



LEADING THROUGH QUALITY OF SERVICE

HOT DIP GALVANIZED EARTHING FLATS

SPECIFICATIONS

20 x 3MM	50 x 10MM
25 x 3MM	50 x 12MM
25 x 5MM	63 x 6MM
25 x 6MM	63 x 8MM
32 x 5MM	63 x 10MM
32 x 6MM	75 x 6MM
40 x 3MM	75 x 8MM
40 x 5MM	75 x 10MM
40 x 6MM	75 x 12MM
50 x 3MM	100 x 6MM
50 x 5MM	100 x 8MM
50 x 6MM	125 x 6MM
50 x 8MM	150 x 6MM

Galvanized earthing strip is connected to the actual earthing bar. In some places GI Earthing Strips are used instead of insulated cables due to lower cost or deter thefts. GI Flats results in the required minimum earthing resistance to meet your installations requirement.



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HOT DIP GALVANIZED ANGLES

SPECIFICATIONS

25 x 25 x 3MM	65 x 65 x 6MM
25 x 25 x 5MM	75 x 75 x 6MM
32 x 32 x 3MM	75 x 75 x 8MM
35 x 35 x 5MM	75 x 75 x 10MM
37 x 37 x 3MM	90 x 90 x 10MM
40 x 40 x 5MM	100 x 100 x 10MM
40 x 40 x 6MM	130 x 130 x 10MM
50 x 50 x 5MM	150 x 150 x 16MM
50 x 50 x 6MM	150 x 150 x 20MM

Galvanized angles has very widely use with tower, communication tower, railway and highway protection, lamp posts, Marine structures, construction steel structure component, ancillary facilities of substation, light industry, etc.

HOT DIP GALVANIZED CHANNELS

SPECIFICATIONS

75 x 40MM
100 x 50MM
125 x 65MM
150 x 75MM
200 x 75MM
250 x 80MM
300 x 90MM
400 x 100MM

Galvanized Channels can be used to create any construction connections, e.g. facades, precast concrete construction, residential construction and traffic engineering (e.g. tunnels), and for lift constructions, infrastructure projects such as bridges or crane runway fixings, Switchyard structures



HOT DIP GALVANIZED BEAMS

SPECIFICATIONS

100 x 50MM

150 x 75MM

200 x 100MM

250 x 125MM

300 x 140MM

350 x 140MM

400 x 140MM

Galvanized I Beams are used for manufacturing of truck-trailers, EOT cranes and its Gantry, ship building, factory sheds, conveyors, boilers, agricultural equipment, and many more engineering industries.

HOT DIP GALVANIZED PLATES / EARTHING PLATES

SPECIFICATIONS

2' x 2' x 3MM

2' x 2' x 4MM

2' x 2' x 5MM

2' x 2' x 6MM

2' x 2' x 8MM

2' x 2' x 10MM

2' x 2' x 12MM

8' x 4' x 3MM

8' x 4' x 4MM

8' x 4' x 5MM

8' x 4' x 6MM

8' x 4' x 8MM

8' x 4' x 10 MM

8' x 4' x 12MM

8' x 4' x 16MM

8' x 4' x 20MM

It is an essential component of roofs and panels, HVAC, electric appliance, and machine parts for earthing .



HOT DIP GALVANIZED CHECKERED PLATE

SPECIFICATIONS

8' x 4' x 3MM

8' x 4' x 4MM

8' x 4' x 5MM

8' x 4' x 6MM

8' x 4' x 8MM

8' x 4' x 10MM

These are used as ramps at certain places, also used at railway platforms and skywalks.



HOT DIP GALVANIZED 'W' CRASHGUARD BARRIER

SPECIFICATIONS

311 x 4318MM

150 x 75MM - POST

150 x 75MM - SPACER

A Metal Crash Barriers is a particularly effective road safety system serving to protect vehicles and its occupants in the case of a mishap and also serve as a good visual guide for drivers, especially in the night. They are used to protect traffic from roadside obstacles or hazards, such as steep slopes, enough to cause rollover crashes, fixed objects like bridge piers, and bodies of water.



HOT DIP GALVANIZED GRATINGS

SPECIFICATIONS

Width: 1000 / 1200MM
Length: 6000MM

FEATURES

Excellent finish
Robust construction
Precise design
Sturdiness
Dimensional accuracy
Application specific structure
Rust proof

Industrial gratings combine great strength with light structure giving good non-slip properties. Ideal for use on platforms, galleries, gangways, storage floors etc. The gratings can be manufactured to customers specifications.



