Exterior mild steels

New ferrous metals architectural and structural

For specific systems for severe exterior environments contact Resene

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

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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 rainwashed	Inorganic zinc or 2K organic zinc High build epoxy	Gloss	22e 2.1EMT	MT	D801.1 D801.8 D801.7	1st or 2nd		Zincilate 11 ArmourZinc 120 Armourcote 512	RA21 RA22 RA407	75 75 150	S S S/R	Sacrificial Sacrificial Near white epoxy
Mild steel	Exterior rainwashed	Inorganic zinc or 2K organic zinc High build epoxy	Semi-gloss	22e 2.2EMT	MT	D801.1 D801.8 D801.7	1st or 2nd		Zincilate 11 ArmourZinc 120 Armourcote 510	RA21 RA22 RA40	75 75 150	S S S/R	Sacrificial Sacrificial 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 rainwashed	Inorganic zinc or 2K organic zinc High build epoxy Acrylic urethane	Gloss	22e 2.1UMT	MT	D801.1 D801.8 D801.7	1st or 2nd 3rd		Zincilate 11 ArmourZinc 120 Armourcote 510 Uracryl 403	RA21 RA22 RA40 RA56	75 75 125 50	S S S/R S/B/R	Sacrificial Sacrificial High build barrier Gloss retention
Mild steel	Exterior rainwashed	Inorganic zinc or 2K organic zinc High build epoxy Acrylic urethane	Semi-gloss	22e 2.2UMT	MT	D801.1 D801.8 D801.7	1st or 2nd 3rd		Zincilate 11 ArmourZinc 120 Armourcote 510 Uracryl 402	RA21 RA22 RA40 RA55	75 75 125 50	S S S/R S/B/R	Sacrificial Sacrificial High build barrier Gloss retention
Mild steel	Exterior rainwashed	Inorganic zinc or 2K organic zinc High build epoxy Acrylic epoxy	Satin metallic finish	22e 2.3MFMT	MT	D801.1 D801.8 D801.7	1st or 2nd 3rd		Zincilate 11 ArmourZinc 120 Armourcote 510 Imperite I.F. 503 Metallic	RA21 RA22 RA40 RA81	75 75 125 75	S S S/R S	Sacrificial Sacrificial High build barrier Isocyanate free
Mild steel	Exterior rainwashed	Inorganic zinc or 2K organic zinc High build epoxy Acrylic urethane	Low sheen	22e 2.4UMT	MT	D801.1 D801.8 D801.7	1st or 2nd 3rd		Zincilate 11 ArmourZinc 120 Armourcote 510 Uracryl 404	RA21 RA22 RA40 RA59	75 75 125 50	S S S/R S/R	Sacrificial Sacrificial High build barrier 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 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 R = Roller EMT = Epoxy finish medium term protection S = Spray UMT = Urethane finish medium term protection MFMT = Metallic finish medium term protection MT = Medium term (5-10 years)

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

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22e 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
Mild steel	Exterior rainwashed	Inorganic zinc or 2K organic zinc High build epoxy	Gloss	22e 2.1ELT	LT	D801.1 D801.8 D801.7	1st or 2nd	Zincilate 11 ArmourZinc 120 Armourcote 512	RA21 RA22 RA407	75 75 200	S S S/R	Sacrificial Sacrificial Near white epoxy
Mild steel	Exterior rainwashed	Inorganic zinc or 2K organic zinc High build epoxy	Semi-gloss	22e 2.2ELT	LT	D801.1 D801.8 D801.7	1st or 2nd	Zincilate 11 ArmourZinc 120 Armourcote 510	RA21 RA22 RA40	75 75 200	S S S/R	Sacrificial Sacrificial 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~long term protection: urethane (ULT)/metallic finish (MFLT)

