SYSTEM RECOMMENDATION
39TR-INT/RSAG

HIGH PERFORMANCE REFURBISHMENT OF ALUMINIUM AND GRP LAMINATE SUBSTRATES USED ON INTERIORS OF PASSENGER RAIL ROLLING STOCK VEHICLES

Coating System
COPON HYCOTE EA9WB
COPON HYCOTE PU WB AG

Prepared for
ROSCOS, TOCS, LUL, OTHER PASSENGER TRANSPORT OPERATORS AND THEIR CONTRACTORS

Date Prepared
12 MARCH 2010

ISSUE 4

Promain UK Limited Promain House Knowl Piece Business Park Hitchin, Hertfordshire SG4 0TY t: 01462 421333
www.promain.co.uk info@promain.co.uk

CONTENTS

1 INTRODUCTION

2 SYSTEM RECOMMENDATIONS

2.1) Proposed System

2.2) Surface Preparation

2.2.1) Phenolic / Polyester GRP Substrates

2.2.1.1) Preparing the Surface
2.2.1.2) Filling of Surface Defects
2.2.1.3) Sanding / Flatting Operation
2.2.1.4) Final Surface Cleaning

2.2.2) Aluminium Substrates

2.2.2.1) Preparing the Surface
2.2.2.2) Filling of Surface Defects (If Required)

2.2.3 Painted Surfaces

2.2.3.1) Preparing the surface
2.2.3.2) Filling of surface Defects (if required)

2.3) Application of **Copon Hycote EA9WB** to aluminium substrates

2.4) Overcoating time for **Copon Hycote EA9WB**

2.5) Application of **Copon Hycote PU WB AG**

2.6) Overcoating Times (If Required)

2.7) Application of Second Coat of **Copon Hycote PU WB AG** (If Required)

2.8) Final Cure Times

2.9) Touch Up and Repair Procedures

2.9.1) Treatment of Damaged Areas
2.9.2) Use of Polishing Techniques to Rectify Finish Defects

2.10) Cleaning procedures

3 PRODUCT CROSS REFERENCES

4 PERFORMANCE DATA FOR COPON SYSTEM 39TR-INTRSAG

5 COPON DATA AND SAFETY DATA SHEETS COPON HYCOTE EA9WB COPON PU WB AG

1. INTRODUCTION

Over the last 40 years, **Copon** products have achieved an international reputation in the field of high performance corrosion protection and long term maintenance free coating performance.

These products have been extensively used for many years on numerous rail rolling stock contracts, new build and refurbishment, operating in different climates worldwide.

Ongoing commitment to research and development of new polymer based protection systems has led to a product range which is safer and easier to apply and environmentally much more acceptable than traditional solvent based systems. Indeed legislation will increasingly lead to ever more severe restrictions on the use of coatings manufactured with volatile solvent blends.

3M™ System Recommendation 39TR-INT/RSAG has been developed entirely on the very latest high performance waterborne resin technology, and is designed to meet the specific performance requirements of refurbishment of interiors of rail rolling stock.

For an optimum standard of finish appearance, all of these waterborne coatings should be applied by spray using appropriate equipment. However, these materials are also suitable for brush application where localised touch up or repair is required.

This system recommendation incorporates the following specific performance characteristics.

- **EXCELLENT ADHESION TO CORRECTLY PREPARED SUBSTRATES**
- **ENHANCED LEVELS OF COLOUR AND GLOSS RETENTION**
- **FAST AND COST EFFECTIVE APPLICATION**
- **GREATLY IMPROVED HEALTH AND SAFETY DURING USE**
- **VOC COMPLIANT**
- **TESTED TO NATIONAL AND INTERNATIONAL STANDARDS FOR LIMITED FIRE HAZARD PERFORMANCE**

2. SYSTEM RECOMMENDATION

2.1 Proposed System

Surface Preparation
Application of **Copon Hycote EA9WB** to aluminium surfaces at 30 microns dft
Overall application of finish coat of **Copon Hycote PU WB AG** to 50 microns dft

NOTE 1: On certain types of laminate **Copon Hycote PUWB AG** may need to be applied in two separate coats, wet on touch dry at 25 microns per coat.

NOTE 2: Where laminate substrates require filling and/or dissimilarity of colour occurs the total dry film thickness of finish colour may require increasing with certain colours, particularly white or tints of white to ensure complete obliteration and uniform colour finish. The use of a light grey mist coat as the first part of a wet on wet application will be advisable for certain finish colours.

