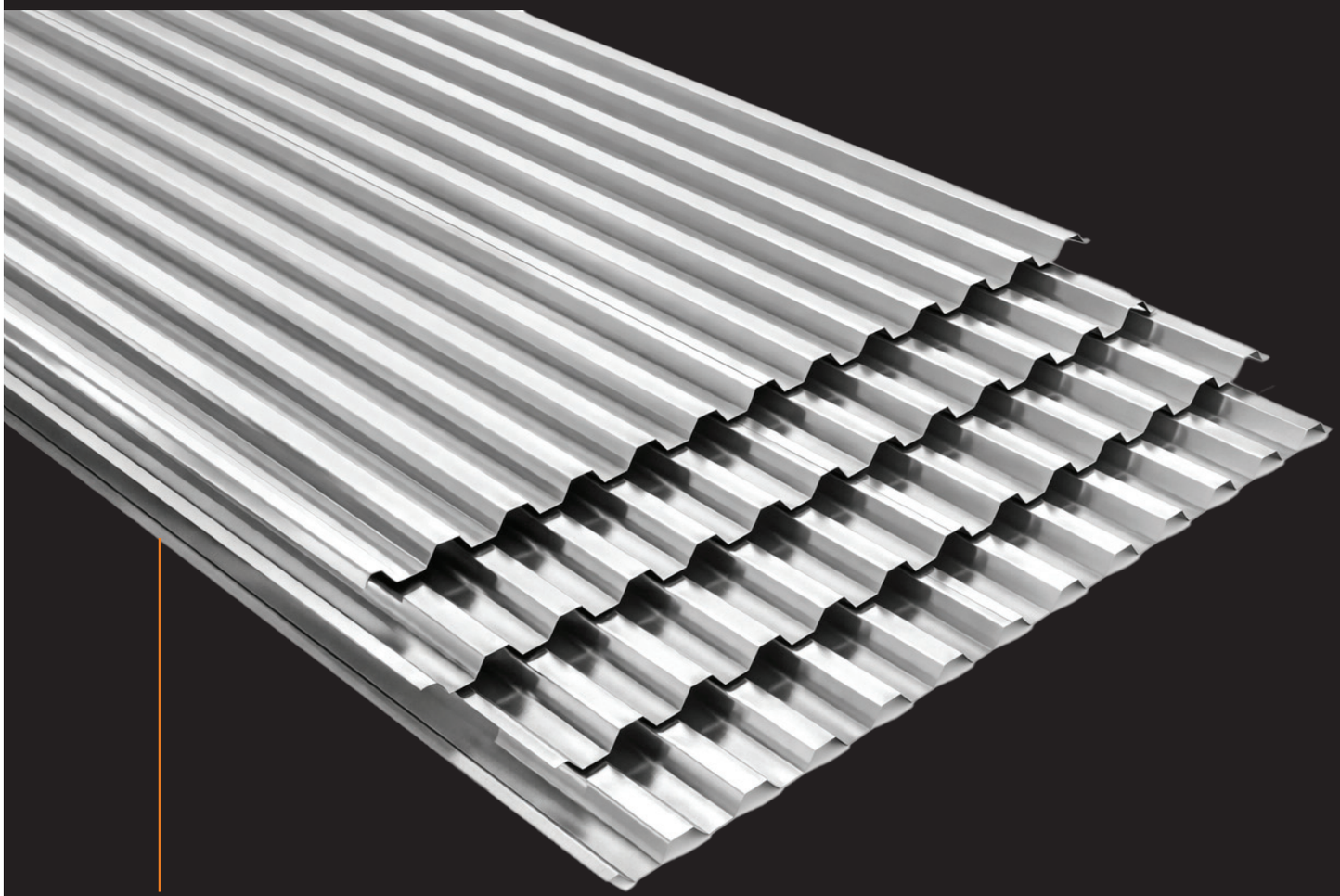
JINDAL STAINLESS

STAINLESS ROOFING
FOR EVERY ENVIRONMENT

Built for long-term performance across coastal, industrial and process-intensive sites.

WHEN OTHERS FAIL, STAINLESS STEEL PERFORMS.



Backed by plant references, lifecycle data and application-ready profiles

Engineered by Jindal Stainless

JINDAL STAINLESS

India's largest stainless steel manufacturer

Jindal Stainless is India's largest stainless steel manufacturer and a global leader in high-performance industrial solutions. We combine world-class metallurgy, a wide range of grades and deep application understanding, so products are built to perform in demanding environments over the long term.

