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## Substrate characteristics

Mild steel, for its strength to weight ratio and low cost, is one of the most widely used construction materials. However unprotected steel readily rusts in exterior environments and must be painted with an appropriate coating system to prevent corrosion and to provide it with a decorative appearance. The rate of corrosion is primarily a function of the environment in which the steel structure is located. Both macro and micro climatic features need to be considered when designing a protective coating system. Many areas of Australasia may be classified as having high rates of corrosion for unpainted steel in exterior locations, due to salt-laden prevailing winds and high humidity. Micro climatic effects, such as protection of surfaces from direct rainwashing, prolonged times of dampness and/or chemical fallout may often outweigh the macro climate and result in increased corrosion rates in these areas and subsequent early failure of the coating system. Regular freshwater washing of sheltered areas to remove accumulated salts, dirt and other deposits is recommended to avert early failure. Alternatively, increased film builds should be specified for areas where access for washing is not possible or practical.

## Design

Careful consideration must always be given at the early design stages to prevent corrosion problems from occurring. Good design may prevent corrosion by avoiding unwashed areas, eliminating ledges, crevices or intermittent joints. Hollow sections must be hermetically sealed. Drainage holes must be included for structural members, such as angles, channels and universal sections. The radius of edges and corners should be a minimum of 1.5mm. Welded joints should be arranged to ensure clean uninterrupted lines. Continuous welds are preferable to intermittent welds. Intermittent welds must not be used in aggressive environments.

## Surface preparation

The levels of surface preparation specified in these specification guidelines are the minimum levels required to ensure that the expected lifetime of a system is achieved. For certain priming systems, such as inorganic zinc silicate primers, abrasive blast cleaning is the only possible surface preparation method. As a general rule, increasing the standard of preparation will increase the service life of the coating system. Surface preparation must include the removal of soluble salts prior to the commencement of each day's painting. 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 lifetimes of the various coating systems are expressed as short (2-5 years), medium (5-10 years) and long (10-20 years). Short, medium and long term protection are to the time to first maintenance and, unless otherwise indicated, it is assumed that painted areas will be cleansed by 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 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

## Exterior mild steels New ferrous metals architectural and structural

For specific systems for severe  
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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. If aesthetics are an important factor, see **UMT/ULT** or **MFMT/MFLT** systems below.

## 22e 2 Exterior rainwashed areas~medium term protection: epoxy finish (EMT)

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	
Mild steel	Exterior rain-washed	Inorganic zinc or 2K organic zinc High build epoxy	Gloss	22e 2.1 <sup>EMT</sup>	MT	D801.1 D801.8 D801.7	1st	Zincilate 11	RA21	75	S	Sacrificial
							or	ArmourZinc 120	RA22	75	S	Sacrificial
							2nd	Armourcote 512	RA407	150	S/R	Near white epoxy
Mild steel	Exterior rain-washed	Inorganic zinc or 2K organic zinc High build epoxy	Semi-gloss	22e 2.2 <sup>EMT</sup>	MT	D801.1 D801.8 D801.7	1st	Zincilate 11	RA21	75	S	Sacrificial
							or	ArmourZinc 120	RA22	75	S	Sacrificial
							2nd	Armourcote 510	RA40	150	S/R	Most colours

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

**Note 2:** Use Resene Zincilate 10 (see [Data Sheet RA20](#)) two pack inorganic zinc silicate in place of Resene Zincilate 11 (see [Data Sheet RA21](#)) if this option is preferred by the applicator/specifier.

**Note 3:** Use Resene ArmourZinc 120 (see [Data Sheet RA22](#)) if two pack organic zinc rich primer is selected.

Contact Resene for specification details for non rainwashed areas.

## 22e 2 Exterior rainwashed areas~medium term protection: urethane (UMT)/metallic finish (MFMT)

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	
Mild steel	Exterior rain-washed	Inorganic zinc or 2K organic zinc High build epoxy Acrylic urethane	Gloss	22e 2.1 <sup>UMT</sup>	MT	D801.1 D801.8 D801.7	1st	Zincilate 11	RA21	75	S	Sacrificial
							or	ArmourZinc 120	RA22	75	S	Sacrificial
							2nd	Armourcote 510	RA40	125	S/R	High build barrier
Mild steel	Exterior rain-washed	Inorganic zinc or 2K organic zinc High build epoxy Acrylic urethane	Semi-gloss	22e 2.2 <sup>UMT</sup>	MT	D801.1 D801.8 D801.7	1st	Zincilate 11	RA21	75	S	Sacrificial
							or	ArmourZinc 120	RA22	75	S	Sacrificial
							2nd	Armourcote 510	RA40	125	S/R	High build barrier
Mild steel	Exterior rain-washed	Inorganic zinc or 2K organic zinc High build epoxy Acrylic epoxy	Satin metallic finish	22e 2.3 <sup>MFMT</sup>	MT	D801.1 D801.8 D801.7	1st	Zincilate 11	RA21	75	S	Sacrificial
							or	ArmourZinc 120	RA22	75	S	Sacrificial
							2nd	Armourcote 510	RA40	125	S/R	High build barrier
Mild steel	Exterior rain-washed	Inorganic zinc or 2K organic zinc High build epoxy Acrylic urethane	Low sheen	22e 2.4 <sup>UMT</sup>	MT	D801.1 D801.8 D801.7	1st	Zincilate 11	RA21	75	S	Sacrificial
							or	ArmourZinc 120	RA22	75	S	Sacrificial
							2nd	Armourcote 510	RA40	125	S/R	High build barrier
Mild steel	Exterior rain-washed	Inorganic zinc or 2K organic zinc High build epoxy Acrylic urethane	Low sheen	22e 2.4 <sup>UMT</sup>	MT	D801.1 D801.8 D801.7	3rd	Uracyl 403	RA56	50	S/B/R	Gloss retention
							3rd	Uracyl 404	RA59	50	S/R	Gloss retention

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

**Note 2:** Use Resene Zincilate 10 (see [Data Sheet RA20](#)) two pack inorganic zinc silicate in place of Resene Zincilate 11 (see [Data Sheet RA21](#)) if this option is preferred by the applicator/specifier.

**Note 3:** Use Resene ArmourZinc 120 (see [Data Sheet RA22](#)) if two pack organic zinc rich primer is selected.

**Note 4:** 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 5:** Use Resene Imperite I.F. 503 (see [Data Sheet RA81](#)) in place of Resene Uracyl 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 EMT = Epoxy finish medium term protection MFMT = Metallic finish medium term protection MT = Medium term (5-10 years)  
R = Roller S = Spray UMT = Urethane finish medium term protection

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



