

# Corrosion protection





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# Blast & paint

## Capabilities

We are recognised as a leading provider of abrasive blasting and protective coating services and boasts one of the largest blasting chambers in Western Australia.

The blasting chamber measures an impressive 30 [m] x 6 [m] x 6 [m] and can accommodate single structures weighing up to 18 tonnes. The paint shop building has an internal floor area of some 6,000 square metres, meaning we have the capability to handle jobs of all shapes and sizes.

We also employ no less than four 10-tonne gantry cranes and two five-tonne semi-portable cranes. We also have an on-site weighbridge.

The purpose-built site was designed to ensure that even double trailers have ease of manoeuvrability.

We have been setting the industry standard in abrasive blasting and protective coating services since 1981 and have built an enviable reputation based on quality due to stringently enforced quality assurance process and methodical training of all staff.

This commitment, combined with practical knowledge and extensive experience, is why we boast so many long-term clients and strong relationships within a wide range of industries – from marine and construction to engineering and mining.

The depth of technical knowledge and experience of our long-standing Blast & Paint team members is significant. This technical knowledge, combined with strong relationships with paint manufacturers, enables us to service large and complex projects.

Major projects include the Perth landmarks of the Perth Convention and Exhibition Centre and the Swan Bell Tower, as well as large infrastructure projects in the North West of Western Australia such as the Dampier Port Upgrade, Comalco Alumina Refinery, Cape Lambert and Telfer.

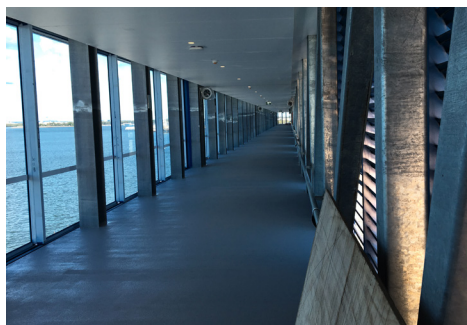
## More recent projects

### Metro area

- Yanchep Rail Extension
- Thornlie-Cockburn Link
- Kwinana Waste to Energy Project
- Roe Highway Logistics Park
- Kwinana Freeway VMS Gantries
- Karrinyup Shopping Centre

### North-west

- Waitsia Gas Project
- Gudai-Darri (Koodaideri) NPI
- Brockman 1 NPI





# Galvanizing

Investing in the latest equipment and working to world best practice systems ensures we are a leading supplier for a wide range of infrastructure projects – from light commercial industry through to large-scale mining and oil & gas projects.

Our state-of-the-art galvanizing plant in Narangba Queensland houses the state’s largest facility.

Our Western Australian plant at Kewdale is the largest Hot Dip Galvanizing facility in Australia and represents a level of investment and commitment to our industry not previously seen in Australia.

The European-designed kettles, combustion systems and automated mechanical handling systems are not only the most technologically advanced, providing uniformity of surface quality and increased safety and environmental control in the production process, they enable us to vertically hot dip galvanise increasingly larger items, resulting in a smoother finish and a reduction in the potential for hand injury.

Our long-standing team of executive, technical and operational staff stretching from coast to coast has a combined knowledge base and technical ability totalling many decades – a cumulative wealth of experience that empowers us to better service our extensive customer base.

In Western Australia, our Galvanizing and Blasting capabilities combine individual skills and accumulated knowledge to achieve a synergistic approach to problem solving and provide the ultimate integrated anti-corrosion services in the one location.

All of this works to ensure our customers are getting the best advice, superior quality and efficient turn-around times.

Dimensions & capacity

	Wa zinc kettle	Queensland zinc kettle
Main plant (L x W x D)	15.0 x 2.2 x 3.6 [m]	13.0 x 1.8 x 3.0 [m]
Spin plant (L x W x D)	4.0 x 1.5 x 2.4 [m]	3.0 x 1.2 x 1.5 [m]
Max lifting capacity	15 [tonnes]	16 [tonnes]
Max length double dip	22.5 [metres]	20 [metres]

Please note: Dipping capacity is slightly less than the zinc bath size. Items larger than zinc bath capacity may be double-end dipped.

Why galvanize?

- Low cost
- High quality
- Low maintenance
- Long life
- Speed of application
- Reliability – durable and predictable performance
- Toughness – resistance to abrasion and mechanical damage
- Complete coverage
- Faster construction – Galvanised steel is ready for use.





# Design for galvanizing

There are some very important factors to be considered at the design stage when a job is to be hot dip galvanised.

Factors such as venting and draining of hollow members, overall physical size, purpose-designed lifting points, steel composition and combinations of differing section sizes are critical to the ultimate success of the job.

Our galvanizing technical team is available to work with designers and fabricators and provide galvanizing advice in the design stage to ensure the highest quality finish, minimum costs and faster delivery. Below are some key things to consider in the design stage before fabrication and galvanizing.

