

STEEL Fact File

An information source for design professionals

FF1 – Galvanised steel essentials

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Fast Facts

- Manufactured by continuous hot dip galvanising to apply zinc coating to a steel base
- Relies mainly on sacrificial protection which ceases when the zinc is consumed
- Widely used in current form since 1936
- Available in a range of coating mass levels
- Can be used unpainted, prepainted or field painted
- Application of a primer required for effective paint adhesion
- Thermal performance of unpainted product deteriorates when weathered
- Preferred product solution for cladding in intensive animal farming applications



Galvanised steel purlins



The distinctive "spangle" pattern of galvanised steel

Behind the Facts

Q. What is continuous hot dip galvanised steel?

A. Galvanised steel is mild steel with a hot dipped coating of almost pure zinc. The addition of a small amount of antimony provides its characteristic spangled appearance.

Continuously hot dipped galvanised steel is used extensively in the automotive, whitegoods and agricultural industries as well as in the building sector.

Q. How does the zinc coating work in protecting the steel substrate?

A. The zinc coating protects the steel in two ways, by acting as both a barrier coating and as a sacrificial coating. The overall zinc coating corrodes slower than the steel to which it is applied, so it acts as a barrier to the steel surface. Additionally where the steel is exposed to the air (ie at cut edges, scratches etc), the zinc coating will also sacrifice itself (give itself up) to prevent the steel from rusting. Over time, the zinc coating will be consumed, leaving the steel unprotected – and that is when red rust begins.



Q How is continuously hot dip galvanised different to batch galvanised product?

A. Batch galvanised coating uses pure zinc, and in this process, a very thick iron/zinc compound layer forms in the



Galvanized steel purlins

coating. The result is a coating that is not ductile. Batch galvanising is predominantly used for protecting pre-fabricated steel articles.

Q. What is the expected service life of galvanised steel?

A. The life of galvanised steel will principally depend on the amount of zinc coating applied to the steel (referred to as its coating class or coating mass) and the environmental factors to which the galvanised steel is exposed.

A reliable guiding principle is that in any given environment, if you double the amount of zinc coating (ie double the coating class) you will double the life of the product. The converse is also true. If you halve the amount of zinc coating (ie half the coating class) you will halve the life of the product.

Q. What zinc coating (class) is recommended for roofing and walling?

A. Galvanized steel is produced in a range of coating classes – traditionally the most common coating class for roofing and walling in the western world has been Z275 – based on considerations of cost, performance

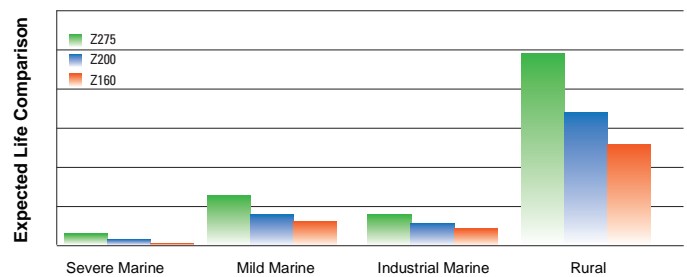
and aesthetics. As referred to above in ‘expected service life’, a galvanised zinc coating of Z160 for roofing and walling would severely compromise its performance.



Galvanized steel decking

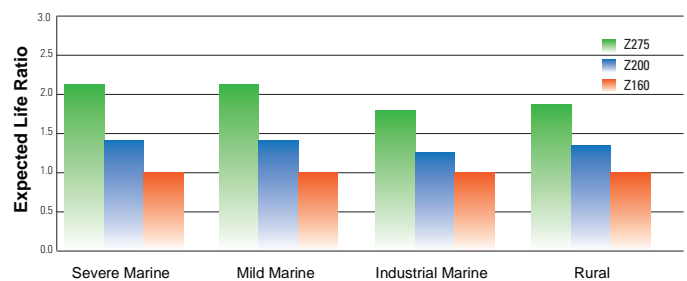
Resistance to Atmospheric Corrosion

Galvanized Steel: Expected Life Comparison of Z275, Z200 and Z160 Coating Mass



The coating life expectancy of Z275 galvanised steel compared to both Z200 galvanised and Z160 galvanised steel after exposure at East Coast Australia test sites, ranging from rural to severe marine.

Galvanized Steel: Expected Life Ratio Comparison of Z275, Z200 and Z160 Coating Mass



This graph shows the relative differences in expected life of Z275, Z200 and Z160 galvanised steel.

- Z275 galvanised steel has at least 1.8 times the life of Z160 galvanised steel and
- Z200 galvanised steel has at least 1.3 times the life of Z160 galvanised steel

A comparison across the various test sites shows that Z275 galvanised steel is expected to last close to twice (2x) as long as Z160 galvanised steel and close to one third (1/3rd) longer than a Z200 galvanised steel.

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