HOT DIP GALVANIZED PERFORATED CABLE TRAYS

SPECIFICATIONS

50 x 25MM
75 x 25MM
100 x 25MM
100 x 50MM
150 x 25MM
150 x 50MM
200 x 25MM
200 x 50MM
250 x 25MM
250 x 50MM
300 x 25MM
300 x 50MM

Perforated Cable Trays easy to install and cost-effective in usage. These are corrosion resistant and can be used in outdoor spaces. These trays are ideal to support large volume of network cables and also assist in providing smooth transition around obstacles. These trays can be easily attached to floor, ceiling, wall or top of racks and cabinets and can be made available in different widths, heights and length options



HOT DIP GALVANIZED LADDER CABLE TRAYS



SPECIFICATIONS

150 x 50MM

300 x 50MM

300 x 75MM

450 x 50MM

450 x 75MM

500 x 50MM

500 x 75MM

600 x 50MM

600 x 75MM

750 x 50MM

750 x 75MM

A cable tray system is used in the electrical wiring of buildings to support insulated electric cables used for power distribution and communication. Cable trays are used as an alternative to open wiring or electrical conduit systems, and are commonly used for cable management in commercial and industrial construction.



HOT DIP GALVANIZED CABLE TRAYS SUPPORTS



C1 & C2 Channels are easy to install and cost-effective in usage. These are corrosion resistant and can be used in outdoor spaces. These Channels are ideal to support Cable Trays. These trays can be made available in different widths, heights and length options.



GALVANIZED EARTHING ELECTRODE



SPECIFICATIONS

HDG Electrode

40 x 3MTR

65 x 3MTR

100 x 3MTR

SPECIFICATIONS

Cast Iron Electrodes:

100 x 3MTR

150 x 3MTR

Purpose of Earthing

Safety for Human life /
Building / Equipment

Over voltage protection

Voltage stabilization

ADVANTAGES OF GALVANIZED MATERIALS

1. Lowest first cost. Galvanizing is lower in first cost than any other commonly specified protective coatings for steel.

2. Less maintenance/Lowest long term cost. Galvanizing is almost invariably cheapest in the long term because it lasts longer and needs less maintenance.

3. Long life. The life expectancy of galvanized coatings on typical structural members is far in excess of 50 years in most rural environments, and 20 to 25 years plus, even in severe urban and coastal exposure.

4. Reliability. Galvanizing is carried out as per International Standard 2629/2633/6745/4759 with minimum thickness of 86 microns.

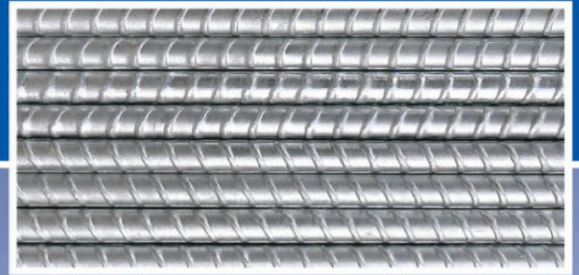
5. Toughest coating. A galvanized coating has a unique metallurgical structure which gives outstanding resistance to mechanical damage in transport, erection and service.

6. Ease of inspection. Galvanized coatings are assessed readily by eye, and simple non-destructive thickness testing methods can be used.



Mr. Nikhil Patel
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 **SHREE GAYATRI**
ENGINEERING & GALVANIZING
Hot Dip Galvanized Reinforcement Steel Bars




Shree Gayatri Engineering & Galvanizing

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E-mail info@www.sgeggalvanizers.com

Galvanized Rebar

A close-up photograph of several galvanized rebar bars, showing their characteristic twisted, ribbed texture and metallic sheen.

Shree Gayatri Engineering & Galvanizing. is the first company in India to introduce Hot Dip Galvanized reinforcement steel bars (Galva Rebars) as a readily available standard product. The company also undertakes job work of Hot Dip Galvanizing of MS Reinforcement bars and TMT bars. The rebars are galvanized according to Indian Standard IS: 12594-1988.

It would be worthwhile mentioning that the reason behind the collapse of buildings is not earthquake but expansion of steel due to corrosion, by up to three times its original diameter. This leads to cracks in the surrounding concrete, resulting in weakening of structure. The Hot Dip Galvanizing is a corrosion protection process which results in metallurgical bonding by completely enclosing the steel & sealing it from the corrosion impact of the atmosphere, without any effect to the properties of steel. This process is secure & reliable and has emerged technically superior and cost effective in the long run. It increases life of the TMT Bars (Galva Rebars) by more than 300%.

We all observe common galvanized structures like Telecom Towers, Wind Mill Towers and Power Transmission Towers, etc. which were erected in open atmosphere 30 to 60 years ago. They still have some of their original coating & are expected to be corrosion free for years.