Sustainability at our core:

Stainless steel is 100% recyclable and infinitely reusable—supporting a circular, low-waste future.

Wide range of grades:

Austenitic, Ferritic, Duplex and specialty grades for diverse industrial applications.

Built for demanding environments:

Our stainless steel offers long life, low maintenance and consistent performance in tough conditions.

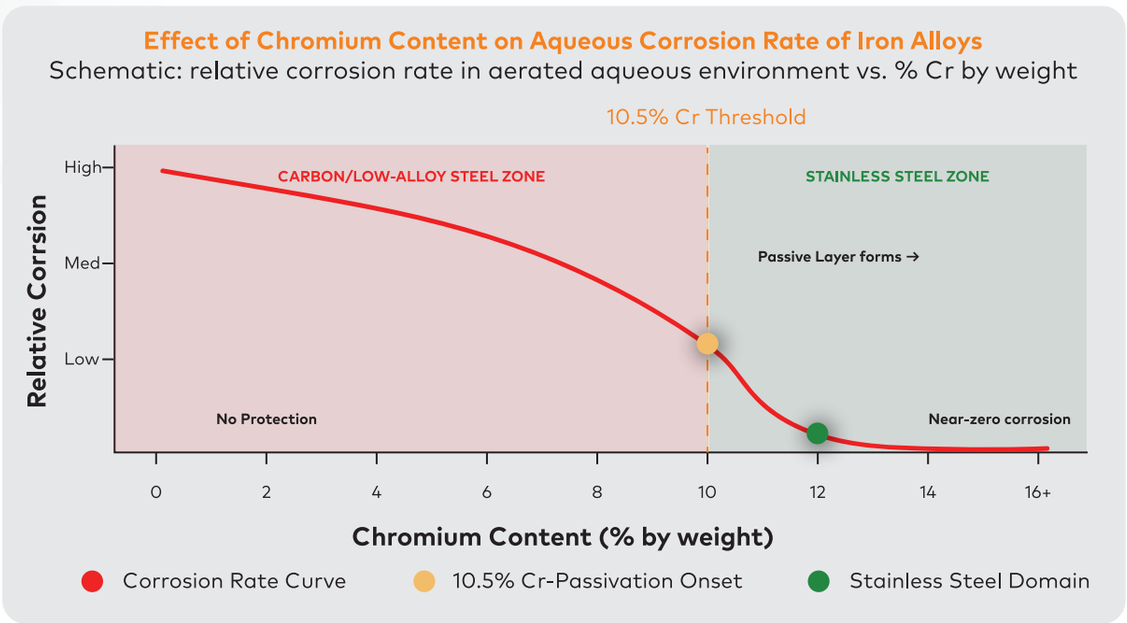
From coastal structures to demanding industrial environments, including roofing, our stainless steel solutions are designed for long-term performance and lower total lifecycle cost.

METALLURGY OF CORROSION RESISTANCE

The 10.5% Chromium Threshold

Stainless steel is not a coated product. It is an alloy in which chromium is metallurgically dissolved into the iron matrix. When chromium content crosses 10.5% by weight, a microscopic, invisible film of chromium oxide (Cr_2O_3) forms spontaneously on the surface.

This passive layer is self-repairing: wherever it is scratched, cut, drilled or sheared in the presence of oxygen, it regenerates instantly. Below 10.5% Cr, no continuous passive film forms, and the steel corrodes like ordinary iron.



Schematic: relative corrosion rate in aerated aqueous environment vs. % Cr by weight

CARBON/LOW-ALLOY STEEL ZONE	STAINLESS STEEL ZONE
Chromium content below 10.5%	Chromium content ≥ 10.5% | Passivation onset at 10.5% Cr
Discontinuous oxide corrodes freely. No protection.	Self-healing passive film | Near-zero corrosion.

10.5% Cr
Passivation Threshold

Cr_2O_3
Passive Film Compound

Self-Healing
Film Regenerates at Cuts & Holes

No Coating
Resistance Inherent in Alloy

THE CLEAR CHOICE, BUILT INTO THE ALLOY.

Not all roofing performs the same.
Here's how materials compare where it matters most.

