

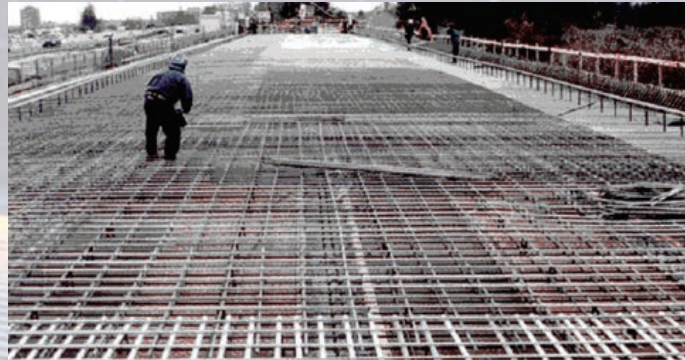
Stainless Steel Rebar SSR 550 (Grade G)



Advantages of SS Rebar Grade G

- SS REBAR GRADE G has inherently good corrosion resistance like any other stainless steel due to chromium oxide layer on the surface.
- It has good high and low temperature tensile as well as yield strength to match or exceed carbon steel.
- In RSSR (F) G IS 16651:2017, no cathodic protection is required.
- It has got good weldability due to very low percentage of carbon content (i.e 0.03 % max.)
- It has very good ductility.
- No coating is required here to have adequate corrosion resistance.
- It can be shipped, handled and bent without any problem.
- SS REBAR GRADE G has excellent earthquake resistance due to high percentage of elongation and ductility.
- Establish Examples of use of similar Stainless Steel Rebars

In South Africa



A similar product 3CR12 has been used extensively for many projects in bridges, building.....

Switzerland & Part of Europe

In the region it is produced and promoted by SWISS steel under the brand name of TOP12.



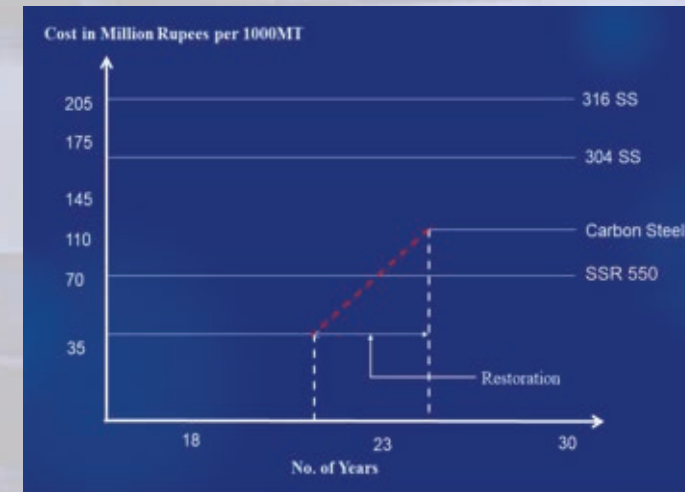
Japan

In Japan ferritic stainless steel rebar is being produced by Nippon Steel & Sumikin Stainless Steel Corporation under the brand name of NSSD410-295 External Wall of Nippon Keidanren Building of NSSD 410-295 Stainless Rebar