Many great Infrastructures in the world have used galvanized steel like the Changi Airport of Singapore, Lotus Temple in New Delhi, Sabarmati Riverfront in Ahmedabad.

The Infrastructure development today needs to keep pace with demand of new world to sustain the current impacts of nature & polluted environment. Iron & steel is most important material for infrastructure development. Unless protected, it will corrode & lead to weakening of structures. Galvanized steel is the best way to build environment sustainable, cost effective & long lasting structure.



Why Galvanized Rebar?

- ▶ Corrosion products of steel are over three times the volumes of original steel.
- ▶ Higher volume of corrosion products exerts greater tensile disruptive stress on the surrounding concrete.
- ▶ The structure would have spalling on concrete, suffer loss of durability and serviceability, and would require early remediation, repair and even demolition.
- ▶ Corrosion of steel reinforcement bars is a key reason for damage to concrete.
- ▶ Many regions in India accounting for 20-25% of rebar use require corrosion protection that is not provided by the concrete cover.
- ▶ Of the several corrosion protection technique tried and tested over long periods, galvanized reinforcement bar have emerged technically superior and cost effective. Further galvanized reinforcement bars are economical.
- ▶ **Galvanization increases reinforcement bar life by more than 300%.**

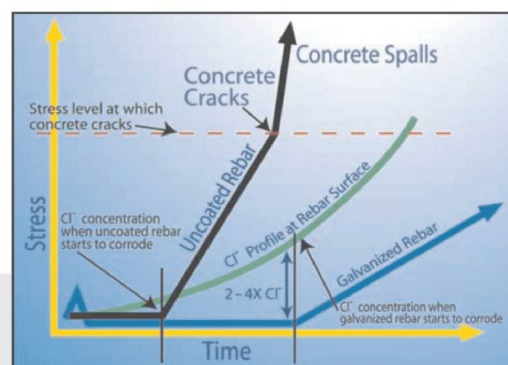
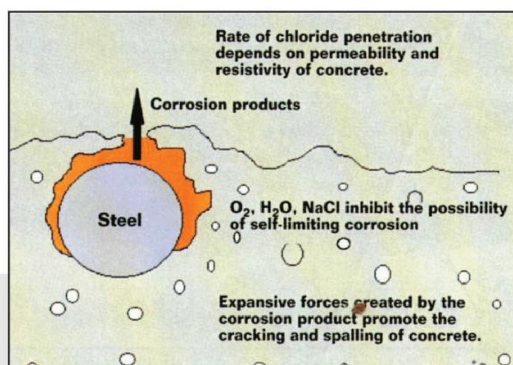
Bond Strength

Galvanized reinforcement bars show equal or better strength in all conditions in both plain and deformed types.*

*Structure Engineering Materials Laboratory
University of California

Major Benefits of Galvanized Rebars

- ▶ Protection to the steel during storage and construction, prior to placing in the concrete.
- ▶ Diminished effect of variations in concrete quality.
- ▶ Safeguards against poor workmanship, especially misplacement of reinforcement, poor compaction and inadequate curing.
- ▶ Delayed initiation of corrosion and the onset of cracking.
- ▶ Reduced likelihood of surface staining.
- ▶ Increased structural life of concrete, particularly where chloride contamination is likely.
- ▶ Chloride ion concentration required to start corrosion of zinc on galvanized release is 3 times the threshold concentration for plain rebars.
- ▶ Zinc corrosion products do not damage concrete but block pores in concrete, reducing the chloride ion diffusion.
- ▶ Zinc provides cathodic protection even to areas that become uncovered due to zinc corrosion.
- ▶ Zinc does not allow contact between chloride ions and steel.



Advantage of Hot Dip Galvanized Rebar over Epoxy Coated Rebar

1. Special Handling

- ▶ The zinc coating of HDG rebar is harder than the steel itself. Bundling, dragging, and rough treatment prior to and during placement have no detrimental effect.
- ▶ ECR requires delicate handling to prevent damage to the epoxy coating. Any damage to the coating prior to placement will compromise the corrosion protection.

2. UV Damage

- ▶ HDG rebar is unaffected by UV ray exposure during field storage and installation period.
- ▶ ECR coatings break down under UV ray exposure.

3. Touch-up

- ▶ HDG rebar coatings are tenacious and resistant to scratching and chipping during shipping and placement.
- ▶ Only cut ends need touch-up in the field because of cathodic protection ability of zinc.