COLOUR-COATED GI	ALUMINIUM ROOFINGS	STAINLESS STEEL ROOFING
✗ Paint over zinc — sacrificial protection only	✗ Susceptible to pitting corrosion	✓ Corrosion resistance built into the alloy itself
✗ Coating degrades under UV, chemicals and salt spray	✗ Not suitable for offshore/ onshore applications	✓ No paint, no coating, no sacrificial cycle results in a low lifecycle cost.
✗ Cut-edge corrosion at sheared edges and drilled fastener holes — the dominant field failure mode	✗ Not suitable for alkaline & aggressive environment	✓ Self-healing passive film protects every cut, sheared edge and drilled fastener hole
✗ Fails early in coastal and industrial atmospheres	✗ Not suitable for high temperature environments	✓ Works from rural inland to direct marine exposure
✗ Corrosion near fastener pull-through and uplift in coastal regions, failures in cyclonic / high-wind zones	✗ Low Strength and limited load bearing capacity	✓ High strength, superior fastener retention, and corrosion resistance ensure reliable performance against extreme wind uplift.
✗ Frequent replacements lead to higher long-term costs	✗ It has a high carbon footprint as it is made from primary aluminium.	✓ Ease of formability, innovative profiles, curved geometries (standing-seam, trapezoidal, custom)
✗ Safety & reliability issues, increased plant downtime and production loss		✓ Up-to 100% recyclable — high end-of-life recovery value

Stainless steel is not a coating. It is protection, inherent to the alloy — today, tomorrow and for decades.

CHEMICAL AND MECHANICAL PROPERTIES OF JSL ROOFING GRADES

Property	SS 430 Ferritic	SS 441 Ferritic (Nb+Ti Stab.)	SS 304L Austenitic — Low C	SS 316L Austenitic — Mo Bearing
Cr (%)	16.0 – 18.0	17.5 – 18.5	18.0 – 20.0	16.0 – 18.0
Ni (%)	—	—	8.0 – 12.0	10.0 – 14.0
Mo (%)	—	—	—	2.0 – 3.0
C (% max)	0.12	0.03	0.030	0.030
Stabiliser	—	Ti + Nb	—	—
N (%)	—	—	0.10 max	0.10 max
YS (MPa, min)	205	250	170	170
UTS (MPa, min)	450	430	485	485
Elongation (%)	22	18	40	40
Hardness (HRB max)	89	88	92	95
PREN (Cr+3.3Mo+16N)	~17	~18	~19	~25

Indicative values per ASTM A240 / EN 10088 / IS 6911.
Final mill test certificates issued per heat against the customer's specification.

Cr_2O_3
Passive Film Compound

No Coating
Resistance Inherent in Alloy

Self-Healing
Film Regenerates at Cuts & Holes

10.5% Cr
Passivation Threshold

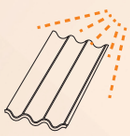
PREN — WHY IT BEATS THE SALT-SPRAY TEST

PREN (Pitting Resistance Equivalent Number) is a metallurgically derived, chemistry-based index that quantifies a stainless steel's resistance to chloride-induced pitting and crevice corrosion — the dominant failure mode for roofs in coastal and industrial atmospheres.

PREN = %Cr + 3.3 × %Mo + 16 × %N

A higher PREN means greater resistance to localised attack. Because PREN is calculated directly from the certified chemistry of every heat, it is traceable, repeatable and predictive of long-term field performance — not a snapshot of a few hours in a chamber.

COMPARISON



SALT-SPRAY TEST (ASTM B117)

Short-duration accelerated chamber test in 5% NaCl mist. Designed for coatings and platings. Does not replicate wet-dry cycling, UV, temperature swings or real chloride concentration. Two grades with identical salt-spray hours can perform very differently in the field.

PREN — CHEMISTRY-BASED INDEX

Independent test duration, operator and chemical conditions. Globally accepted by EN, ASTM and NACE for ranking pitting resistance. Grade selection becomes a deterministic engineering decision, not a test report.

STRONGER MATERIAL. LONGER PERFORMANCE.

A simplified decision matrix for all roofing environments, re-framed around long-term service, not just purchase price.

PROPERTY	GI	GALVALUME	PPGL	JSL STAINLESS
Life in corrosive exposure	Poor	Poor	Poor	Excellent
Corrosion resistance	Low	Low	Low	Excellent
Maintenance burden	High	Medium-high	Medium-high	Minimal
Coating / cut-edge dependence	High	High	Very high	None
Aesthetics over time	Poor	Poor	Fades	Excellent
Lifetime cost	High	High	High	Low

Why stainless steel wins: Unlike coating-based systems, stainless steel delivers its protection through the full thickness of the sheet.

*Indicative service-life positioning. Actual performance depends on grade selection, thickness, environment, design details and system choice.

