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Substrate characteristics

The hot dip galvanising process produces a durable coating of metallic zinc and zinc iron alloys bonded metallurgically to the parent (base) metal. The sacrificial zinc coating ensures that a small area of the base metal exposed through abrasion or impact is protected from corrosion by the surrounding galvanising.

All factors being equal the protection afforded by the zinc coating is roughly proportional to its thickness. The total zinc coating mass is usually affected by the mass and thickness of the steel being galvanised. Coating mass typically is in the range of 300–600g/square metre (see AS/NZ 4680 for details). The higher coating mass may only be achieved on heavier steel sections or with special grades of steel. A range of different sized items may be galvanised with the only limitation being the size of the galvanising bath. During the process the entire surface of the item is coated and may include internal areas difficult to protect by other means.

After removal from the bath of molten zinc, the coated steel is usually quenched in water or water containing a small quantity of sodium dichromate. Chromate quenching provides short term protection to the reactive zinc surface but should not be specified for galvanised steel that will subsequently be painted, as paint adhesion may be compromised. If chromate quenching is used then the surface preparation for painting should include a light abrasive blast of the surface using ilmenite or garnet to roughen the surface. Extreme care is required during blasting to avoid excessive loss of the protective zinc layer.

Duplex coatings of galvanising and a paint system may provide long term protection for steel in aggressive or corrosive environments. The galvanising provides a base that greatly increases paint life while the coating system protects the galvanising to give a synergistic effect.

Visual inspection of the galvanising is the simplest means of assessing the quality of the galvanising. Duplex systems require a high standard of finish for the galvanising as defects in the galvanised substrate will be highlighted following paint application.

Surface preparation

The levels of surface preparation specified in these specification guidelines are the minimum levels required to ensure the expected lifetime of a system is achieved. See appropriate surface preparation sheet/s for detailed preparation guidelines.

Inspection

Inspection at all stages of preparation and painting of steel structures is needed to ensure that the specified coating system has been applied in accordance with the manufacturer's specification. The extent of inspection may range from spot checks of the total system dry film thickness to a full inspection programme covering surface preparation, atmospheric conditions and measurement of the dry film thickness of each component of the coating system. Inspections are best carried out by a qualified Coatings Inspector, independent of the paint supplier and applicator.

System life

The expected lifetime of the various coating systems are expressed as short (2-5 years), medium (5-10 years) and long (10-20 years). Unless otherwise indicated it is assumed that painted areas will be cleansed by natural rainwashing.

Maintenance

Long life coating systems should always be specified for steel structures with difficult access or where there will be a limitation on the type of preparation methods that are permissible at maintenance painting. Annual inspections of the coating systems are recommended to identify breakdown or undesirable deterioration of the paint. Repairs must be carried out quickly to maintain system integrity and prevent the repair costs from escalating if system breakdown remains unchecked. Impact damage, such as chipping, must be repaired immediately with a compatible coating system. Areas not subject to regular rainwashing, such as canopy steel, soffit framing and other sheltered steel components, should be washed with freshwater at six monthly intervals to remove dirt, dust, salts and any other atmospheric contaminants. System life will be significantly reduced if regular maintenance washing of non rainwashed areas is not carried out. Most epoxy topcoat finishes are prone to early chalking in exterior environments.

Exterior new hot dipped galvanised mild steel

For specific systems for severe
exterior environments
contact Resene

Chromate quenching of galvanised items must not be specified, as this process will impair coating adhesion. Modified surface preparation standards may be required if the surface is smooth and/or glossy at the time of painting. Consult Resene for advice in this situation. If aesthetics are an important factor, see **ULT** or **MFLT** systems below.

