® Steel Shops
- FIRST to launch the revolutionary Thermo Quench Technology in South Asia under the licence from H & K Germany
- First to Introduce Rathi Shaktiman Ultra Construction Steel Bars.

Rathi Steel, one among the largest TMT producers in India, is the first company in the country to introduce the unique double-66-pattern design equivalent to British standard BSOOC designed and manufactured from the latest technology with international quality standards.

Fully Integrated Steel Maker

RATHI® SHAKTIMAN® EXCEL rebars are produced in the state-of-the-art plant under close supervision of our frontline metallurgists and engineers. RATHI® SHAKTIMAN® EXCEL has setup the bar mill with the latest technology, spacious billet yard for castwise stacking of billets, reheating furnace, pre-finishing & finishing mill, flying shear, cold shear to cut bars and the latest TMT facilities are the feature of the bar mill. Each bar is tested through rigorous process so that buildings get higher strength in different geographical conditions. One of the only manufacturers to have in-house source of Raw material i.e. billets in Northern India



Production that Performs

Although steel & concrete are two different materials, they have to behave as a single unit in a reinforcement structure. It happens only when the concrete grips the steel rebar to form the strongest bond through the unique double-rib pattern of the bar. RATHI® SHAKTIMAN® EXCEL has a unique double rib pattern for better reinforcement solution in terms of greater rib depth/height and closer rib spacing at different angles. The CNC notch cutting m/c ensures uniform rib pattern which allows uniform bonding with concrete for the whole structure. Due to uniformity & critically designed ribs, fatigue strength & ductility of RATHI® SHAKTIMAN® EXCEL is much superior to ordinary rebars. Moreover, meticulous testing throughout the steel making & rolling process is there to ensure the quality standards are maintained.

RATHI® SHAKTIMAN® EXCEL rebars are hot rolled from steel billets & subjected to PLC controlled online thermo mechanical treatment in three successful stages that are necessary for making a high quality rebar. There three stages are

Quenching Stage

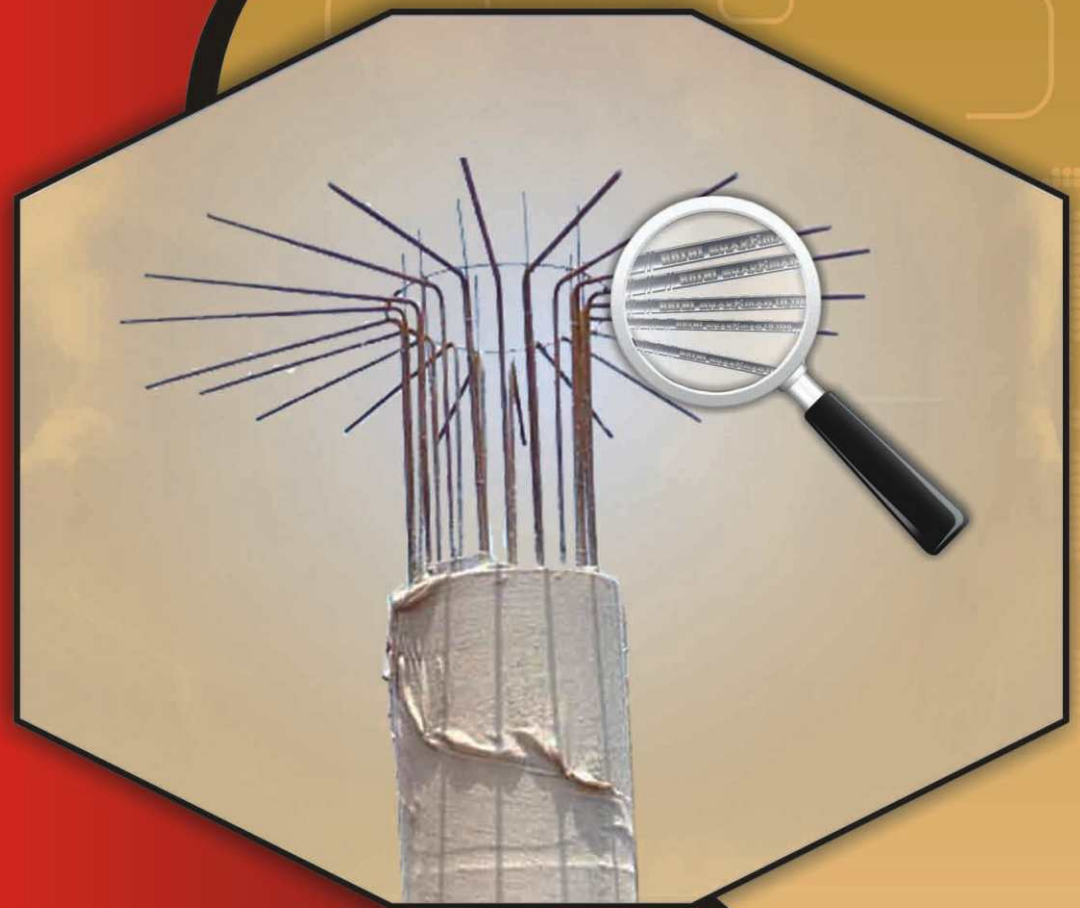
Under the Quenching stage, water spray is used as a cooling treatment to the hot ribbed bar at controlled temperature and pressure. The effectiveness of the water spraying equipment in this stage is critical as to rapidly harden the surface layer, faster than the critical rate, to form the martensite while core remains austenite.