ENVIRONMENT-BASED SELECTION MATRIX

The right grade for every environment. From inland sites to the most aggressive marine and chemical conditions.

Category A — Light-duty | SS 430

RURAL · INLAND · LOW HUMIDITY.

Clean rural atmospheres, dry inland plains, and low industrial activity. Pollution and chlorides are negligible.

Warehouses, logistics parks, rural institutional roofs

Category B — Mild Industrial | SS 441

URBAN · MILD INDUSTRIAL · SUB-COASTAL.

Urban pollution, moderate SO_2 exposure, sub-coastal zones beyond 5 km from the sea. Nb/Ti stabilisation ensures weld-zone integrity.

Sheds, factories, metro / railway station canopies

Category C — Heavy Industrial | SS 304

PROCESS PLANTS · COASTAL INDUSTRIAL.

Paper, sugar, fertilizer, chemical and coastal industrial sites where PPGI rusts within 2–5 years. Low-carbon grade resists sensitisation in welded structures.

Paper & sugar mills, fertilizer plants, urban coastal industry

Category D — Aggressive | SS 316L

MARINE · SMELTERS · CHEMICAL.

Direct sea-front (<1 km), smelter roofs, chlorine and acid-laden environments. 2% molybdenum delivers pitting resistance unmatched by any coated carbon product.

Copper / zinc smelters, jetties, chlor-alkali, offshore sheds

Final material selection to be validated by JSL's technical advisory team through site corrosivity assessment and life-cycle cost analysis.

FERTILIZER ENVIRONMENT: SAFER OPERATIONS, COOLER ROOFS, LONGER LIFE.

SS 304 solved a corrosive fertilizer roofing problem where coated systems were failing under acidic fumes, moisture and dust.

Category: C

FERTILIZER PLANT · VADODARA REGION

Before: coated roof failure

SS 304 · CORROSION RESISTANT

After: with JSL SS 304

6+ Years
Service life ongoing

8x
Lifecycle improvement

High
Reflectivity retained

40,000 m²
Converted area*

Challenge

Acidic fumes, fluorides, chlorides and fertilizer dust rapidly attacked zinc coatings and raised leakage and safety concerns.

Stainless result

SS 304 avoided coating failure, handled cyclic wet–dry exposure and delivered minimal-maintenance roofing performance.

Working benefit

Stable reflectivity and lower heat absorption helped the roof stay cooler and improved working conditions inside the plant.

LOWER LIFE-CYCLE COST vs. GALVALUME

~65%

Independent techno-economic analysis by CIDCO (Maharashtra) for the Koparkhairane & Airoli railway station roofing projects concluded that stainless steel roofing is approximately 65% cheaper than the galvalume option on a Life-Cycle Cost basis.

Source: PIB, Ministry of Steel (6 Sept 2002); ISSDA Stainless India, Vol. 9 No. 1 (June 2003).

The case-study document states approximately 40,000 m² converted; that direct case-study figure is used here.

COPPER SMELTER CASE IN GUJARAT

FROM 1.5-YEAR FAILURE CYCLES TO 9+ YEARS OF SERVICE.

The reference shows how SS 316L solved a combined heat, fumes, chlorides and copper-dust environment that was destroying GI.

Category: D

COPPER SMELTING PLANT - GUJARAT

Dahej, Gujarat | Copper Smelter

SS 316L | 2–3% Molybdenum

9+ Years
of ongoing performance

Zero
visible corrosion or perforation

5-6x
longer life than conventional roofing

What was failing

GI was dissolving under acidic fumes, coastal chlorides, copper dust and temperatures that degrade zinc-based protection.

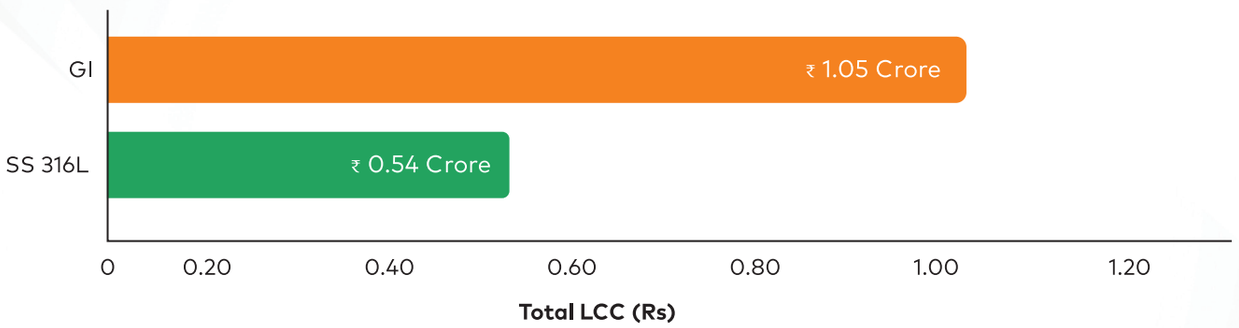
Why SS 316L worked

2–3% molybdenum improved pitting resistance. The passive film self-protected the surface, and there was no coating layer to peel or dissolve.