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 rainwashed	Inorganic zinc or 2K organic zinc High build epoxy Acrylic urethane	Gloss	22e 2.1ULT	LT	D801.1 D801.8 D801.7	1st or 2nd 3rd	Zincilate 11 ArmourZinc 120 Armourcote 510 Uracryl 403	RA21 RA22 RA40 RA56	75 75 200 50	S S S/R S/B/R	Sacrificial Sacrificial High build barrier Gloss retention
Mild steel	Exterior rainwashed	Inorganic zinc or 2K organic zinc High build epoxy Acrylic urethane	Semi-gloss	22e 2.2ULT	LT	D801.1 D801.8 D801.7	1st or 2nd 3rd	Zincilate 11 ArmourZinc 120 Armourcote 510 Uracryl 402	RA21 RA22 RA40 RA55	75 75 200 50	S S S/R S/B/R	Sacrificial Sacrificial High build barrier Gloss retention
Mild steel	Exterior rainwashed	Inorganic zinc or 2K organic zinc High build epoxy Acrylic epoxy	Satin metallic finish	22e 2.3MFLT	LT	D801.1 D801.8 D801.7	1st or 2nd 3rd	Zincilate 11 ArmourZinc 120 Armourcote 510 Imperite I.F. 503 Metallic	RA21 RA22 RA40 RA81	75 75 200 75	S S S/R S	Sacrificial Sacrificial High build barrier Isocyanate free
Mild steel	Exterior rainwashed	Inorganic zinc or 2K organic zinc High build epoxy Acrylic urethane	Low sheen	22e 2.4ULT	LT	D801.1 D801.8 D801.7	1st or 2nd 3rd	Zincilate 11 ArmourZinc 120 Armourcote 510 Uracryl 404	RA21 RA22 RA40 RA59	75 75 200 50	S S S/R S/R	Sacrificial Sacrificial High build barrier 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 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 S = Spray ELT = Epoxy finish long term protection ULT = Urethane finish long term protection LT = Long term (10-20 years) MFLT = Metallic finish long term protection R = Roller

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Interior mild steels

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Substrate characteristics

Corrosion rates of fully enclosed structural steel components within a building are normally low. However short-term corrosion protection is required as the fabricated steel is often left exposed to the elements before being closed in.

The required corrosion protection may be achieved by modified alkyd or epoxy resin systems containing anti-corrosive pigmentation.

In areas where decorative properties are not required, the primer in most cases may be left uncoated.

Surface preparation

See appropriate surface preparation sheet/s and clauses for detailed preparation guidelines.

22i 2 Interior mild steel~non-encased areas

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	Interior non-encased	Alkyd primer Alkyd Alkyd	Gloss	**22i 2.1^{AF}**	N/A	D801.1 D801.8 D801.5 or D801.7	1st 2nd	Armourcote 210 Armourcote 608	RA35 RA72	75 50	S S	High build Fast dry
Mild steel	Interior non-encased	Epoxy primer Acrylic urethane Acrylic urethane	Gloss	**22i 2.1^{UF}**	N/A	D801.1 D801.8 D801.5 or D801.7	1st 2nd 3rd	Armourcote 220 Uracryl 403 Uracryl 403	RA34 RA56 RA56	50 50 50	S S/B/R S/B/R	Inhibitive Brushable and abrasion resistant
Mild steel	Interior non-encased	Epoxy primer Acrylic urethane Acrylic urethane	Semi-gloss	**22i 2.2^{UF}**	N/A	D801.1 D801.8 D801.5 or D801.7	1st 2nd 3rd	Armourcote 220 Uracryl 402 Uracryl 402	RA34 RA55 RA55	50 50 50	S S/B/R S/B/R	Inhibitive Brushable and abrasion resistant
Mild steel	Interior non-encased	Epoxy primer Acrylic epoxy [Acrylic epoxy clear]	Satin metallic finish	**22i 2.3^{AEMF}**	N/A	D801.1 D801.8 D801.5 or D801.7	1st 2nd 3rd	Armourcote 220 Imperite I.F. 503 Metallic Imperite I.F. 502 Clear	RA34 RA81 RA82	50 75 50	S S S	Inhibitive Isocyanate free Cleanable (optional)
Mild steel	Interior non-encased	Epoxy primer Acrylic urethane Acrylic urethane	Low sheen	**22i 2.4^{UF}**	N/A	D801.1 D801.8 D801.5 or D801.7	1st 2nd 3rd	Armourcote 220 Uracryl 404 Uracryl 404	RA34 RA59 RA59	50 50 50	S S/R S/R	Inhibitive Abrasion resistant
Mild steel	Interior non-encased	Alkyd primer Alkyd Alkyd	Metallic finish	**22i 2.5^{AMF}**	N/A	D801.1 D801.8 D801.5 or D801.7	1st 2nd 3rd	Armourcote 210 Mica Bond Mica Bond	RA35 RA71 RA71	75 50 50	S S/B/R S/B/R	High build Micaceous finish

Note 1: *Topcoats can be deleted from each system if steel component is fully encased.*

Note 2: *Specified film builds are best achieved by spray application. Brush/roller application will require additional coats to achieve specified DFTs.*

Note 3: *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.*

Note 4: *Use Resene Super Gloss (see Data Sheet D32) in place of Resene Armourcote 608 (see Data Sheet RA72) if brush applied topcoats are required.*

Key: AEMF = Acrylic epoxy metallic finish AF = Alkyd finish AMF = Alkyd metallic finish B = Brush R = Roller S = Spray UF = Urethane finish

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