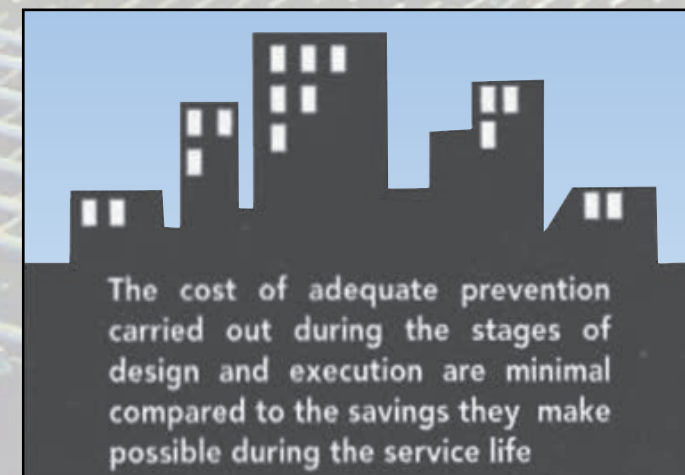


Life Cycle Cost

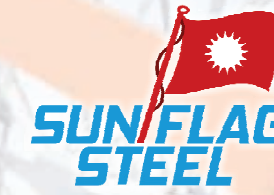
Life cycle costing estimates the total cost of product from initial outlay, through all related future costs may be incurred as a Consequence of initial investment decisions. While making any building or RCC structure the initial investment is going to be higher as there is a price gap between Carbon Steel Rebar and SS Rebar Grade G. But in the long run there will be major savings as building made by SS REBAR GRADE G does not need any maintenance/replacement. Hence, higher investment cost gets offset due to low maintenance.



Case Study : Midlands Links Viaduct



SS Rebar Grade G
Rebars are Characterized
by Superior Mechanical Properties,
Ductility & Enhanced Life.
It's Built to Last Longer



Certificates



OFFICES OF SUNFLAG IRON & STEEL CO. LTD.

Regd. & Head Office :

33, Mount Road, Sadar,
Nagpur - 440001
Tel: 91-0712-2520356
Fax: 91-0712-2520360



WORKS:

PO. Bhandara Road, - 441905
Dist. Bhandara.
Tel: 91-07197-285551
Fax: 91-07197-285570



For further detail please contact:

Ranjan Chhibba
Section Head (Corporate Affairs)
Sunflag Iron & Steel Co. Ltd.
D 47, 2nd Floor, Defence Colony
New Delhi - 110 024
Mob. 91 9810172113
Tel. +91 11 49576030
Email: rrc@sunflagsteel.com



BRANCH OFFICES:

Faridabad Office:

Plot No. 12, Sector - 6,
Mathura Road, Faridabad,
Haryana - 121006
Email: s_sanjeev@sunflagsteel.com



Mumbai Office:

S.K. Chanda (Dy. Head - Marketing)
Sunflag Iron & Steel Co. Ltd.
307, Hamilton-B, Hiranandani Business Park
Ghodbunder Road, Thane (West) - 400607
Mob: 91 9323221481
Email: chanda@sunflagsteel.com

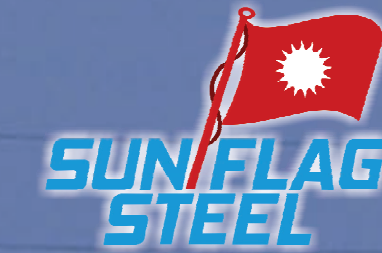


Chennai Office:

705, 7th Floor, Challamall,
11-11A Sir Thiagaraya Road,
T Nagar, Chennai- 600017
Tel: 91-044-24342262
Email: tm_elango@sunflagsteel.com

