



## Advisory Note

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### Abrasion Resistance of After Fabrication Galvanized Coatings

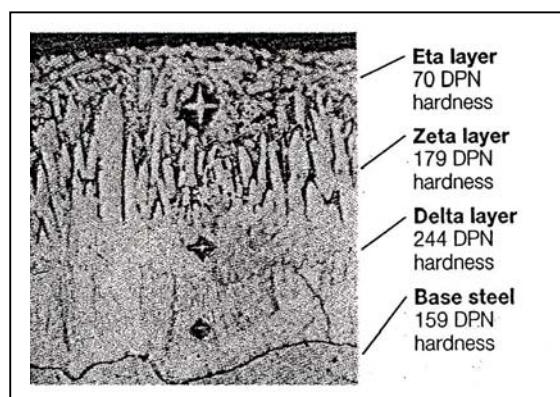
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The toughness of a galvanized coating makes it particularly suitable in situations where abrasion could be a problem either in assembly or in use. Conveyor systems, including buckets for quarried material and hoppers for coal wagons, are well suited. Galvanizing also limits the damage when spanners or other tools slip or when nuts turn on a galvanized surface during tightening. While toughness of the coating does greatly simplify the handling of large, heavy sections and reduces any remedial measures that are necessary. Even where basis steel is exposed the sacrificial corrosion protection properties of galvanizing coating will protect these exposed areas and prevent unsightly and damaging rust.

Abrasion tests show that if abrasion resistance for epoxy zinc-rich primers and most other conventional paints is taken as unity, polystyrene zinc-rich primers are 5 times better, zinc silicate primers 50 times better and hot-dip galvanized steel 400 times better. The comparison is made by comparing the weight of silicon carbide (in g) to erase 100 micrometres of coating using a Taber Abraser.

Epoxy zinc-rich primer	0.05-0.06
Polystyrene zinc-rich primer	0.2-0.3
Zinc silicate primer	2-3
Galvanized steel product	20-25

The section through the galvanized coating (Fig. 1) shows the various iron/zinc alloys growing out of the steel base and covered by an outer layer of pure zinc in most galvanized coatings. The galvanized coating can be likened to a buffer stop. The soft outer zinc absorbs much of the shock of an initial impact, and then the underlying iron/zinc alloys, which are harder than the mild steel base, prevent or greatly reduce the penetration of the coating and exposure of bare steel.



**Figure 1** Hardness of each layer in a galvanized coating.

#### References:

- Zinc Handbook, International Lead Zinc Research Organization, 1991
- After-Fabrication Hot Dip Galvanizing – A Practical Reference, Galvanizers Association of Australia, 1999

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