4. Overlap Lengths

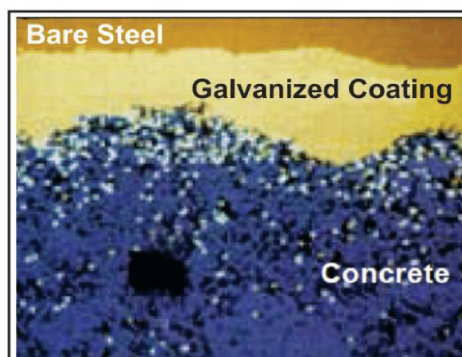
- ▶ Laboratory tests show no significant difference in the slip for HDG and black rebar in loaded bars.
- ▶ American Concrete Institute (ACI 318) recommends 20% more overlap when using ECR.

5. Holidays / Pinholes (Coating Inconsistencies)

- ▶ HDG specifications allow for zero uncoated surface area. The HDG process ensures 100% of the bar is coated with zinc.
- ▶ ECR specifications allow for a percentage of the bar to have holidays and pinholes, compromising its protection mechanism before it reaches the job site.

6. Bond to Concrete

- ▶ There is no significant difference at ultimate load between the bond strength of ribbed galvanized and black rebar.
- ▶ ACI Code requires the basic development length for ribbed epoxy-coated bars to be increased due to the loss of bond strength as a result of the epoxy coating.



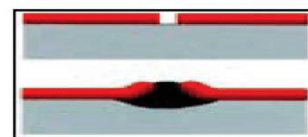
Elemental map of Galvanized Rebar
 The corrosion products of Galvanized Rebar are less dense and do not build up pressure to cause concrete spalling (unlike the dense corrosion products of bare steel). The zinc corrosion products (depicted left, in white), migrate away from the Galvanized coating and disperse into the concrete matrix.

7. Fabricate After Coating

- ▶ HDG can and is often fabricated / bent after coating.
- ▶ ECR is not practically fabricated after coating as the epoxy will crack / flake.

8. Underfilm Corrosion

- ▶ The zinc of HDG rebar is self-healing and impermeable. If HDG rebar is damaged, there is only small, localized corrosion.
- ▶ ECR coatings are permeable and once corrosion begins, it spreads throughout the bar underneath the epoxy film.



9. Cathodic Protection

- ▶ HDG offers sacrificial protection to the substrate steel. HDG prevents corrosion in chloride ion concentrations 2 to 5 times greater than what causes corrosion of black rebar. HDG also provides barrier protection.
- ▶ ECR offers only barrier protection that is compromised by allowing a percentage of pinholes and holidays in the coating.

10. Abrasion Resistance

- ▶ HDG rebar coatings (alloy layers) are harder than the substrate steel with a hardness ranging from 179 to 250 DPN (Diamond Pyramid Number).
- ▶ ECR must be handled with extreme care to avoid all contact and scraping against other ECR bars in order to avoid coating damage.

11. Installation Conditions

- ▶ HDG can be handled in all temperatures.
- ▶ ECR coatings may crack when handled in temperatures less than 50 F.

12. Accelerated Performance Tests

- ▶ Real-world performance (>30 years) shows HDG passivates after curing of concrete, producing zinc corrosion products that migrate away from the concrete matrix (no cracking / spalling pressure is created) and has a higher threshold for chloride corrosion.
- ▶ Estimates of epoxy-coated rebar (ECR) performance is largely based on accelerated salt spray test data. The artificial conditions of salt spray tests accelerate only one parameter and monitor corrosion current, which does not mimic real world conditions.

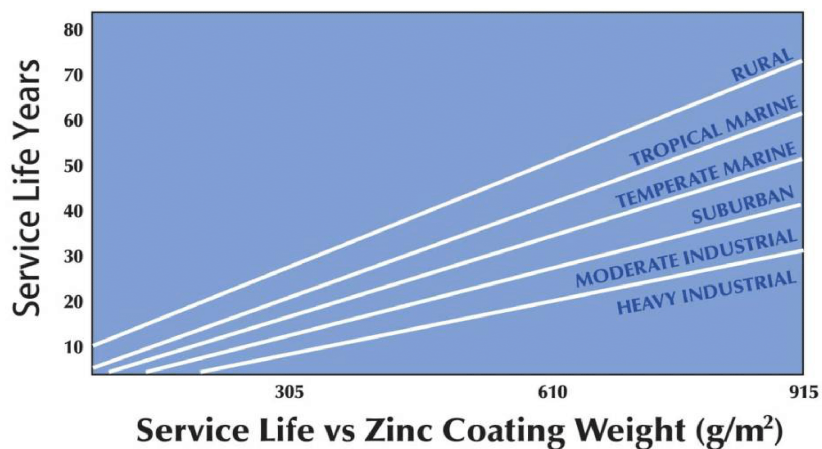
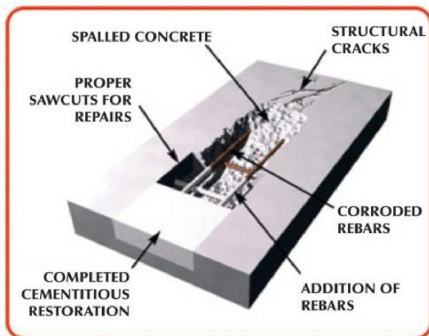
Life Cycle Cost

