Hot Dip Galvanizing (HDG) Plant

Hot-Dip galvanization, Corrosion Prevention, Metal plating, Coatings, Electrogalvanization, Zinc


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Galvanized coatings are applied to iron and steel primarily to provide protection against corrosion of the basis metal. Hot Dip Galvanizing is a process in which an adherent, protective coating of zinc and zinc compounds is developed on the surfaces of iron and steel products by immersing them in a bath of molten zinc. The protective coatings usually consist of several layers.
Those closest to the basis metal are composed of iron-zinc compounds these in turn are covered by an outer layer consisting almost entirely of zinc.

The complex structure of layers that comprise a galvanized coating varies greatly in chemical composition and physical and mechanical properties, being affected by chemical activity, diffusion, and subsequent cooling.
Small differences in coating composition, bath temperature, time of immersion, and rate of cooling or subsequent reheating can result in significant changes in the appearance and properties of the coating.

Hot dip galvanized coatings are produced on a variety of steel mill products, using fully mechanized and mass production methods.
Hot dip galvanized zinc coatings have their longest life expectancy in rural areas where sulfur dioxide and other industrial pollutant concentrations are low. These coatings also give satisfactory service in most marine environments. Although the life expectancy of hot dip galvanized coatings in more severe industrial environments is not as long as for less aggressive environments,
the coatings are still used extensively in those exposures, because in general, no more effective and economical method of protection is available. India's steel pipe industry is primarily engaged in manufacturing seamless or welded steel pipes or tubes or ferrous metal pipes or tube fittings. Steel pipes are primarily of two types, seamless and welded.
Other specific types extend the basic classification to include: (a) cast iron pipes, (b) stainless steel tubes, (c) ERW (electric resistance welding) steel pipes, (d) galvanized pipes, (e) API pipes, (f) SAW (submerged arc welded) pipes, and (g) spun pipes.

Welded steel pipes include a wide variety of pipes and tubes. Welded pipes are normally manufactured from HR and CR coils by ERW.
Galvanized pipes are zinc-coated to prevent corrosion. ERW tubes are meant for high performance applications, such as trusses and columns in housing, industrial and construction sectors, chassis for two-wheelers and light commercial vehicles, propeller shafts and axles. According to observation of engineering goods statistics, we can conclude about the essentiality of the galvanizing process as company's work or on the job work base.
It can be concluded that galvanization process is partially proportional to the increase of demand of the engineering goods or most or ancillary item production the steel base.

It can be concluded that demand of galvanizing industries will be increased 10% per annum. On that base it can be predicted that there is good scope for galvanizing industries as job work base.
Important use of hot dip galvanised steel is in immersed condition. The life of galvanised coating on steel in structures which are permanently immersed in liquid depends on the corrosion properties of the liquid and the thickness of galvanising coating used in the structure. Hot dip galvanising can be effectively used for protecting diesel and petrol tanks & for storing honey and fish before canning.

Hot dip galvanised coating of about 100 mm thickness
provides 10 years of maintenance free life if it is totally immersed in sea water. Magnesium chloride present in sea water acts as an inhibitor to prevent the aggressive attack from sodium chloride.

When immersed in water, hot dip galvanising steel's ability to form a protective scale depends on three factors namely dissolved oxygen, calcium content and the alkalinity of water. These factors determine the rate at which the zinc coating is consumed.
Benefits of Hot Dip Galvanizing

• **Lower first cost:** Hot dip galvanizing generally has the lowest first cost when compared to other commonly specified comparable protective coatings for steel. The application cost of labour intensive coatings such as painting has risen far more than the cost of factory applied hot dip galvanizing.

• **Lower maintenance / lower long term cost:** Even in cases where the initial cost of hot dip galvanizing is higher than alternative coatings, galvanizing is invariably more cost effective, due to lower maintenance costs during a longer service life. Maintenance is even more costly when structures are located in remote areas. Maintenance programmes also invariably have a negative impact on productivity.
• **Long life:** The life expectancy of hot dip galvanized coatings on structural members is in excess of 50 years in most rural environments, and between 10 to 30 years in most corrosive urban and coastal environments.

• **Surface preparation:** Immersion in acid ensures uniform cleaning of the steel surfaces, in contrast organic coatings must be applied on abrasive blast cleaned surfaces (generally to ISO 8501 – 1 to SA 2) and verified by third party inspection. Additionally, the application of organic coatings is limited in terms of prevailing ambient temperature and relative humidity. This adds to the cost of applying a heavy duty paint system.

• In hot dip galvanizing, all surfaces receive equally goad coatings.
• **Speed of coating application:** A full protective coating can be applied in minutes, a comparable multicoat paint system, may require up to a week. The effective application of a hot dip galvanized coating is not influenced by weather conditions.

• **Reliability:** Hot dip galvanizing is required to conform to the ISO 1461 specification. The coating thicknesses specified are related to steel thickness. Coating life is reliable and predictable.

• **Ease of Inspection:** Hot dip galvanized coatings are readily assessed visually. Simple non-destructive testing methods are used to determine coating thickness. Inspection of organic coatings is necessary after surface preparation and each stage of coating application thereafter.
Few Indian Major Players are as under

- A P L Apollo Tubes Ltd.
- Apollo Metalex Pvt. Ltd.
- Arun Pipes Ltd.
- Electrometal Ltd.
- J T L Infra Ltd.
- Kadevi Industries Ltd.
- Precimax Engineers Ltd.
- Premier Tubes Ltd.
- Samana Steels Ltd.
- Sarigam Seamless Pipes Ltd.
- Shilpa Steel & Power Ltd.
- Shri Bankey Bihari Pipes Ltd.
- Shri Lakshmi Metal Udyog Ltd.
- Steelite Engineering Ltd.
- Transasia Tubes & Inds. Ltd.
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<th><strong>Capacity</strong></th>
<th>3600 MT/Annum</th>
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<td><strong>Plant &amp; Machinery</strong></td>
<td>102 Lakhs</td>
</tr>
<tr>
<td><strong>Cost of Project</strong></td>
<td>378 Lakhs</td>
</tr>
<tr>
<td><strong>Rate of Return</strong></td>
<td>44%</td>
</tr>
<tr>
<td><strong>Break Even Point</strong></td>
<td>54%</td>
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Niir Project Consultancy Services (NPCS) can provide Detailed Project Report on Hot Dip Galvanizing Plant

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