



Himalaya Stainless Steel Foot Over Bridge,
CSMT Station, Mumbai

STAINLESS STEEL FOR BRIDGES, TUNNELS & ROADS

JINDAL INFINITY
INFRA SOLUTIONS
THAT LASTS FOR CENTURIES

A LEGACY BUILT ON SAFETY & TRUST

Founded by Shri O.P. Jindal in 1970, Jindal Stainless is one of the largest stainless steel conglomerates in India and ranks amongst the top 10 stainless steel conglomerates in the world. Jindal Stainless Group has an annual crude steel capacity of 2.9 MTPA and an annual turnover of \$ 4.2 Billion USD (as on Mar'2023).

Our growth has been backed by the excellence of our people, value driven business operations, customer centricity, adoption of one of the best safety practices in the stainless steel industry and a commitment for social responsibility.



ABOUT STAINLESS STEEL

Stainless steel is the common name for all steel grades containing at least 10.5% chromium. chromium improves the corrosion resistance of stainless steels. In addition to iron and chromium, stainless steels contain other alloying metals, of which the most important are nickel and molybdenum. The combination of chromium and oxygen leads to the formation of a chromium-rich passive layer on the surface of the steel. This layer protects the steel, and re-forms over time if damaged.

On the basis of their microstructure, Stainless steels are divided into Austenetic, Ferritic, Duplex and Martensitic types. More than 100 different stainless steel grades have been developed for various applications.

The alloying metals influence the corrosion resistance, durability, strength and formability of the steel.





PROMISE

STRENGTH TO PROTECT LIFE

Advantages of Stainless Steel Bridges are:



DESIGN FLEXIBILITY

CARBON STEEL

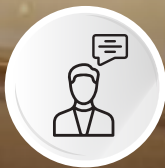
The section type and structural configuration are influenced by the corrosion mitigation, thereby limiting the choices available to the designer while optimising the design.

STAINLESS STEEL

In view of superior corrosion resistance, the structural engineer is free to select the most aesthetic and economical structural configuration with closed sections and any other combination, purely based on strength and serviceability parameters.



JINDAL INFINITY INFRASTRUCTURE SOLUTIONS



Advisory

Grade Selection, Approvals,
Policy Framework Support,
Adhering & Developing
Standards, Training,
Design and more



Raw Material Supplier

Stainless Steel Plate,
Reinforcement Bars &
Chequered Plate



Customization

Cutting, Slitting,
Fabrication, Welding
and Drilling



Fabricated Components

Girders, Facade,
Railing, Bus Shelter,
Built-up Sections,
Angle & Channels



JSL offers an One-Stop Solution for building Durable Infrastructure by being involved in every step of Project Life Cycle such as.

Suitable Grade Selection to satisfy Strength and Serviceability Criteria.

Experienced Structural Engineers to design Stainless Steel Structures as per GAD.

Development & Identification of Fabricators having rich experience in fabricating Stainless Steel Structural Members.

Regular Trainings & Workshops for Fabricators to ensure quality at highest level.

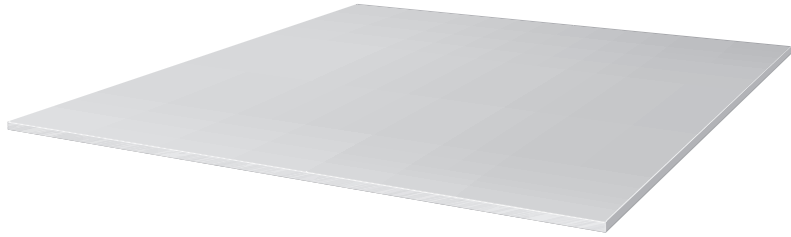


FLAT PRODUCTS PLATE GIRDERS FABRICATED SECTIONS

JINDAL INFINITY INFRA SOLUTIONS FOR STRUCTURAL APPLICATIONS

A. Plates

- i. Thickness - 3 mm - 80 mm
- ii. Width - 1500 mm max
- iii. Length - 12000 mm max