Let's understand the life cycle cost by using three types of coated TMT, in the same environment, at the average cost in Rupees Per Metric Ton of Steel.

	Hot Dip Galvanizing	Epoxy Coating	Painting
Year 00	15000	14000	11000
Year 05	0	0*	11000
Year 10	0	14000	11000
Year 15	0	0*	11000
Year 20	0	14000	11000
Year 25	0	0*	11000
Year 30	0	14000	11000
Year 35	0	0*	11000
Year 40	0	14000	11000
Year 45	0	0*	11000
Year 50	End of Life		
Life Cycle Cost	15000	70000	110000
		About 4.5 Times	About 7 Times

* Only if the coating is not damaged before or while concreting.

For simplicity we have not calculated inflation & other hidden costs like replacing interior appearance, addition of steel etc. The maintenance cost of Fusion Bonded Epoxy Coating & Painting is much more in the long run, while Galvanizing is virtually maintenance free.





Tests Performed on Galvanized Reinforcements

Technical studies on Galvanized Rebars - Torsteel Research Foundation in India. The tests were done to analyze the relative performance of galvanized rebars in comparison with uncoated rebars. The tests conclusively prove that in terms of corrosion protection galvanized rebars have emerged highly superior to uncoated steel. At the same time the bond strength and bending properties remained unaffected.

Tests by IIT Mumbai

The investigations clearly showed that the galvanized and galvanized chromate reinforcement resulted in a several fold increase in the corrosion resistance capability compared to the plain black steel. It was also observed that an improvement in the grade of concrete has improve the corrosion resistance significantly.

Central Electrochemical Research Institute (CERI) in Karaikudi, India. Galvanized and galvanized chromated performed better than black in every set of test and under all conditions.

Galvanized and Chromated performed better in most environments Galvanized specimens seem to perform best in rich (M30) concrete with no chloride contamination while galvanized and chromated performed best in lean (M15) and in contaminated (1% Chloride) concrete.

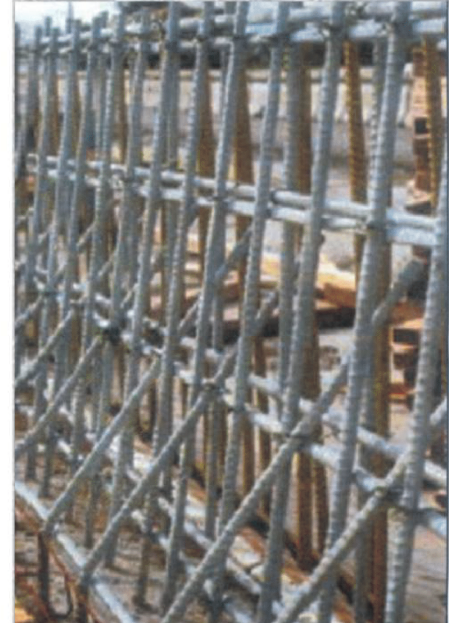
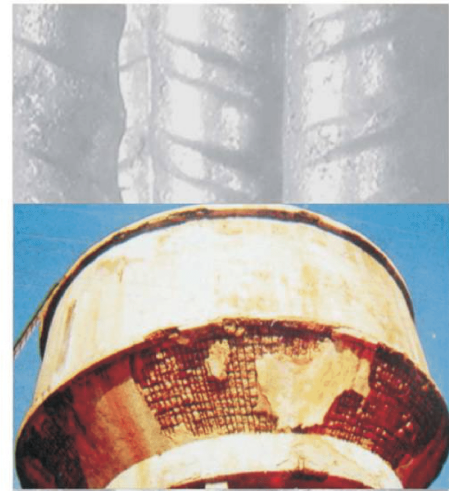
CINVESTAV Final Report

The study shows that zinc can be used to protect reinforcing bars from corrosion in tropical marine environments by using local materials and also that this application can be monitored using local resources.

Source & for further details : www.galrebars.com
Hindustan Zinc Ltd.

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