

Galvafacts

Variations in Surface Colour

Dark grey or light grey - it's all galvanized.

Protection is equal - and often better - with dark grey coatings than with light grey.

When rimmed or aluminium killed steels are hot dip galvanized, compact zinc-iron alloy layers are formed and covered by zinc, which has a light bluish grey metallic lustre. In some cases the zinc can form randomly orientated crystals to give a 'spangle' finish but this is not a sign of either good or poor hot dip galvanizing, nor does spangle affect the corrosion resistance of the zinc coating.

Silicon, which is sometimes added to steel as a deoxidant during its production, speeds up the reaction between the steel and molten zinc. When the steel part is removed from the galvanizing bath but still remains hot, the reaction may continue and convert all or part of the surface zinc layers to zinc-iron alloys.

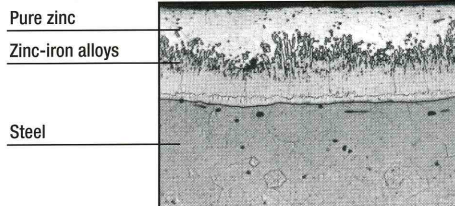
Zinc-iron alloys are dark-grey compared with the light grey of zinc and are more abrasion resistant.

Usually zinc-iron alloy coatings form more thickly and hence give longer life than the coatings on rimmed or aluminium killed steels. The zinc-iron alloys in any case have at least as good corrosion resistance as zinc, thickness for thickness and can have better intrinsic corrosion resistance in acid industrial environments. These thick coatings can be more susceptible to mechanical damage particularly if handled roughly, and appropriate care must be taken.

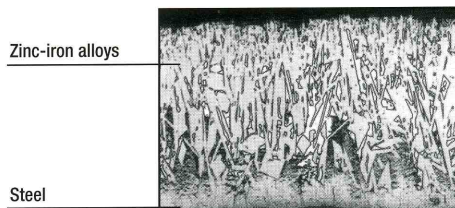
The dark grey coating surface may develop iron oxide staining on atmospheric exposure, even in mild conditions when moist. This is only a surface effect and does not develop into nodular or flaking rust; the galvanized coating remains intact to protect the steel.



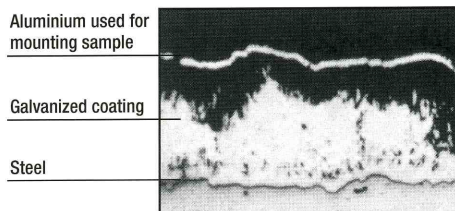
A silicon containing steel (centre) welded to a rimmed or aluminium killed steel (right and left) combines dark and light grey galvanizing.



Section through galvanized coating showing pure zinc and zinc-iron alloy layers which are the normal coating developments on rimmed or aluminium killed steels.



Section through galvanized coating on silicon containing steel; the whole coating is zinc-iron alloy which appears grey.



Section through brown stained galvanized coating (shown above). The galvanized coating remains substantially intact under the brown stain. The uncoloured material close to the galvanized surface is merely aluminium sheet used to assist preparation of the section to show the features of the coating more clearly.



Mottled appearance when light grey pure zinc is surrounded by dark grey zinc-iron alloys developed, for example where reaction is greater at grain boundaries and locally allows the full thickness of coating to convert to zinc-iron alloy.



Over thirty years exposure to a mild urban atmosphere - but the steel is fully protected as is shown in the micro-section on the left.