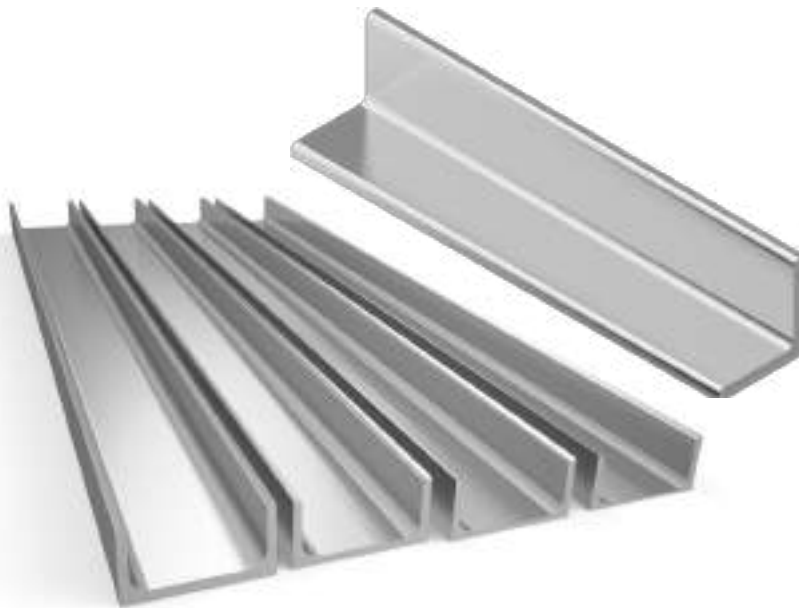
B. Fabricated Sections

- i. JSL offers welded stainless-steel I-beams, H-beams, hollow-section tubes and for Structural Members
- ii. Upto a length of 12 metres* include tubular.



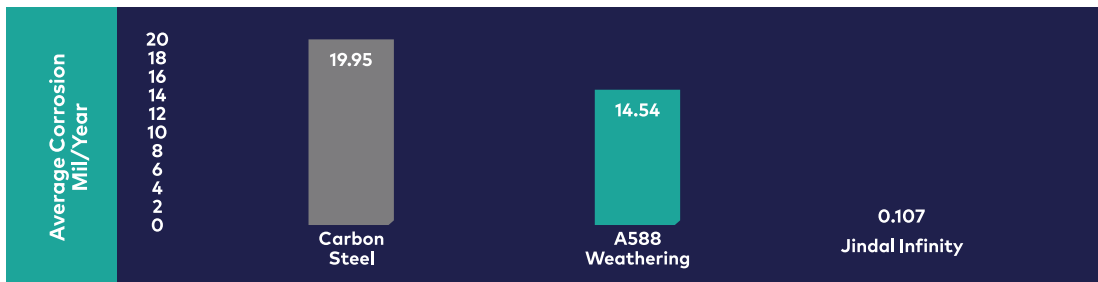
C. Angles & Channels

Cold Rolled formed /
press sections



JINDAL INFINITY PROPERTIES

Upto 186x better corrosion resistance



Corrosion performance as per SAE J2334 test consists of alternating wet/dry cycles with salt for 8 weeks, leads to low maintenance.

Mechanical Properties

Grade	Yield Strength	Tensile Strength	% Elongation	Impact
IRS 350 CR	350 MPA min	485 MPA min	18 min	34 J min
IRS 450 CR	450 MPA min	585 MPA min	18 min	27 J min

Physical Properties	Values
Density (kg/m ³)	7750
Modulus of Elasticity (N/mm ²)	2 × 10 ⁶
Poisson's Ratio	0.3
Thermal Conductivity (W/mK)	24.6
Mean Coefficient of Thermal Expansion /°C	10.4 × 10 ⁻⁶