Tempering Stage

The Tempering stage is very important for bars as after quenching they leave the water quenching line and t are exposed to air. The heat flux from the still hot core reheats the surface by conduction thus self-tempering' the surface to a structure called Tempered Martensite" which is strong and tough. The core is still austenitic at this stage.

Cooling Stage

The third stage of 'Atmospheric Cooling" occurs on the cooling bed, where the austenitic core is transformed to a ductile ferrite pearlite core. The final structure consists of a combination of a strong outer layer of tempered martensite and a ductile core of ferrite-pearlite.



Chemical Properties

RATHI® SHAKTIMAN® EXCEL is produced as a unique range product of company within the quality standards according to BIS specifications & as well as comply with BS (British Standards) B500C. Its carbon level is maintained at much lower than the specification, which results in its excellent ductility, high bendability, better corrosion resistant & superior weidability. The other undesirable impurities like S&P that impair the overall longevity of rebars inside construction are also maintained at much lower in RATHI® SHAKTIMAN® EXCEL than specification.

Chemical Element	Unit	IS : 1786 Fe-500D	RATHI® SHAKTIMAN® EXCEL	UK-Based Bar B500C
C	%	0.25 (max.)	0.23 (max.)	0.24 (max.)
CE	%	0.42 (max.)	0.38 (max.)	0.52 (max.)
S	%	0.040 (max.)	0.050 (max.)	0.055 (max.)
P	%	0.040 (max.)	0.050 (max.)	0.055 (max.)
S+P	%	0.075 (max.)	0.100 (max.)	0.100 (max.)

Physical Properties

RATHI® SHAKTIMAN® EXCEL is manufactured by unique method maintaining a combination of strength & ductility that far exceeds the minimum limit specified in BIS.

PHYSICAL PROPERTIES TABLE

Mechanical Properties	Unit	IS : 1786 Fe-500D	RATHI® SHAKTIMAN® EXCEL	UK-Based B500C
Yield Stress	N/mm2	500 (min.)	550 (min.)	500 (min.)
Ultimate Tensile Strength (UTS)	N/mn2	545 (min.)	620 (min.)	575 (min.)
UTS/YS	Ratio	1.10 (min.)	1.12 (min.)	1.15(min.)
Elongation	%	16 (min.)	18.0 (min.)	16 (min.)
Uniform Elongation	%	5.0 (min.)	8.0 (min.)	7.5 (min.)

As contained in 90% of the heats.

DLF Windsor Court, Gurgaon: This earthquake resistant monumental example of architectural finesse stands 26 floors tall. **It has got the unshakable strength of RATHI® Steel Bars.**

Product Range and Others

RATHI® SHAKTIMAN® EXCEL rebars are available in the various sizes at retail/distribution network across India: 8, 10, 12, 16 20, 25, 28 & 32 mm.