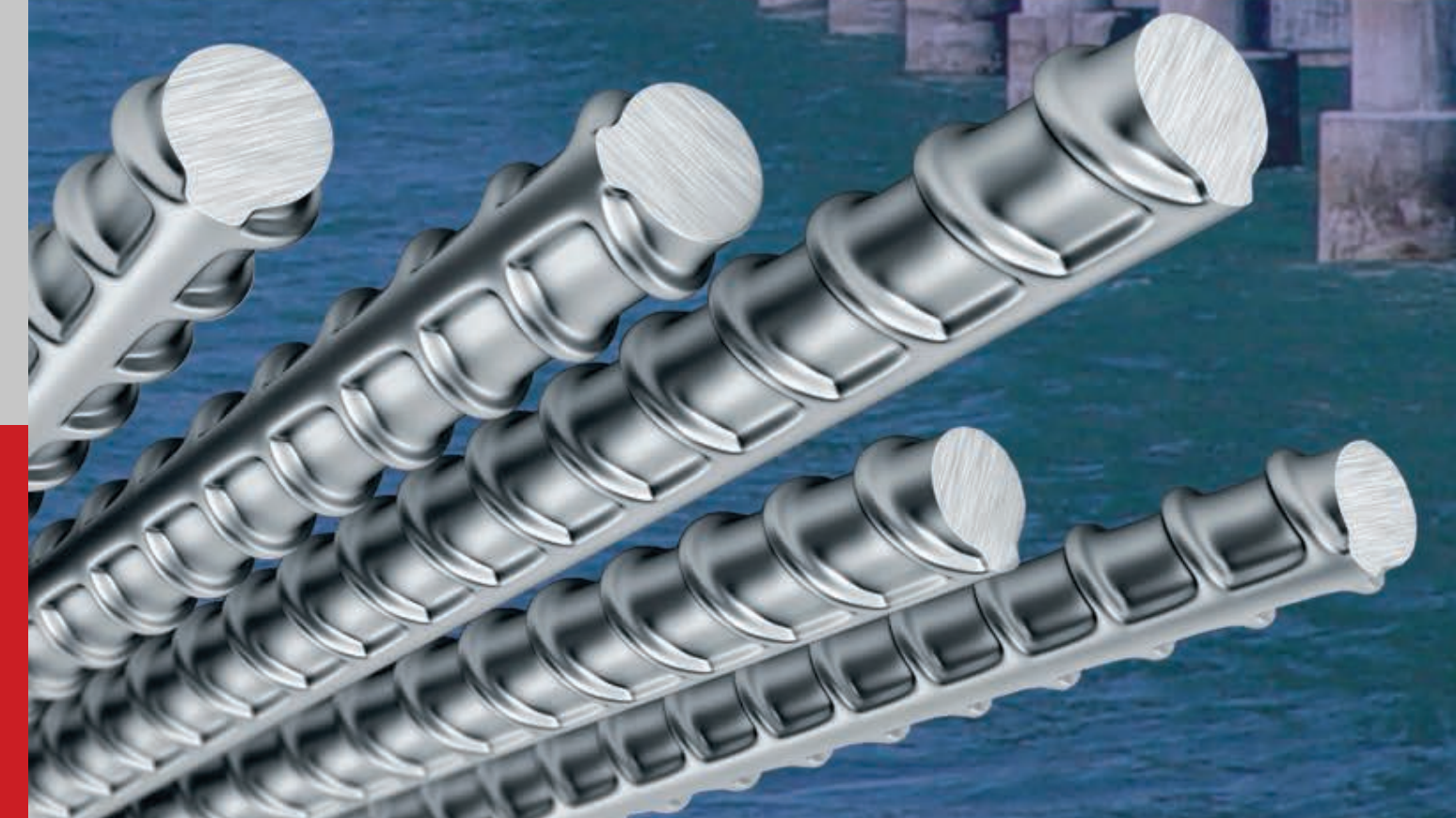


OUR PRODUCT RANGE



SSR 550

A Stainless Steel Rebar Built to Last





About us

Sunflag Iron & Steel Co. Ltd., INDIA is a part of the renowned Sunflag Group. The sunflag Group was founded in Kenya in 1937. It has a diversified range of activities in Kenya, Tanzania, Nigeria, Comeroon, The United Kingdom & India employing over 10,000 people.

In India Sunflag Iron & Steel Co. Ltd.. (SISCO) activity is divided into two business segment : Steel and Stainless Steel products and power sector. SISCO has set-up an integrated steel plant with technical know-how and major equipments from MANNESMANN DEMAG and KRUPP of Germany. It is most modern plant, the first integrated steel plant of its kind in India with a capacity of 0.5 million tonnes per annum of rolled products, which are comparable to the best in the world. This plant produces alloy steels, special steels and stainless steels, which are also supplied to major automobile manufacturers in India and a large part of our production is exported. SISCO has its own captive thermal power plant to meet the requirement of steel plant.

With ISO 9002 / QS 9000 organisation we provide best quality of steel to our customers.



Reinforcement Stainless Steel Rebars (Ferritic) Grade G of IS 16651:2017



What is SS Rebar Grade G?