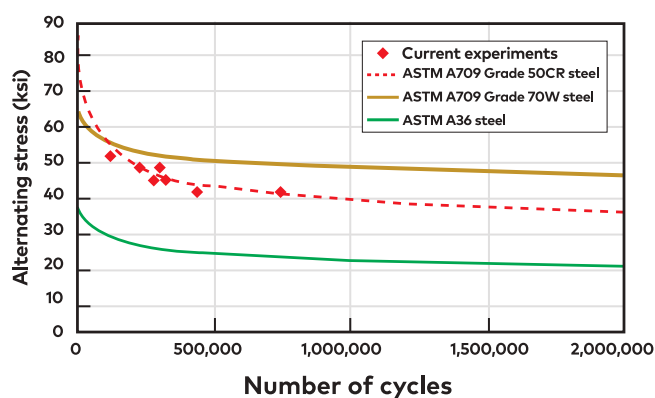
Chemical Composition

Jindal Infinity conforms to ASTM A709 50 CR, ASTM A1010 and RDSO specification BS-S-7.5.3.1-9

Element	C	Mn	Si	S	P	Ni	Mo	Cr	N	Other
Min. %							0.10-	10.5-		-
Max. %	0.03	1.5	1	0.01	0.04	1.5	0.75	12.5	0.03	

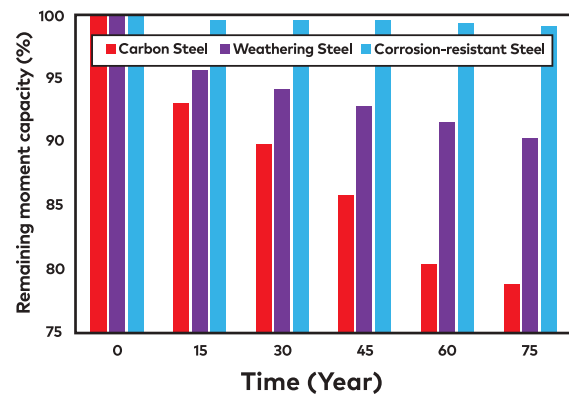
*Maximum, unless range or minimum is indicated

Fatigue Strength



Fatigue behavior ASTM A709 Grade 50CR steel in comparison to the other conventional structural steels (1 ksi = 6.9 MPa).

Moment Capacity Retention Vs Time



Percentage of drop in the moment capacity as a function of age.

Source: W. Shi, B. Shafei and B. Phares, Structural capacity and fatigue performance of ASTM A709 Grade 50CR steel, Construction and Building Materials. <https://doi.org/10.1016/j.conbuildmat.2020.121379>

RECOMMENDED FASTENERS DETAILS FOR FABRICATION OF JINDAL INFINITY

Item	Code	Grade
Bolt	ASTM A193	GR B8 Class 2
Nut	ASTM A194	GR 8
Washer		Type 303

All types of nuts & bolts domestically available.

Visit www.makestainless.com for suppliers of consumables, fasteners and fabricated components.

Weldability of Jindal Infinity

- For SAW Welding, it is recommended to use ER308L, ER309L, ER316L, and their higher silicon content counterparts however, ER309L has by far been the most widely used filler wire for welding the plate girders fabricated with this steel.
- Suitable flux should be used with filler wires.
- For FCAW, ER 309L and for GMAW –ER 309L/ER 309LMo with Gas mixture Ar-98% are recommended.
- Any other suitable welding consumable permissible by AWS D1.6 may also be used.

LCC Analysis:

- A. Initial cost increase is 20-25% over existing carbon steel.
- B. Low maintenance over carbon steel. For aesthetics purpose, paint is recommended for utility Ferritic stainless steel. Addresses the current challenges of maintaining bridges like safety, accessibility, shutdowns, additional cost for upkeeping and channelizing dedicated resources for the repeated jobs.
- C. Weight reduction of more than 25-30% achieved due to higher yield strength and light weight design.
- D. Stainless steel is green material and helps in reducing carbon foot print.
- E. Service life of stainless steel is double that of carbon steel.

