

TECHNICAL INFORMATION TECHNICAL INFORMATION INFORMATION

DURAGAL[®] & GALTUBE[®] PLUS

Powder Coating Guide

Issue 1 December 2000



The company that published this work is now in a joint venture company named **Australian Tube Mills**. For technical support or sale enquiries please contact **Australian Tube Mills**.

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Important Note:

This information has been generated from considerable research and testing on DuraGal and Galtube Plus surfaces only.

As surface treatments on other galvanised or electroplated surfaces vary considerably the enclosed recommendations will not apply to other products.

This guide represents a breakthrough on powder coating technology and provides recommendations that may enable powder coaters to achieve up to 1000 hours neutral salt spray to ASTM B117 for DuraGal and Galtube Plus and thus comply with AS 4506:1998.

1.0 | Scope

1.1 DuraGal®

DuraGal® hollow sections are manufactured with an in-line, hot-dip galvanized coating applied over a prepared external metal surface, to produce a fully bonded coating with a minimum average coating mass of 100g/m² (14 micron). A surface passivation coating is then applied to assist in preventing white rusting during transport and storage, and to improve the adhesion of paint and powder coatings.

The zinc coating on DuraGal® is applied in accordance with coating class ILG100 Section 4 of AS/NZS 4792:1999 Hot-dip galvanized (zinc) coatings, applied by continuous or specialized processes, on ferrous hollow sections.

Detailed information about the corrosion life of DuraGal in different environments is provided in the DuraGal® “Easy Painting and Corrosion Guide”.

1.2 About This Guide

This guide is the result of collaborative work between OneSteel, Henkel Australia Pty Ltd, Akzo Nobel Powder Coatings and Dulux Powder Coatings. Recommendations stemming from the combined expertise of parties involved is provided in a practical and concise manner. The aim is to provide expected levels of neutral salt spray (ASTM B117: Standard Practice for Operating Salt Spray (Fog) Apparatus) performance with pretreatment and powder coating type.

1.3 Word of Caution

It is not possible to translate the number of hours achieved in neutral salt spray requirements into expected outdoor weathering performance in years. The collaborative testing leading to recommendations made has been carried out under controlled conditions. Claims are only made within the scope of the testing regime used. All powder coaters should undertake their own work to confirm results obtained can be duplicated in their plants.

1.4 Safety

The use of any chemical or proprietary product must be within the scope of the material safety data sheet provided by the supplier.

The equipment and procedures for powder coating application by electrostatic spray shall comply with the requirements for safe operation specified in AS 3754:1990 Safe application of powder coatings by electrostatic spraying.

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2.0 | White Rust and Weld Areas

When white storage stain (white rust) is present on a galvanized surface it should be removed prior to pretreatment for powder coating. White rust can lead to adhesion problems or outgassing of the powder coating. Information about general means of removing white rust is provided in our “DuraGal® Easy Painting and Corrosion Protection Guide”.

Silicone based anti spatters should be avoided as they may lead to dewetting of the powder. Where specifications require prime coating of welded areas in structures manufactured from DuraGal and Galtube Plus, it is important to ensure compatibility with the pretreatment and powder top coat and advice should be sought from respective manufacturers.

3.0 | Atmospheric Environments

The classification of atmospheric environments is given in Appendix E of AS/NZS 4506:1998 Metal Finishing-Thermoset Powder Coatings. A table providing information extracted from the standard is given below. This table links the AS/NZS 4506:1998 atmospheric conditions with service conditions. Typical pretreatments and coating thickness requirements for various environments are provided in AS/NZS 4506:1998.

It is always important, when considering an application, to assess the impact of the local environmental effect or micro climate. Micro climatic effects often outweigh those of the macro climatic zone considered, examples are given in Appendix E of AS/NZS 4506.