It is a new kind of stainless steel rebar first introduced in India by Sunflag Steel. SS Rebar Grade G is a low cost stainless containing 11-13.5 % Chromium rebar that has a good corrosion resistance. SS REBAR GRADE G is a new age building material which increase the life of the building because of its better corrosion resistance properties compared to TMT, Epoxy coated or Zinc coated rebars.

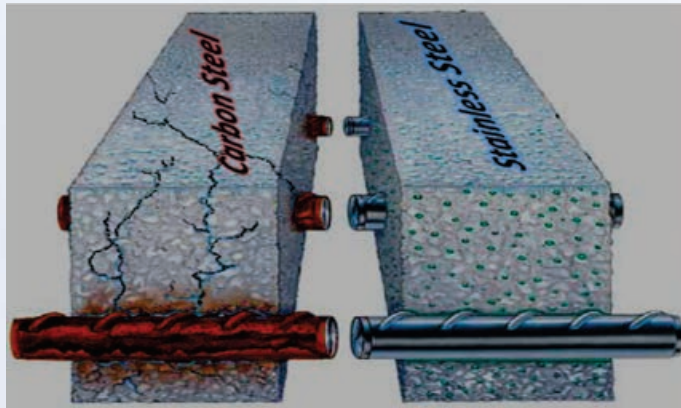
Why SS Rebar Grade G ?

Like any other rebar SS REBAR GRADE G does the job of reinforcement. The concrete inner structure of any building is made of steel. Due to formation of chromium oxide layer on the surface when exposed to atmosphere the SS REBAR GRADE G rebar does not get corroded. This protective oxide layer improves the life of rebar in concrete. In twenty first century SS REBAR GRADE G is a gift to builder, architect and consumer for corrosion free structure.

Corrosion in Concrete Structure

The corrosion of reinforcing bar can result in cost maintenance and repair of concrete structures. Corrosion may occur as a result of carbonation of the concrete, which destroys the protective passive layer surrounding the reinforcing bar. In marine environments, chemical and mineral processing plants etc., corrosion is usually caused by the ingress of highly corrosive chloride ions through the concrete to the reinforcing bar. The products of corrosion (Iron salts and oxides) of the reinforcing bar occupy a considerably greater volume than the original steel resulting in the cracking and subsequent spalling of the concrete. The corrosive attack on the reinforcement then becomes very rapid as the steel is no longer protected by the concrete cover.

The structure will soon weaken to the point where it will become unserviceable or dangerous.



Carbon Steel
Iron expansion inside due to increase in volume of rusting product from reinforced bar and thus the cracking and spalling

RSSR (F) G IS 16651:2017
Passive layer of chromium oxide prevents rusting

To protect the concrete structure form corrosion few techniques have been adopted without much success.

- Coatings on the steel bars
- Using Alloy Steel in the place of Carbon Steel
- Cathodic Protection
- Addition of inhibitors in the concrete
- Increase concrete cover thickness
- Reduced water/cement ratios

Though application of coatings to rebar is an easy route, damage of coatings during handling is the main limitation. Effect of inhibitors is temporary and short-lived. Cathodic protection is perhaps the perfect method but is difficult to implement and requires post maintenance and monitoring (Stainless steel is therefore the only solution for enhancing corrosion protection of concrete).

Low alloy steel with alloy concentration - 1% or so are also not the answer, where the concrete is exposed to both high levels of urban pollution and aggressive marine environment.

What Type of Stainless Steel Can be Used in the Reinforcement of Concrete?

A wide range of stainless steel alloy types is available for rebar selection, to meet the mechanical design aspects and the expected corrosivity of the environment. Stainless Steels are available mainly in five main groups. Austenitic, Ferritic, Duplex, Martensite and Precipitation hardened steels. Depending upon several factors such as relative corrosion, longevity, life cycle cost the SS REBAR GRADE G Stainless Steel is a desirable material. SS REBAR GRADE G is currently used by Orbit Buildcon & Reality (P) Ltd. in Mumbai for their premium housing projects. Orbit Buildcon is a famous construction company located in Mumbai.