STANDARDS AND CODES

Standard	Corresponding Design Code	Corresponding Construction / Fabrication Code
EN 10088 (Part 1 – List of stainless steel) (Part 2 – TDC for sheets/plates and strips of corrosion resisting steels for general purposes) (Part3- TDC for semi-finished products, bars, rods, wire, sections & bright products of corrosion resisting steels for general purposes) (Part4-TDC for sheet/plate and strip of corrosion resisting steels for construction purposes)	EN 1993-1-1(General Design Rules),EN 1993-2 (Steel Bridges) & EN 1993-1-4 (Supplementary Rules for Stainless Steel	EN 1090-2: Execution of steel structures (Technical Requirements for Steel Structures)
ASTM A1010/A1010M (standard specification for higher-strength martensitic stainless steel plate, sheet, and strip ASTM A709/A709M (standard specification for structural steel for bridges) ASTM 240 (standard specification for chromium and chromium-nickel stainless steel plate, sheet, and strip for pressure vessels and for general applications	AASHTO LRFD Bridge Design Specifications	AASHTO LRFD Bridge Construction Specifications
BS-S-7.5.3.1-9 (Specification for higher-strength martensitic stainless steel for bridge and associated structural applications IRS 350 CR)	AASHTO LRFD Bridge Design Specifications	AASHTO LRFD Bridge Construction Specifications

Jindal Infinity confirms to ASTM A1010 and RDSO specification BS-S-7.5.3.1-9

Structural Stainless Steel Grade IRS 350CR/IRS 450CR has been adopted by the mentioned agencies for Foot Over Bridges (FOB), Road Over Bridges(ROB), Flyovers Etc.

1. Railways - All Zonal Railways
2. Dedicated Freight Corridor Corporation of India (DFCCIL)
3. Rail Vikas Nigam Limited (RVNL)
4. Indian Railway Construction International Limited (IRCON)
5. Municipal Corporation of Greater Mumbai (MCGM)
6. Mumbai Metropolitan Region Development Authority (MMRDA)
7. Mumbai Trans Harbour Link (MTHL)
8. National Highways Authority of India (NHAI)
9. Public Works Department (PWD)
10. Greater Chennai Corporation (GCC)

Types of Bridges Approved

1. Composite Girders
2. Open Web Girders
3. Bow-string Girders
4. Cable Stayed Bridges
5. Truss Type



THE SCHEDULE OF RATES(SOR) FOR PLATES, FABRICATED SECTIONS, STAINLESS STEEL REBAR AND STAINLESS STEEL CHEQUERED PLATES ARE CURRENTLY AVAILABLE FROM THE FOLLOWING AGENCIES:

1. Municipal Corporation of Greater Mumbai (MCGM)
2. Public Works Department (PWD) Madhya Pradesh
3. Mumbai Metropolitan Region Development Authority (MMRDA)
4. Railways and All Zonal Railways

APPROVED BY INDIAN RAILWAYS AND MUNICIPAL CORPORATION

Indian Railways and Municipal bodies have approved the use of stainless in structural applications of bridges in line with global success stories of using modern technologies in construction.

Recognised by RDSO & Indian Railways

Stainless steel specification for structural applications in line with RDSO Specification

1. Material Specification: BS-S-7.5-3.1-9
2. Completed Project Drawings - FOB
 - i. Span 33.55 x 3 mtr - Drawing no - RC 5036
 - ii. Span 15.7 x 10 meter - Drawing number RC - 5032
 - iii. Span 35.21 x 6 mtr - Drawing no - UG-2203014-FOB-SG-001
 - iv. Span 43.86 x 3.5 mtr - RVNL/SCR/GRIL/KCK/FOB/SPF/440
3. RDSO standard stainless steel drawings
 - A. Foot Over Bridge (FOB)
 - i. Span 25-30m length x 6m wide; drawing no. RDSO/B-10424
 - ii. Span 20-25m length x 6m wide; drawing no. RDSO/B-10426
 - B. Road Over Bridge (ROB)
 - i. Span 36m length x 11m wide; drawing no. - CBS 0048
 - ii. Span 30m length x 11m wide; drawing no. - CBS 0050
 - iii. Span 40 m x 3 m - Drawing No. NRHQE P-390-FB/2022
 - iv. Span 20 x 3 m - Drawing No. CBE/GM2/190/2023
 - v. Span 50 x 3 m - Drawing No. 20352/05/KGP/23



JINDAL INFINITY SUCCESS STORIES

STAINLESS STEEL FOOT OVER BRIDGE

NAUPADA JUNCTION RAILWAY STATION,
WALTAIR DIVISION, EAST COAST RAILWAY

Project Details

Project	Naupada FOB, Waltair Division, East Coast Railway
Contractor	MD Jahageer, Visakhapatnam
Fabricator	Pennar Industries Ltd, Hyderabad
Stainless Steel Supplier	Jindal Stainless Ltd