For more detailed information visit the Galvanisers' Association of Australia website: [www.gaa.com.au](http://www.gaa.com.au)

**Materials**

All ferrous materials can be galvanised. Mild and low alloy steels and iron and steel castings are successfully galvanised, as are steel fabrications incorporating stainless steel parts and fittings.

**Size and shape**

Our large galvanizing baths and lifting equipment enable galvanizing of a wide variety of component shapes and sizes. Larger structures can be galvanised by designing in modules or can be double-end dipped.

We recommend that you speak to our technical team about all large-structure galvanizing to ensure the design can be accommodated.



**Venting, filling and draining**

Hollow structures incorporating closed sections must have provision for venting during the galvanizing process for safety reasons. Correct venting also ensures the entire internal surface is properly galvanised.

Tanks and closed vessels need to allow pickle acids, fluxes and molten zinc to enter, fill and flow upwards through an opening at the highest point, so air is not trapped in the vessel and to allow complete drainage of the interior.

A hole as large as the design will allow should be provided opposite a vent hole of equal dimensions to facilitate draining.

**Distortion**

Galvanizing is unlikely to cause distortion, providing the design and fabrication recommendations are adhered to.

The galvanizing reaction between zinc and steel takes place in liquid zinc, at approximately 445-460 degrees Celsius.

Steel invariably contains internal stresses and at this temperature hot dip galvanizing can release or vary the stress so distortion is possible.

However, stresses in steel are more commonly caused during fabrication. Welding can result in extreme temperature differences within small areas resulting in residual stresses. To minimise the introduction of stresses during welding, components should not be forced, sprung or restrained during welding; different thicknesses of steel should avoid being joined together; and welded assemblies should be aligned so that the stresses are balanced.

Large, unsupported flat sheets may tend to buckle, so stiffeners should be included in the design and frames around flat panels, whether solid or welded mesh, should be galvanised separately.

Distortion can be minimised for fabricated products, such as girders or lattice beams with top or bottom chords of different size, by rapid immersion in a single dip.

**Weld areas**

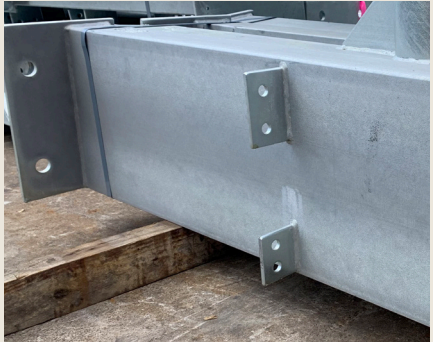
All welded sections of fabricated pipe work should be interconnected with open tee or mitre joints, or closed sections should be vented.

Fabricated columns and strengthening gussets fabricated from channel sections should have corners cropped to allow free flow of zinc during the galvanizing process.

**Lifting points**

The size, location and design of lifting points can be crucial in minimising the possibility of distortion on heavy or complex structures.

Ensure lifting points are considered in the design stage. Our galvanizing technical services team can provide advice on the best location and strength of lifting points.



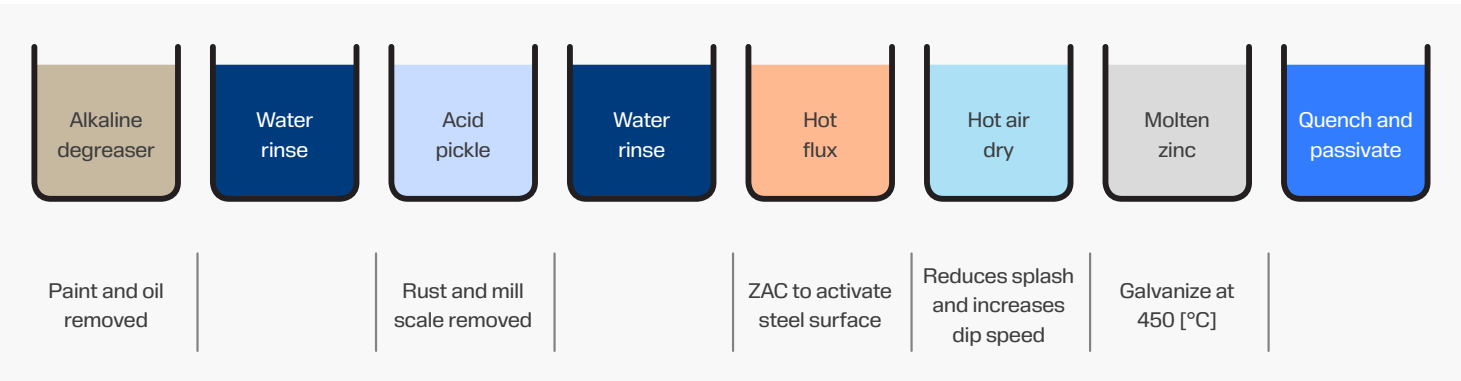


# Galvanizing process

## Galvanizing provides outstanding corrosion performance in a wide variety of environments

The galvanizing process creates a durable, abrasion-resistant coating of metallic zinc and zinc-iron alloy layers, which are bonded metallurgically to the steel and completely covers the item providing a number of significant advantages.