What changed operationally

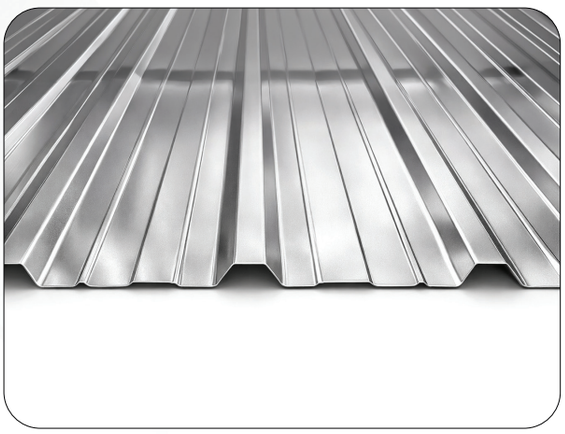
No repainting, no patching and no corrosion-led downtime since installation—the roof moved from repeat replacement to durable service.

Lifecycle Cost comparison (10 Years):

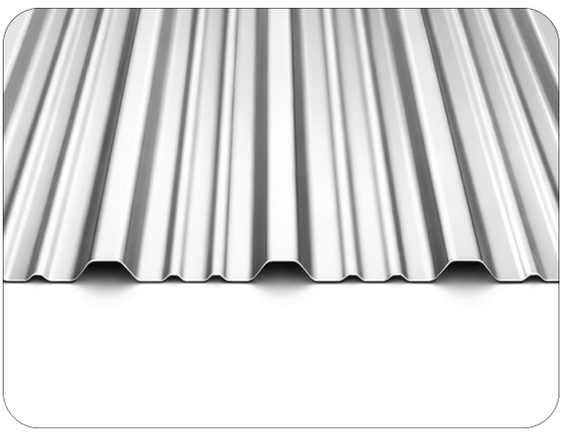


FAMILIAR PROFILES. SUPERIOR PERFORMANCE.

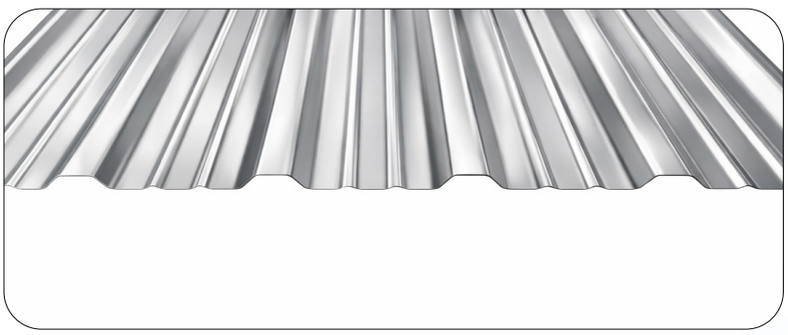
JSL stainless steel can be roll-formed into the same roofing families the market already uses—now with a stronger long-life material behind them.



Wide-cover trapezoidal profile for economical roofing and cladding.



Strong rib geometry for drainage, traffic and solar-ready applications.



Concealed-fixing profile for cleaner lines and better leak resistance.

The profile geometry does not need to change. The material performance does.
That means familiar roofing logic, familiar fabrication pathways and a much stronger long-life proposition for corrosive or demanding environments.

BUILT TO LAST.
BUILT TO PERFORM.

Stainless steel roofing for environments that don't allow for second chances.

Proven in real plants

Field-tested. Performance-verified.

Backed by grade expertise

The right stainless for the right environment.

Built for tough environments

Corrosive, coastal, fertilizer, smelting.

Made to fit your profile

Compatible with familiar roofing systems.

JINDAL STAINLESS

Let's build a roof that lasts

Talk to JSL Experts

Specialty Flat Products – Roofing Solutions

Grade advisory | Technical support | Commercial engagement

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