Stainless Steel used in Project

Grade	Product	Application	Quantity (MT)
IRS350CR	HRAP plates/sheets (6mm to 40mm thickness)	Girders / columns/ hollow sections	116
X2CrNi12	HRAP chequered sheets (3.5mm & 4mm thickness)	Roof deck sheet	15
X2CrNi12	CRAP Sheets (2mm thickness)	Walkway side protective sheeting	4

STAINLESS STEEL FOOT OVER BRIDGE

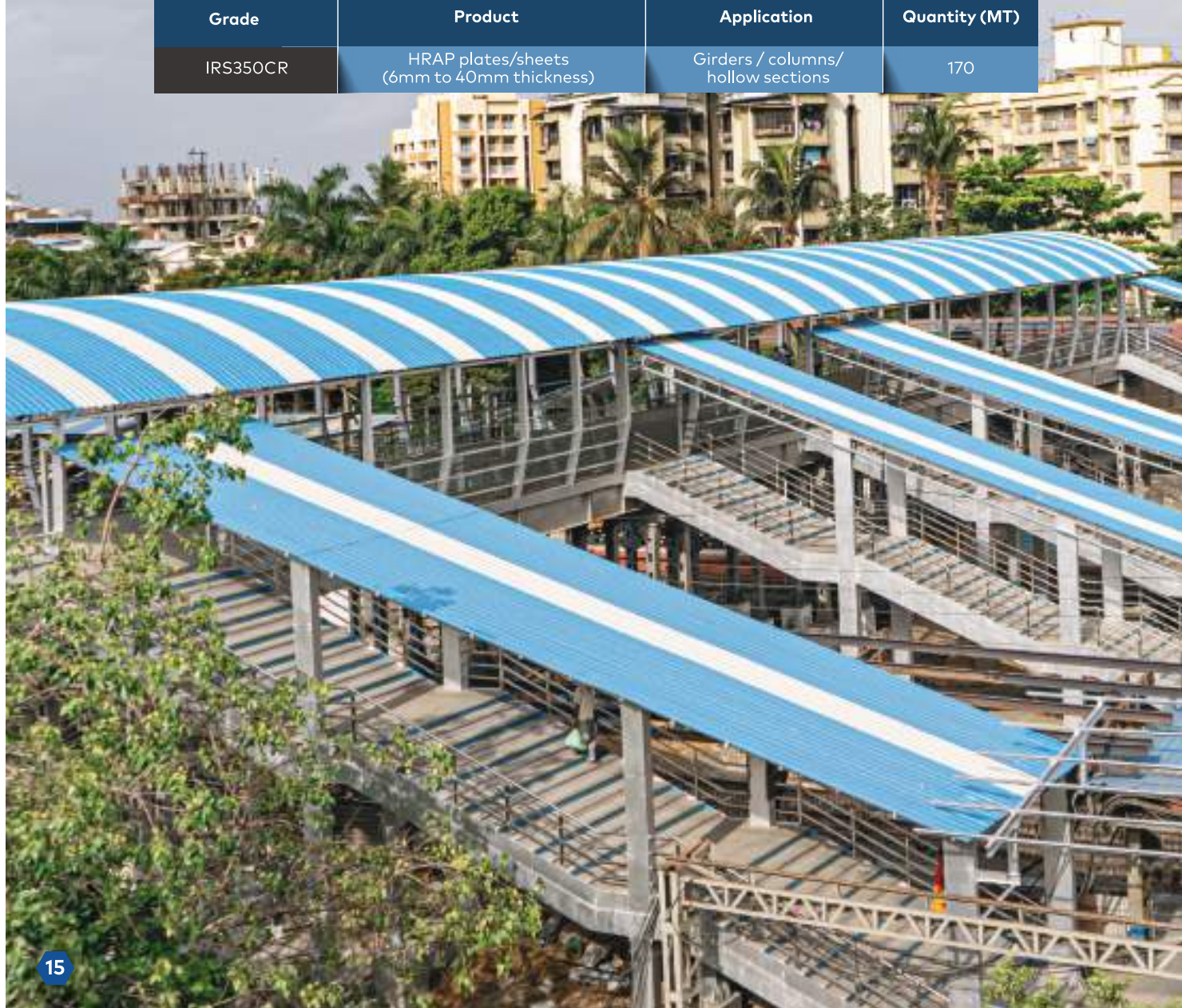
BHAYANDAR RAILWAY STATION, MUMBAI DIVISION, WESTERN RAILWAY

Project Details

Project	Bhayandar FOB, Western Railway
Contractor	Sai Projects Mumbai Pvt Ltd., Mumbai
Fabricator	Sai Projects Mumbai Pvt Ltd., Mumbai
Stainless Steel Supplier	Jindal Stainless Ltd.

Stainless Steel used in Project

Grade	Product	Application	Quantity (MT)
IRS350CR	HRAP plates/sheets (6mm to 40mm thickness)	Girders / columns/ hollow sections	170



STAINLESS STEEL FOOT OVER BRIDGE

SRIKAKULAM ROAD RAILWAY STATION, WALTAIR DIVISION, EAST COAST RAILWAY

Project Details

Project	Srikakulam FOB, Waltair Division, East Coast Railway
Contractor	MD Jahageer, Visakhapatnam
Fabricator	Pennar Industries Ltd, Hyderabad
Stainless Steel Supplier	Jindal Stainless Ltd

Stainless Steel used in Project

Grade	Product	Application	Quantity (MT)