It provides outstanding toughness, resistance to mechanical damage, slows corrosion to about one sixteenth that of steel and a standard minimum coating thickness is applied even to sharp corners to provide a sound and continuous coating.



### 1. Surface Preparation

Preparation is vital to high-quality galvanizing. Fero Galv and Fero Blast work together to ensure the preparation for galvanizing is perfect. Epoxies, powder coating and other paints must be removed by mechanical cleaning such as shot or grit blasting.

### 2. Caustic Cleaning

The first cleaning step is caustic cleaning or degreasing in a hot alkali solution to remove contaminates like dirt, grease, residual paint and oil from the metal surface prior to the galvanizing process.

### 3. Acid Pickling

Scale, rust and other surface contaminates are removed from the steel by acid cleaning or pickling in hydrochloric acids followed by rinsing.

### 4. Fluxing

The acid-cleaned steel is then immersed in a flux solution of zinc ammonium chloride and wetting agents to active the pickled and rinsed articles to ensure a fast and consistent reaction with the molten zinc. This process also heats the steel to between 60-80 degrees Celsius to prepare it for the high temperatures of hot-dipping in the zinc bath.

### 5. Hot-dip galvanizing

The molten zinc is heated to about 450 degrees Celsius. When the steel is immersed in the galvanizing bath at a controlled rate, the steel surface is coated by the molten zinc resulting in a reaction which forms of a series of zinc-alloy layers. This process takes about 10-15 mins, longer for larger items, and the resulting zinc-alloy layers are actually harder than the base steel. As the item is removed, again at a controlled rate, the molten zinc solidifies to form the outer zinc coating.

### 6. Quenching

After galvanizing, the steelwork is immediately dipped in a quench solution which contains additives to prevent the formation of wet storage staining or “white rust”. This process also cools the steelwork in order to facilitate the efficient movement of steel products. Some products can be air-cooled if required.

### 7. Fettling

Any remaining excess drips and dags are removed, either by hand or by mechanical means.

### 8. Galvanizing small components (spinning)

Small components are loaded into baskets for galvanizing. Once removed from the molten zinc the spinning baskets are centrifuge spun to remove excess zinc.

### Coating thickness

The total zinc coating mass or coating thickness of galvanized steel depends mainly on the mass and thickness of the steel being galvanised.

Requirements for coating thickness & mass for articles that are not centrifuged

Article thickness [mm]	LCT [µm]	ACT [µm]	ACM [g/m2]
≤ 1.5	35	45	320
> 1.5 to ≤ 3	45	55	390
> 3 to ≤ 6	55	70	500
> 6	70	85	600
Requirements for coating thickness & mass for articles that are centrifuged			
< 8	25	35	250
≥ 8	40	55	390

### Other factors influencing coating thickness include

#### Surface condition:

The process of grit blasting steel before galvanizing increases the surface area and results in greater zinc-alloy growth during galvanizing, producing a thicker coating, but also a rougher and potentially more brittle finish of the surface.

#### Composition of steel:

Silicon and phosphorous content can have a major effect on the structure, appearance and properties of galvanised coatings.

#### Silicon:

Certain levels of silicon content will result in excessively thick galvanised coatings. Steels with silicon content in the range of 0.04-0.14 per cent result in excessive growth of zinc-iron alloys on steel surfaces and will generally have a dull grey appearance. Growth rates are less for steels containing between 0.15 and 0.22 per cent and increase again with greater silicon levels.

#### Phosphorous:

The presence of phosphorous above 0.5 per cent produces an increase in the coating growth. When present in combination with silicon, excessively thick galvanised coatings can be produced.

### Technical services

Our reputation as a quality-assured company is proven in the galvanizing and Blast & Paint divisions in Western Australia and Queensland.

#### Galvanizing

The ability to provide Inspection & Test Plans (ITPs) on project work is paramount in assuring top-class products. Quality Assurance reports on galvanizing tasks to Australian Standards can be produced, along with a Letter of Compliance, also to Australian Standards.

Our large galvanizing baths and lifting equipment enable galvanizing of a wide variety of component shapes and sizes. Larger structures are galvanised by designing in modules or can be double-end dipped. Cranes can handle jobs up to 16 tonnes.

Galvanizing thickness is inspected to Australian Standards.

#### Blast & paint

Blasting capabilities range from small to large jobs in our massive undercover facility. Inspection & test plans are supplied for all project work for blast and paint procedures, from receiving the job through to completion.

Quality assurance reports are produced on a daily basis. There are inspections for surface preparation, paint batch numbers, dry film thickness (DFT) and ambient conditions.

We offer project management, providing service all the way through to ensuring the job is finished on time and to the quality of customers' specifications.

We can advise on the size of fabricated projects and the ability to tackle large tasks. As with galvanizing, we are quality assured to the ISO 9001:2015. For information on your specific requirements please contact our sales team.



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