Villa Orb
This is a 28 storey structure with exquisite ocean facing suits located at Darabsha lane in Napeansea Road, Mumbai.



Orbit Heaven
Located at apeansea Road, Orbit Haven is a 33 storey residential tower with 5 star comforts.



Orbit Arya
This is a 27 storey building located at Darabsha lane in Napeansea Road, Mumbai.

Stainless Steel Rebar SSR 550



Intrinsic Properties of SS Rebar Grade G

Carbon and Nitrogen control the mechanical properties of Stainless Steel. Higher Carbon and Nitrogen contents are harmful for reinforcement purposes, since these result in a steel with low weldability and low toughness (Control of Carbon content to 300 ppm max. and Nitrogen content to 300 ppm max). results in the formation of a fine equiaxed ferritic steel with good toughness and adequate mechanical properties. That makes SSR 550, Grade G of IS 16651:2017 the best stainless steel for reinforcement of concrete.

Chemical composition of SS Rebar Grade G

Chemical	C	Ni	Mn	Si	P	S	Cr	N
Min %		0.0					11	-
Max %	0.03	0.60	1.0	1.0	0.04	0.030	13.50	-

Properties of SS Rebar Grade G

Grade Elongation	02% Proof Strength/ Yield strength	Tensile Strength	
	Mpa	Mpa	%
SS REBAR GRADE G Min	550	625	17
MS Fe415	415	485	145
MS Fe500	500	545	12
MS Fe 550	550	585	8

Equivalent Standards

SS REBAR GRADE G falls in IS 16551:2017 and also A;LSzO Conforms to all requirements of equivalent grade in JIS G 4322: 2008

Physical Properties

Density	Kg/m ³	7740
Modulus of Elasticity	Tension(Gpa)	200
	Torsion(Gpa)	79
Poisson's Ratio	-	0.32
Specific Heat Capacity	J/Kg/K	478
Thermal Conductivity	100C(W/mk)	30.5
Coefficient of thermal expansion	Um/mk	11.07
Relative permeability	-	Ferromagnetic
Magnetic permeability	Oersted	700-1000

Size & Mass

Nominal Diameter (mm)	Nominal Mass/M (kg/m)	Nominal Sectional area (mm ²)	Circumference (mm)
8	0.395	50.27	25.13
10	0.617	78.54	31.42
12	0.888	113.10	37.70
16	1.578	201.10	50.27
25	2.466	490.90	78.53
32	6.313	804.20	100.50

Cutting

SS REBAR GRADE G has good cutting property and can be easily cut by a mechanical shear or abrasive disc with less tool/disc wear but it is advised not to cut by an oxy-acetylene flame.

Welding

SS REBAR GRADE G has good weldability because of its fine grained structure. Filler material such as AFRIX RSSR (F) G IS 16651:2017, or austenitic stainless steel filler materials such as R309L or 316L are preferred.

In marine environments, chemical and mineral processing plants etc., corrosion is usually caused by the ingress of highly corrosive chloride ions through the concrete to the reinforcing bar. The products of corrosion (Iron salts and oxides) of the reinforcing bar occupy a considerably greater volume than the original steel resulting in the cracking and subsequent spalling of the concrete. Immersion tests in various solutions show eligible corrosion rate (Table 1) of SS Rebar Grade G.

(Table 1).

S.No.	Test Solution (30°C)	Corrosion Rate (mmpy)		•Relative Corrosion Resistance
		16mm	10mm	
1	10% NaOH	0.0013	0.0014	Outstanding
2	10% Ca(OH)	0.00064	0.000575	Outstanding
3	Saturated CaCl	0.000663	0.00089	Outstanding
4	3.5% NaCl	0.025225	0.0268	Excellent
5	3% H ₂ SO ₄	2.05925	0.3375	Poor
6	Hot Water (65°C)	0.1855	0.21625	Good
*M.G. Fontana, Corrosion Engineering, Mc Graw Hill Outstanding <0.02, Excellent = 0.02-0.1, Good = 0.1-0.5, Poor • 10-5.0 mmpy (millimeter penetration per year) is the most commonly used corrosion expression				