IRS350CR	HRAP plates/sheets (6mm to 40mm thickness)	Girders / ccolumns/ hollow sections	142
X2CrNi12	HRAP chequered sheets (3.5mm & 4mm thickness)	Roof deck sheet	18
X2CrNi12	CRAP sheets (2mm thickness)	Walkway side protective sheeting	5



STAINLESS STEEL VEHICULAR BRIDGE

MRINAL TAI, MUMBAI

Project Details

Project	MCGM (Municipal Corporation of Greater Mumbai)
Contractor	Relcon Infra
Duplex - 2205	450 MT of Stainless steel used
Stainless Steel Supplier	Jindal Stainless Ltd

STAINLESS STEEL

BRIDGES, BUILT TO LAST FOR CENTURIES

HIMALAYA FOOT OVER BRIDGE, MUMBAI

Project Details

Client	MCGM (MUNICIPAL CORPORATION OF GREATER MUMBAI)
Contractor	PINAKEE CONSTRUCTION
IRS -350 CR	116 MT OF STAINLESS STEEL USED
Stainless Steel Supplier	Jindal Stainless Ltd



JINDAL INFINITY

**CHOOSE SAFETY
THAT IS LONG-LASTING
WITH STAINLESS STEEL
CHEQUERED SHEETS**

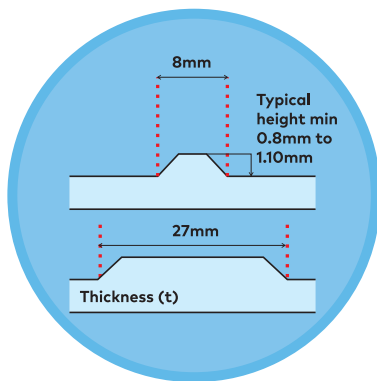


STAINLESS STEEL CHEQUERED PLATES

PRODUCT RANGE

- **Grade** - 409M
- **Thickness range** - 3mm to 8mm
- **Width Upto** - 1500mm
- **Finish** - Chequered

PATTERNED ALONG THE BEST GLOBAL STANDARDS



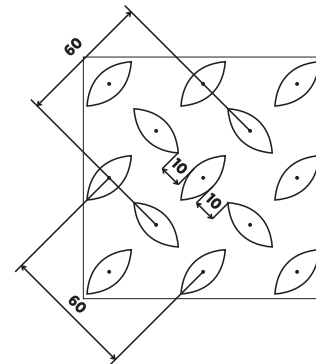
The pattern of this Stainless Steel Chequered Plate is in accordance with IS 3502 Pattern 1A.

