



A different shade of grey

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Don't be alarmed at the new shade of grey. In the past, during the Hot Dip Galvanising (HDG) process, products were dipped into a solution that would give a lustre finish. As part of environmental improvements in many countries the use of this solution is being eliminated in this process. Although retaining the same physical properties, the finish on the products is not as bright as it used to be.

"All galvanized coatings change over time to a matt grey colour as the zinc reacts with the environment and initial inconsistencies in the appearance of the coating will mute and often disappear altogether." – Galvanizers Association of Australia.

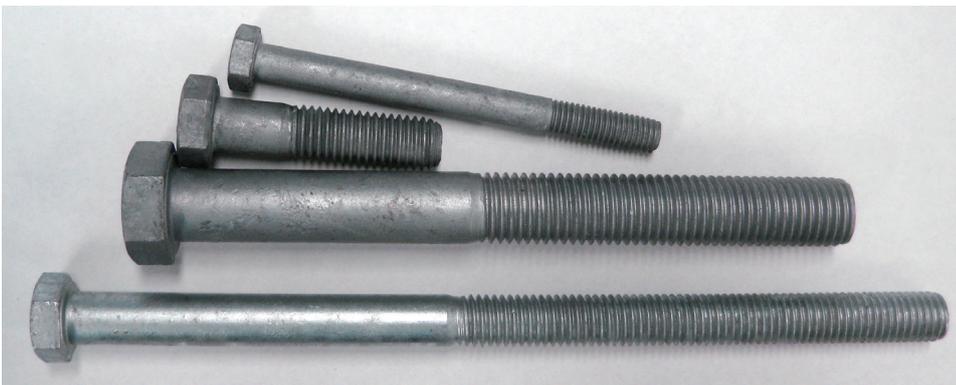
It is important to note that "the brightness of the coating has no effect on its performance in service, the only criteria of corrosion resistance is its coating mass – the heavier the coating the longer its life." - Ref: *Technical Bulletin No. 2*, Galvanizers Association of Australia.

Continued ...

Figure 1: Older HDG process with more lustrous finish on the left vs new method with matt finish on the right.



Figure 2: Bottom Bolt with the previous shinier finish compared to the current darker and flatter look on the top 3 bolts.



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Other factors that influence appearance

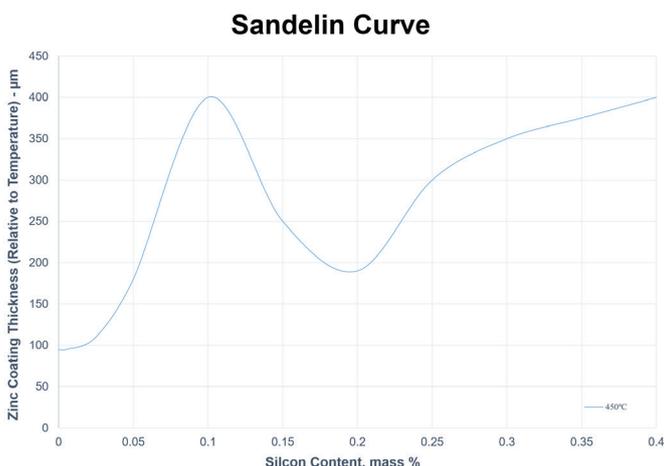
Many factors attribute to the appearance of HDG products and can include the following;

1. Steel quality

- II. The condition of the steel's surface contributes to the initial appearance of galvanizing, with the surface of the galvanized coating typically matching or amplifying the surface profile of the steel.
- I. Abrasive blasting the steel surface prior to galvanizing will increase the steel's surface area and usually produce a thicker coating. This may change the appearance of the galvanized article and/or increase the roughness of the finished surface.

2. Steel chemistry

Silicon (Si) and phosphorus (P) content, in the steel can affect the thickness of the coating by prolonging the reaction between iron and molten zinc while the steel is submerged. The Sandelin Curve below shows the effects of Silicon content on Zinc Coating Mass. If the steel is reactive, the shiny pure zinc layer at the surface of the coating can be partly or fully consumed, leaving duller grey zinc-iron alloys at the surface.



3. Design and fabrication

- I. Adequate venting and draining along with minimising thickness variations where possible are important for a consistent initial appearance.
- II. Weld spatter remaining after fabrication can be visible in the galvanized coating.
- III. Anti-spatter sprays that aren't suitable for galvanizing and haven't been cleaned off can lead to bare spots in the galvanized coating.
- IV. Porosity in the welds leading to bare spots are likely to end up rusting.
- V. Rust bleeding can result from inadequate gaps between faces during fabrication.
- VI. Poor fabrication practices can lead to rough coatings.
- VII. Differing appearance from joining steel of different chemistry can occur.
- VIII. Different steel chemistry in one member can cause a rougher coating next to a smoother finish.
- IX. Steel with different chemistry welded together can cause half of the section to be shiny and the other half dull.

4. The way the steel is produced

e.g. whether hot rolled or cold rolled.

5. Cooling Rate

The longer a steel member is kept at a higher temperature, the duller the appearance of the zinc-iron alloy layers. Members cooled relatively quicker tend to retain a shiny pure zinc layer. Areas of the fabrication holding heat for longer are more likely to develop a duller coating

6. Thermal Cutting

Cutting at high temperatures, including with flame, laser and plasma, can affect the appearance and thickness of galvanizing. The high temperature of the cutting procedure consumes the reactive silicon and phosphorous from the steel's surface, resulting in a thinner and sometimes brighter galvanized coating. Thermally cut edges should be ground back before galvanizing to remove the surface steel and achieve a uniform coating.

REFERENCE

1. Galvanizers Association of Australia, *FACTORS THAT INFLUENCE APPEARANCE*, www.gaa.com.au