



ज़माने के लिए, ज़माने के साथ ।

# FRIENDS 550 HD

## HIGH DUCTILITY REBAR



FRIENDS 550 HD 

## FRIENDS STEEL



SINCE 1998



# Introduction

"Friends Steel" Group is promoted by a group of experts and experienced veterans with proven track record that gives it a special edge to satisfy knowledgeable and demanding customers.

The group caters to consumer needs in Structural Steel i.e Angles, Channels, Flats, Rounds, Squares, Colour Coated Sheets. Reinforcement Steel (TMT) Bars & Friends-Fast Steel(FFS).

The group aims to be one-stop shop for all infrastructure & construction needs on consumer by diversifying into different verticals. It is targeting aggressive expansion to build Pan- India presence. "Friends Steel" is known for its unmatched top-notch quality, superior customer service and being ahead of the industry.

Already being counted among top steel brands of India.

## Vision

To be recognized globally as a producer of world-class steel.

## Mission

To attain 2 million ton per annum steel manufacturing capacity & produce steel at international standards of cost & quality.

## Objectives

- To develop Pan-India brand loyalty for "FRIENDS STEEL".
- To integrate production facilities to have a better grip on quality and costs.
- To associate with quality conscious producers Pan-India to make Friends Steel available locally to customers across India.
- To diversify into different segments related to steel.
- To broaden the portfolio of products offered under the brand umbrella of "Friends Steel".
- Partnering with customers and understanding their needs to achieve higher levels of customer satisfaction.
- To develop customer centered values in employees & facilitate them to excel in their professional, personal & social life.
- To be proactive in conserving environment, maintaining higher level of safety and addressing social concerns.

FRIENDS 550 HD



FRIENDS 550 SD



# Quality Control

## Quality Input → Quality Throughput → Quality Output

- THOROUGH  
CHECKING  
OF RAW MATERIAL

- PHYSICAL  
&  
CHEMICAL  
TESTING

- FULLY  
AUTOMATED ROLLING

- CLOSE ROLLING  
TOLERANCES

- IMPROVED  
ROLLING  
PARAMETERS

- FRIENDS 550 HD REBARS

- (SUPER STRENGTH  
+  
HIGH DUCTILITY)

## FRIENDS 550 HD TMT BARS

- Refined Metallurgy.
- Enhanced Mechanical Properties.
- High Temperature Rolling > 1200°C.

(Recipient of UNDP & Ministry of Steel recognition for Production Systems.)



FRIENDS 550 HD 

FRIENDS 550 SD 

# What are "Friends 550 HD" bars?

Friends Steel has launched new-generation rebars, 'Friends 550 HD', with High Yield Strength with High Elongation Value. It is superior to ordinary Fe 550 grade rebars due to its increased elongation value. This grade of steel is superior to Fe 550 because of the excellent strength-ductility combination it offers. Simultaneously it fully confirms to statutory BIS requirements. "Friends 550 HD" Bars have the potential to be used in High Rises and give better protection against Earthquakes.

"Friends 550 HD" bars are manufactured using only high quality raw materials with chemical composition adhering to IS:1786 Gr: Fe 550. This has been made possible only due to years of R&D at production level and major improvements in production infrastructure.

The QST (Quenching Self Tempering) Manufacturing Process imparts high strength to the bar using the latest technique of thermo mechanical treatment (TMT) without compromising on ductility. After heating ingots/billets in reheating furnace, (at temperature  $>1200^{\circ}\text{C}$ ) 3 stage QST results in combination of strong outer layer of tempered martensite and ductile core of ferrite-pearlite. This is what give "Friends 550 HD" its unique strength & ductility combination.

**Can Friends 550HD Bars be used for design where Fe 550 is advised by Architect/Engineer?**

**Yes, change in design is not required using for Friends 550 HD Bars instead of Fe 550 grade bars.**

**In fact, ability of structure to resist earthquake increases.**

## Friends 550 HD

The production of TMT rebars involve a combination of plastic deformation of steel in austenitic stage followed by quenching and further tempering. The process controls at each critical operation ensure uniform properties in each rebar and provides the TMT rebars with a soft ferrite and pearlite fine grained core, a strong & tough tempered martensite layer imparting it with high ductility as well as strength.

Thus making it ideal for high rises, dams, bridges, individual houses and any critical structures where high yield strength is required without compromising on the elongation properties.



**FRIENDS 550 HD** 

**FRIENDS 550 SD** 

# How is "Friends 550 HD" Different?

- Grade Fe 550 as per IS- 1786: 2008 mentions minimum elongation @ 10%.
- Grade Fe 550 D as per IS-1786:2008 mentions minimum elongation @ 14.5%.
- At Friends Steel even in Fe 550 Grade we are able to offer elongation in excess of 12%. Thereby, Providing High Ductility to the Structures.

➤ there is a tradeoff between strength & ductility in ordinary Fe 550 Bars.

Ordinary Fe 550

Strength ↑

Ductility ↓

➤ But Friends 550 HD TMT Bars offer higher ductility even with higher Strength.

