

Zinc coatings

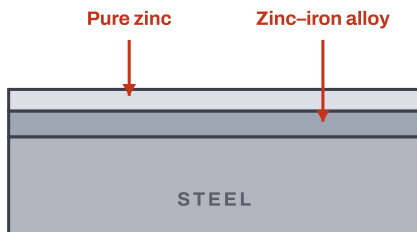
Three ways to put zinc on steel — and why the difference matters.

All three protect steel the same way: zinc corrodes in preference to the steel underneath, so the coating is sacrificed first. What separates them is how the zinc is bonded to the steel and how much of it there is — and that decides how long the protection lasts.

HDG

Hot dip galvanising

Steel is dipped in molten zinc, which reacts with the iron to form a bonded coating.



HOW IT'S DONE

1. Degrease, acid pickle and flux to bare, clean steel.
2. Immerse in molten zinc at around 450 °C.
3. Zinc reacts with the iron to grow zinc-iron alloy layers, topped by a layer of pure zinc as the part is withdrawn.
4. Cool and inspect.

BOND

Metallurgical — alloyed into the steel

TYPICAL THICKNESS

45–85 µm (AS/NZS 4680, by section)

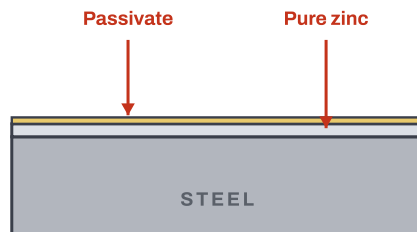
STANDARD

AS/NZS 4680 · AS/NZS 1214 (fasteners)

ZP / ZY

Zinc electroplating

Zinc is deposited from solution by electric current, then passivated.



HOW IT'S DONE

1. Clean and acid-activate the part.
2. Suspend in a zinc salt electrolyte and pass current — zinc deposits evenly on the surface.
3. Apply a chromate passivate: clear, blue, yellow or black.
4. Bake high-strength parts to drive off absorbed hydrogen.

BOND

Electrochemical — deposited onto the surface

TYPICAL THICKNESS

5–25 µm (8–12 µm typical on fasteners)

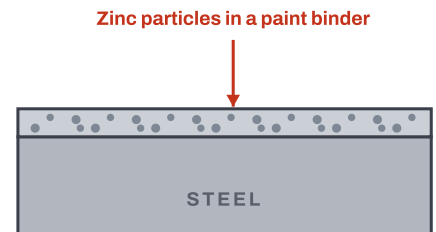
STANDARD

AS 1789 · ISO 4042

ZINC-RICH PAINT

Cold galvanising

A zinc-rich paint brushed, rolled or sprayed on. Not a true galvanising process.



HOW IT'S DONE

1. Clean back to sound, dry steel — remove rust, oil and loose material.
2. Stir the zinc-rich paint thoroughly; zinc settles fast.
3. Brush, roll or spray to the specified dry film thickness.
4. Recoat as needed once touch-dry.

BOND

Adhesive — a paint film sitting on the surface

TYPICAL THICKNESS

50–100 µm dry film, 90–95% zinc

STANDARD

Repair coating to AS/NZS 4680 Appendix

Comparison	Hot dip galvanising	Zinc electroplating	Cold galvanising
Corrosion life outdoors	Longest — decades in inland exposure	Short — indoor or sheltered use only	Moderate — as good as the paint system
Appearance	Matte grey, often spangled; rough	Bright and smooth; clear, blue, yellow or black	Flat grey; visible brush or spray texture
Effect on threads	Thick — nuts must be oversize tapped	Negligible	Will clog threads; keep off them
Damage tolerance	Alloy layers are hard and abrasion resistant	Thin and easily scratched through	Soft; re-coat when damaged
High-strength fasteners	Not used above property class 8.8	Bake after plating to relieve hydrogen	No heat or acid — no embrittlement risk
Best for	Structural steel, outdoor and marine work	Indoor fixings, appliances, general hardware	Site repairs, welds and cut ends on HDG steel