Dimensions of Bead*

Length - 27mm
Width - 8mm
Height - Min. 0.80mm

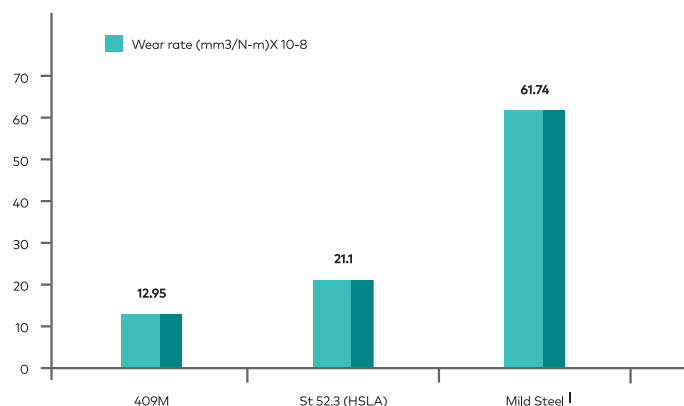
Number of Beads*

(100mm x 100mm):11
*Standard tolerance applies



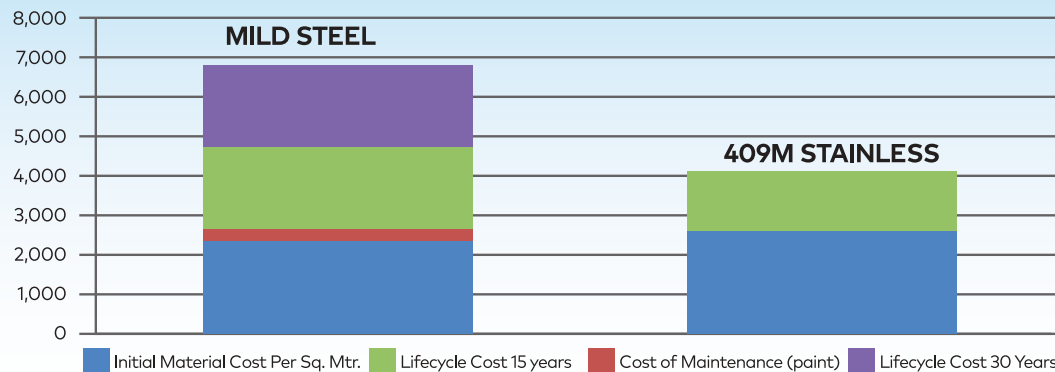
UP TO 5 TIMES HIGHER WEAR RESISTANCE FOR HIGHER COST SAVINGS

Grade 409M is known for its high wear resistance. Under the sliding wear test condition grade 409M is 1.6 times better than HSLA steel and 4.7 times better than normal mild steel.



LOWER LIFECYCLE COST FOR A LIFETIME OF GROWTH

LCC OF SS 409M HRAP CHEQUERED VS MILD STEEL HF CHEQUERED OVER 30 YEARS LIFE



Supplying of anti-skid chequered plates for gangway, trolley refuge, man refuge, side pathway, etc. shall be confirming to latest IS 6911, ISS Symbol 409 M, Minimum 6mm thick (excluding bead height) with flat bottom and top pattern confirming to IS 3502, 1A For, coastal/corrosive areas, thickness may be suitably increased depending upon severity of corrosion.

Appropriate matching stainless steel grade fasteners as recommended by manufacturer shall be used.

INNOVATED FOR A STRONG & LONG-LASTING FUTURE

THE PROMISE OF PROGRESS

STRENGTHENED BY SAFETY AND RELIABILITY

Railway Bridge Pathway: Ensuring safety & convenience during maintenance and inspections.



JINDAL STAINLESS CHEQUERED SHEETS

Architectural Stairs & Flooring with a lustrous finish and high aesthetic appeal.