TABLE 1 : ATMOSPHERIC ENVIRONMENTS

AS/NZS 4506 Atmospheric Classification	Environment Type	Mild Steel Corrosion rate (μ /year)	Typical Service Conditions
1	Interior, Mild	-	Indoors not subject to condensation
2	Interior, Moderate	-	Indoors with moisture condensation
3A	Exterior, Mild	1.3-10	Rural communities other than those on the coast
3B	Exterior, Moderate	10-25	Suburbs of cities on sheltered bays (except those areas near the coast)
4	Exterior, Tropical	-	Northern Queensland (areas not affected by salt spray)
5A	Exterior, Severe (industrial)	25-50	Around smelters
5B	Exterior, Severe (marine)	25-50	Sheltered bays: From the coastline to 100m from the beach Ocean front: 200m from the beach to 5km inland

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4.0 | General Guidelines

4.1 Pretreatment Types

Expected results obtained for several pretreatment types are given in this guide. The pretreatments and cleaners used are listed below. All examples are taken from the range supplied by Henkel Australia Pty Ltd. Other Pretreatment systems may also be suitable. Powder coaters should discuss with their pretreatment supplier the best means to achieve the required result.

Cleaners:

Alkaline cleaner: Novaclean 909®

Acidic cleaner: Ridoline 425®

Pretreatments:

Amorphous phosphate: Bonderite 1070®

Zinc Phosphate: Bonderite 37®

Chromium Chromate: Alodine 1225®

Chromium phosphate: Bonderite E701®

Post Rinse: Deoxylyte 10®

4.2 Powder Coating Types

Powder coating formulations used were:

TGIC (triglycidyl isocyanurate) free

Interpon 610®, Interpon 610® XL (Akzo Nobel)

Alphatec Plus® (Dulux)

TGIC based

Dupol® (Dulux)

Other powder coating formulations such as Valspar 496 TGIC based and Valspar 456 TGIC free series may also be suitable. Powder coaters should discuss with their coating suppliers the best products to use to achieve the required result.

4.3 Permeability Test

Under the controlled conditions used in the collaborative work, all pretreatments used, followed by thermoset powder coatings achieved a pass in the permeability (pressure cooker) test specified in Appendix I of AS/NZS 4506.

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4.4 Expected Neutral Salt Spray Results

TABLE 2 : NEUTRAL SALT SPRAY				
Cleaner	Pretreatment	Post Rinse	Powder Coat	Expected Neutral Salt Spray Hours to 2mm Undercut
No	Amorphous Phosphate	No	TGIC or TGIC Free	150-350
Acidic+Alkaline	Amorphous Phosphate	No	TGIC or TGIC Free	350
Alkaline	Zinc Phosphate	Yes	TGIC or TGIC Free	400-600*
Acidic+Alkaline	Zinc Phosphate	Yes	TGIC or TGIC Free	1000
Acidic+Alkaline	Chromium Chromate	Yes	TGIC or TGIC Free	1000
Acidic+Alkaline	Chromium Phosphate	Yes	TGIC or TGIC Free	1000

*Note: Results obtained on commercial samples.

4.5 Maintenance of Powder Coated Finishes

Powder coated surfaces should be correctly maintained. Guidelines for different climates are provided in Appendix C of AS/NZS 4506 which acknowledges that despite strict adherence to recommendations for a general environment, the effect of micro climates should be taken in consideration.

The local environment effects (micro climate) produced by erection or installation of equipment need to be taken into account. Such factors require additional consideration because a mildly corrosive atmosphere can be converted into an aggressive environment by micro climatic effects.

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**ONESTEEL MARKET MILLS
FOR MORE INFORMATION CONTACT**

ONESTEEL DIRECT

39-45 Flagstaff Road Port Kembla NSW 2505

Locked Bag 8825 South Coast Mail Centre NSW 2521

Phone: 1800 1 STEEL (1800 1 77335) Fax: 1800 101 141

E-mail: onesteeldirect@onesteel.com

Website: www.onesteel.com

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