Friends 550 HD

Strength ↑

Ductility ↑

## Superior Rib Pattern (SDR)

Once the rebars are cast in concrete it is vital that the structure behaves as a single unit.

The rib-pattern of Friends 550 HD is made using Specialized Design Ribs technology (SDR technology) by automated CNC machine following B 500C Standards.

Friends 550 HD Bars form the strongest bond due to the near perfect ribs (Uniform width & Greater Depth, Uniform & Closer Ribs Spacing, Consistent Degree of Ribs).

## Earthquake Resistance (EQR)

**Friends 550** HD bars have a unique combination of superior strength (due to hardened tempered martensite periphery) and higher ductility (due to soft ferrite-pearlite core) which enable them to adequately support a seismic design. Greater yield strength & higher fatigue resistance make it most suitable for earthquake prone areas. Friends 550 HD bars offer much better factor of safety as the standards are over and above the BIS standards.

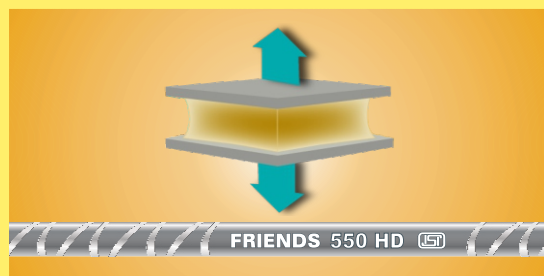


## Corrosion Resistance (CRS)

Owing to the Friends 550 HD process, the hardened outer casing forms a protective coat of thick tempered martensite rim which prevents corrosion. **Friends 550 HD** bars are devoid of any external or internal stresses or strain, making them more adaptable against corrosion.



## Bendability And Weldability



The special micro structure of Friends 550 HD results in a rebar with excellent bendability. Friends 550 HD Bar can be bent easily and sharply. Friends 550 HD can be bent to the exact angle unlike ordinary rebars as desired by the design around mandrels. To obtain maximum advantage refer "Good Operational Practices at Construction Sites" leaflet. Friends 550 HD, due to its low carbon equivalent, has weldability which is superior to ordinary rebars. It can be butt-welded or lap welded using ordinary rutile coated electrodes of matching strength.

**Use only the Best, use only Friends 550 HD, Because a house is made only once.**



# Specification Of Friends Fe 550 HD

- Low carbon content and made from best quality raw material steel.
- Higher yield strength, Ultimate tensile strength and higher percentage elongation above 12 %.
- Easy bendability, weldability and excellent ductility ensures economy and safety of use.
- In-built ability to resist loss of strength at higher temperature.
- Require less energy for bending and re-bending along with superior reverse bending properties. Can be butt welded or lap-welded.
- Use of Friends Fe, 550 HD results in Around 10% saving in steel consumption when compared to other ordinary Fe 500 bars
- Higher corrosion resistance and seismic resistance.
- Ideally suited for any type of concrete structure.

## Mechanical Properties

| Mechanical Properties                                             | IS : 1786<br>Fe 550 | Friends 550 HD<br>Fe 550 | IS : 1786<br>Fe 550 D | Friends 550 SD<br>Fe 550 D |
|-------------------------------------------------------------------|---------------------|--------------------------|-----------------------|----------------------------|
| <b>Yield Stress (YS)</b><br>(in N/mm <sup>2</sup> )               | 550 min             | 570 min                  | 550 min               | 570 min                    |
| <b>Ultimate Tensile Strength (UTS)</b><br>(in N/mm <sup>2</sup> ) | 585 min             | 610 min                  | 600 min               | 630 min                    |
| <b>Elongation (%)</b>                                             | 10% min             | <b>12% min</b>           | 14.5% min             | <b>16% min</b>             |

\* as obtained in 90% of the heats, Friends 550 HD is essentially Fe 550 grade as per IS 1786 : 2008.

## Chemical Properties

| Chemical Properties   | IS : 1786<br>Fe 550 | Friends 550 HD<br>Fe 550 | IS : 1786<br>Fe 550 D | Friends 550 SD<br>Fe 550 D |
|-----------------------|---------------------|--------------------------|-----------------------|----------------------------|
| <b>Carbon (%)</b>     | 0.30 max            | 0.30 max                 | 0.25 max              | 0.23 max                   |
| <b>CE (%)</b>         | 0.42 max            | 0.40 max                 | 0.42 max              | 0.40 max                   |
| <b>Sulphur (%)</b>    | 0.055 max           | 0.055 max                | 0.04 max              | 0.04 max                   |
| <b>Phosphorus (%)</b> | 0.050 max           | 0.050 max                | 0.04 max              | 0.04 max                   |
| <b>S &amp; P (%)</b>  | 0.100 max           | 0.100 max                | 0.075 max             | 0.075 max                  |



• TMT BARS (ISI) 8 to 32 mm • Friends FAST-STEEL (FFS) • MS ANGLE  
• MS Channel • MS FLAT • MS ROUND • MS SQUARE • Colour Coated Sheets

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