2.2. Surface Preparation

2.2.1 Phenolic / Polyester GRP Substrates

2.2.1.1 Preparing the Surface

All surfaces should be thoroughly degreased prior to surface preparation using a proprietry hard surface cleaner/degreaser.

2.2.1.2 Filling of Surface Defects

Minor surface defects and any pinholes in the substrate should be filled with **3M Acrylic Putty** or equivalent, major defects and damage should be filled/repaired using a proprietary polyester filler used in accordance with the manufacturers instructions.

3M Acrylic Putty should be applied by spatula or plastic spreader and slowly spread over the surface of areas where defects exist, working the material into the surface.

2.2.1.3 Sanding / Flatting Operation

As soon as the filler is hard dry for sanding, surfaces should be sanded to give a smooth surface.

Surfaces should be flatted using 400 grade abrasive paper taking care not to ‘open’ the surface of the grp substrate.

2.2.1.4 Final Cleaning of the Surface

All abrasive dust should be wiped from the surface using clean dry rags, surfaces should then be wiped with a tack rag to ensure a completely clean surface.

2.2.2 Aluminium Substrates

2.2.2.1 Preparing the Surface

Surfaces should be thoroughly degreased using a proprietary hard surface cleaner/degreaser.

All Surfaces should then be abraded with 240 grade paper to produce a uniformly etched surface. All dirt and resultant debris must be thoroughly removed then degreased again in case surface areas have been contaminated during the abrading stage, prior to the application of primer.

2.2.2.2 Filling of Surface Defects (If Required)

Any areas requiring filling should be filled with a proprietary polyester filler in accordance with the manufacturers recommendations, once the primer is dry as detailed in Section 4 above.

Once the filler is hard surfaces should be flatted using 400 grade abrasive paper.

All abrasive dust should be wiped from the surface using clean dry rags, surfaces should then be wiped with a tack rag to ensure a completely clean surface.

2.2.3 Painted Substrates

2.2.3.1 Preparing the Surface

Surfaces should be thoroughly degreased using a proprietary hard surface cleaner/degreaser.

The adhesion of the existing paint should be checked and all loose flaking coating cut back to a firm edge. Surfaces should then be abraded with 240 grade paper to produce a uniformly etched surface. All dirt and resultant debris must be thoroughly removed then degreased again in case surface areas have been contaminated during the abrading stage

2.2.3.2 Filling of Surface Defects (If Required)

Any areas requiring filling should be filled with a proprietary polyester filler in accordance with the manufacturers recommendations, once the primer is dry as detailed in Section 4 above.

Once the filler is hard surfaces should be flatted using 400 grade abrasive paper.

All abrasive dust should be wiped from the surface using clean dry rags, surfaces should then be wiped with a tack rag to ensure a completely clean surface.

2.3 Application of Copon Hycote EA9 WB Matt Primer to Aluminium Surfaces

To ensure maximum protection, prepared, uncoated aluminium surfaces should be primed with **Copon Hycote EA9 WB Primer**.

All surfaces must be completely clean of dust, dirt and grease and thoroughly dry.

Copon Hycote EA9 WB is two component high performance waterborne coating, supplied as Base component and Activator component.

As the priming coat, it is manufactured in grey or white to produce a matt finish ready to receive the finish coat.

Before application, the following procedures must be observed. The base component should be thoroughly stirred until a uniform colour is produced. The activator should then be added to the base component and then again thoroughly stirred for **at least two minutes** to produce a homogeneous free flowing mixture. When mixing complete units, the use of a slow or variable speed mechanical mixer is beneficial to ease mixing and ensure complete incorporation.

NOTE 1: Initial mixing of **Copon Hycote EA9 WB** Base and Activator components will produce an increase in viscosity which reduces to the correct viscosity on thorough mixing.

NOTE 2: If only part quantities of the base and activator are to be used, care must be taken to maintain the volume mixing ratio of 9:1 respectively as well as total compliance with the above mixing procedures.

NOTE 3: Copon Hycote EA9 WB is supplied ready for use by airless or air assisted airless spray. Small additions of clean water (up to 5% by volume) may be required to cater for variation in application conditions. **Copon Hycote EA9 WB** will require thinning for application by conventional spray where the minimum amount of clean water (typically 10% by volume) required for adequate atomisation should be used. **Copon Hycote EA9 WB Primer** should be applied by spray to produce a smooth uniform film. The wet film thickness of the material should be 70 microns producing a dry film thickness of 30 microns.

The THEORETICAL coverage rate of **Copon Hycote EA9 WB** is 14.25 m² per litre at 30 microns dft.