23e 2 Exterior rainwashed areas~long term protection: epoxy finish (ELT)

Generic specification				Resene Spec No.	Resene One-Line Specification						
Substrate	Environment	Paint system	Gloss level		System life	Surface prep	Coat	Product	DFT (min)	Application	Features
Hot dipped galvanising	Exterior rain-washed	Epoxy primer High build epoxy	Gloss	23e 2.1 ^{ELT}	LT	D89.1 D89.2	1st	Armourcote 220 RA34	50	S	Fast recoat Near white epoxy
							2nd	Armourcote 512 RA407	150	S/R	
Hot dipped galvanising	Exterior rain-washed	Epoxy primer High build epoxy	Semi-gloss	23e 2.2 ^{ELT}	LT	D89.1 D89.2	1st	Armourcote 220 RA34	50	S	Fast recoat Most colours
							2nd	Armourcote 510 RA40	150	S/R	

Note 1: Specified film builds are best achieved by spray application. Roller application will require additional coats to achieve specified DFTs.

Note 2: Galvanising thicknesses must be in accordance with AS/NZS 4680 [Hot dipped (zinc) coating on fabricated ferrous articles].

Contact Resene for specification details for non rainwashed areas.

23e 2 Exterior rainwashed areas~long term protection: urethane (ULT)/metallic (MFLT) finish

Generic specification				Resene Spec No.	Resene One-Line Specification						
Substrate	Environment	Paint system	Gloss level		System life	Surface prep	Coat	Product	DFT (min)	Application	Features
Hot dipped galvanising	Exterior rain-washed	Epoxy primer High build epoxy Acrylic urethane	Gloss	23e 2.1 ^{ULT}	LT	D89.1 D89.2	1st	Armourcote 220 RA34	50	S	Fast recoat High build barrier Gloss retention
							2nd	Armourcote 510 RA40	125	S/R	
							3rd	Uracryl 403 RA56	50	S/B/R	
Hot dipped galvanising	Exterior rain-washed	Epoxy primer High build epoxy Acrylic urethane	Semi-gloss	23e 2.2 ^{ULT}	LT	D89.1 D89.2	1st	Armourcote 220 RA34	50	S	Fast recoat High build barrier Gloss retention
							2nd	Armourcote 510 RA40	125	S/R	
							3rd	Uracryl 402 RA55	50	S/B/R	
Hot dipped galvanising	Exterior rain-washed	Epoxy primer High build epoxy Acrylic epoxy	Satin metallic finish	23e 2.3 ^{MFLT}	LT	D89.1 D89.2	1st	Armourcote 220 RA34	50	S	Fast recoat High build barrier Isocyanate free
							2nd	Armourcote 510 RA40	125	S/R	
							3rd	Imperite I.F. 503 RA81 Metallic	75	S	
Hot dipped galvanising	Exterior rain-washed	Epoxy primer High build epoxy Acrylic urethane	Low sheen	23e 2.4 ^{ULT}	LT	D89.1 D89.2	1st	Armourcote 220 RA34	50	S	Fast recoat High build barrier Gloss retention
							2nd	Armourcote 510 RA40	125	S/R	
							3rd	Uracryl 404 RA59	50	S/R	

Note 1: Specified film builds are best achieved by spray application. Brush/roller application will require additional coats to achieve specified DFTs.

Note 2: Galvanising thicknesses must be in accordance with AS/NZS 4680 [Hot dipped (zinc) coating on fabricated ferrous articles].

Note 3: Use Resene Armourcote 515HS (see [Data Sheet RA404A](#)) in place of Resene Armourcote 510 (see [Data Sheet RA40](#)) if a fast dry epoxy intermediate coat is required.

Note 4: Use Resene Imperite I.F. 503 (see [Data Sheet RA81](#)) in place of Resene Uracryl 403 (see [Data Sheet RA56](#)) if an isocyanate free gloss topcoat is required (some gloss retention will be sacrificed).

Contact Resene for specification details for non rainwashed areas.

Key: B = Brush ELT = Epoxy finish long term protection LT = Long term (10-20 years) MFLT = Metallic finish long term protection R = Roller
S = Spray ULT = Urethane finish long term protection

If in doubt about any aspect of your specification please contact Resene.