THE PERFECT BLEND OF STRENGTH & DURABILITY TO COMPLEMENT PROGRESS

INTRODUCING *JINDAL INFINITY* REBARS

Chemical Composition of SS Rebar Grade G (410 L) as per IS 16651:2017:

Chemical	C	Ni	Mn	Si	P	S	Cr	N
Min %							11	-
Max %	0.03	0.6	1	1	0.04	0.03	13.5	-

Mechanical Properties of High Strength Deformed Stainless Steel Bars and Wires as per IS 16651:2017:

S. No.	Properties	SS 500	SS 550	SS 600	SS 650
1	0.2 percent proof stress (Rp0.2), Min, N/mm ²	500	550	600	650
2	Percentage elongation after fracture (A5), Min, on gauge length 5.65 √A, where A is the cross-sectional area of the test piece	16	14.5	10	10

Product Offering:

Diameter (mm)	8 mm to 32 mm
Standard Length	12 mtrs.

Policy from Ministry of Road Transport and Highways:

Use of stainless steel in bridges on National Highways and other centrally sponsored projects to be constructed in marine environment susceptible to severe corrosion.

Policy No. RW/NH-34049/03/2020-S&R (B)



STAINLESS STEEL CABLE TRAYS

THAT LAST LONGEST FOR INFRA SOLUTIONS



Grade:	EN 1.4404	EN 304	EN 204CU	EN 430	EN 316L
Width:	300mm	Thickness	1.2mm	Length	300mm



Corrosion
Resistant



Lowest
Maintenance



Long-Lasting
Strength

*Load test certified by Govt. approved laboratory conforming to IEC 61537

STAINLESS STEEL USAGE IN ARCHITECTURE, BUILDING & CONSTRUCTION

Claddings



Roof Sheets



Facades



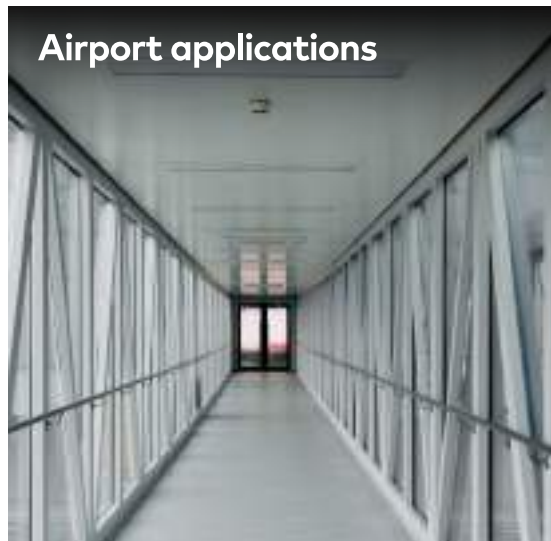
Gratings



Furniture



Airport applications



STAINLESS STEEL USAGE IN ARCHITECTURE, BUILDING & CONSTRUCTION



STAINLESS STEEL USAGE IN ARCHITECTURE, BUILDING & CONSTRUCTION



STAINLESS STEEL USAGE IN ARCHITECTURE, BUILDING & CONSTRUCTION



EDGE AHEAD WITH THE JSL EDGE



Regular Supplier
to Railways



Approved by
RDSO



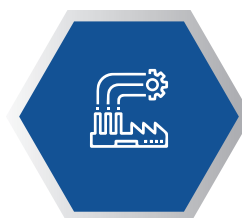
Wide
Manufacturing Range



State of the
Art Technology



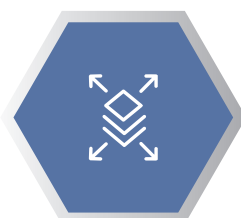
Largest
SS Manufacturer



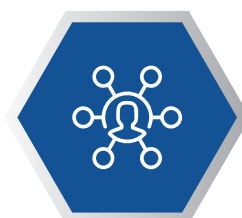
Fully
Integrated Plant



Socially
Responsible Company



Flexibility :
50 MT Heat



Wide
Marketing Network



Environment
Friendly Company



Indian Railways'
Most Trusted
Fabrication Partner



Chain of
Service Centres



Contact for Advisory
Mr. Nagarajan P. :- 8130757806

Contact for Sponsorship
Ms. Pranjali Singh :- 7488631417
pranjali.singh@jindalstainless.com

Email: infinity@jindalstainless.com
www.jindalstainless.com