Product Packaging

RATHI® SHAKTIMAN® EXCEL rebar is supplied in a fixed length of 12 meter to ensure standard processing, and therefore causing less wastage during fabrication. RATHI® SHAKTIMAN® EXCEL is supplied section wise in convenient pre-packed bundles with fixed number of pieces per bundle.

Unique Service Offerings

Selling by piece-Every RATHI® SHAKTIMAN® EXCEL rebar is sold in a standard length of 12 meter thereby removing the hassle of weighing.

Recommended Consumer Price (RCP): RATHI® SHAKTIMAN® EXCEL rebars are sold at RCP for better transparency. The RCP is displayed at all dealers outlets.

RATHI Ductility

Safety of concrete structure is first

Concrete is brittle without ductility, and cannot be used for structural applications without reinforcement. The ductility within a structure, something which concrete does not have, is provided by the steel rinforcement. Therefore, the steel must be sufficiently ductile so that every reinforced concrete section, including structural elements, has the capacity to deform by an adequate amount.

Ductility of the element is its ability to withstand deflection or extensive cracking in an overload situation, without sudden catastrophic collapse.

Imagine a beam built of plain concrete without reinforcing steel supported at both ends and in the middle. If we load both spans than:

- On initial loading, the beam deflects a little.
- in the second stage of loading, the beam collapses all of sudden. Now if the concrete is now reinforced with steel bars and loaded in the same way as before than:
- In initial stage of the loading, the beam deflects a little.
- In the second stage of loading, the beam continues to deform.
- In the third stage of loading, the beam deflects some more and "In general, the higher the steel ductility she greater the ductility of the beam'.
- In the fourth stage of loading, the beam deflects even more and cracking becomes more extensive.
- In general, higher steel ductility provides greater ductility to the beams.

Bond strength

In addition to the strength and ductility requirements, reinforced concrete needs adequate bonding between steel and concrete to ensure the composite works efficiently and cracks are under control. Perfect bonding between concrete and ductility is a property of reinforcing steel that is essential in those applications where structures are subject to unexpected forces (Seismic, dynamic, impact etc.)

RATHI® SHAKTIMAN® EXCEL boasts more than 200% higher values as compared to required bond strength. The structure of two ribs at different angles gives an intact bonding with concrete.

Bending & Re-bending

RATHI® SHAKTIMAN® EXCEL Bars have outstanding bending properties and bend and re-bend without cracking. The tough outer surface and a ductile core result in a rebar with extremely high bendability. These bars can be bent around mandrels much smaller than those specified in IS: 1786.

Weldability

RATHI® SHAKTIMAN® EXCEL Bars offer superior weldability than conventional Cold Twisted Bars due to its low carbon equivalent. They can be easily buff-welded or lap-welded using ordinary coated electrodes of similar strength. No pre-warming or post- heat treatment is necessary in manual arc welding either.

Corrosion Resistance

RATHI® SHAKTIMAN® EXCEL Bars are produced by thermo-mechanical treatment and not by cold twisting therefore eliminating torsion residual stress in the bars which tender superior corrosion resistance.

TV Tower, Pitampura, Delhi: Built in 1988, this is the tallest building in Delhi. It stands really tall at 235 meters or 771 feet. **Behind the grandeur of this skyscraper lies the strength of RATHI® Steel Bars.**

High Temperature Resistance

RATHI® SHAKTIMAN® EXCEL Bars retain more than 80% of its ambient temperature yield strength at 300°C and 40% at 500°C.

Execution

•RATHI® SHAKTIMAN® EXCEL should be applied where high ductility is desired. These applications include structures that are subject to forces difficult to quantify; because of the nature of those forces or due to lack of knowledge about those forces such as:

- Dynamic loading
- Explosions
- Sudden impact
- Compressive and tensile forces

Making Global Technologies Work for You

Using the world's best technology, Steel Bars draw their strength from computer controlled in-line process of hardening and tempering during hot rolling (TMT). After leaving the last rolling stand at the required temperature, the hot rolled bar passes through a set of specially designed cooling pipes. The outer layer gets cooled while the core is still hot. The surface of the bar gets self-tempered by the heat from the core. The combination of a tempered martensite surface and ferrite + fine pearlite core provides considerably higher strength and ductility to the finished material, making it ideally suited for building strong structures.