2.4 Overcoating Interval for Copon Hycote EA9 WB Matt Primer to Aluminium Substrates

CURING/DRYING TEMPERATURE (Minimum Substrate Temperature)	FLASH OFF TIME AT 20/30℃	MINIMUM OVERCOATING TIME
20℃	NIL	3 HOURS
40℃	NIL	1½ HOURS
60℃	NIL	30 MINUTES
80℃	NIL	15 MINUTES

NOTE: Achievement of and improvement in the above times are dependent upon two critical factors:-

A Effective and consistent movement of dry/warm air.

B Maintenance of the selected substrate temperature during the entire drying/curing period.

2.5 Overall Application of Copon Hycote PUWB AG

The prepared GRP and primed aluminium surfaces must be clean, dry and free from contamination. **Copon Hycote PU WB AG** is a two component waterborne polyurethane supplied as a Base component and an Activator component which require a mechanical mixer to ensure successful mixing together prior to use. An electrical or air driven mechanical mixer capable of operating between 1000 and 2000 rpm should be used.

The Base component should be thoroughly mixed prior to adding the activator. The Activator component should then be slowly added whilst continuing stirring, as the activator is added the mix will thicken up slightly. Continue adding the activator slowly under constant stirring until the total contents are added.

NOTE: An alternative method is to add 5% clean water prior to mixing, this should then be mixed thoroughly. This method minimises the possibility of thickening.

Copon Hycote PU WB AG will require thinning for spray application, when typically 10-15% by volume of clean water, including any water added above, depending on colour and equipment being used, should be added to the mixed product and thoroughly mixed in to give a homogeneous mix. The typical spray viscosity at 20℃ should be 50-60 seconds, extra water must not be added to compensate for lower temperatures.

NOTE: If less than full quantities of **Copon Hycote PU WB AG** are required, care must be taken to maintain the volume mixing ratio of 3 parts base to 1 part activator as well as total compliance with the above mixing procedures.

After mixing and thinning the **Copon Hycote PU WB AG** should be applied by spray to give a smooth uniform coating. The **Copon Hycote PU WB AG** should be applied to achieve 50 microns dry film thickness.

The THEORETICAL coverage rate for **Copon Hycote PU WB AG** unthinned at 50 microns dft is **8.6 m² per litre**.

Where the quality of the substrate is such that **Copon Hycote PU WB AG** is absorbed into the substrate this is indicative of the porosoity of the substrate not being sealed, in this case an additional full coat will be required to ensure correct gloss levels are achieved.

2.6 Overcoating Interval (If Required)

A minimum of 2 hours will be required at a temperature range between 20℃ and 30℃ before overcoating can be carried out and the following table is given as a guide for different temperatures.

CURING/DRYING TEMPERATURE (Minimum Substrate Temperature in still air)	FLASH OFF TIME AT 20/30℃	MINIMUM OVERCOATING TIME
20℃	NIL	2 HOURS
40℃	30 MINUTES	30 MINUTES

NOTE: The **Copon Hycote PUWB Colour** must be overcoated within 24 hours at a prevailing temperature of 20℃.

2.7 Application of Second Coat of Copon Hycote PU WB AG (If Required)

Once the conditions set out in section 2.6) above have been met the second coat of **Copon Hycote PU WB AG** should be mixed and applied in accordance with section 2.5) of this recommendation.

2.8 Final Cure Times

At a minimum substrate temperature of 20℃, **Copon Hycote PUWB AG** will be touch dry in approximately 2 hours and dry to handle in approximately 8 hours. Drying and cure times will reduce at higher force dry temperatures.

NOTE: Achievement of and improvement in the above times are dependent upon two critical factors:-

A Effective and consistent movement of warm air.

B Maintenance of the selected substrate temperature during the entire drying/curing period.

2.9 Touch Up and Repair Procedures

2.9.1 Treatment of Damaged Areas: The damaged area and the immediately surrounding area should be cleaned and degreased with a proprietary hard surface cleaner/degreaser. Any loose, flaking coating should be removed back to a sound edge and edges feathered in. After the abrading operation, any residual debris and dust must then be removed using airline or vacuum brush. The prepared areas should then be wiped with a tack rag.

Surfaces should now be coated with **Copon Hycote PU WB AG** in accordance with section 2.5 of this recommendation.

2.9.2 Use of Polishing Techniques to Rectify Minor Finish Defects: Areas of dry spray and minor surface defects evident in the dry/cured finish can be minimised by buffing using a soft head. Once the finish colour is sufficiently dry/cured (ideally 48 hours at a consistent minimum air temperature of 20℃) recognised techniques, used in final stages of conventional coach/car refinishing operations, should be employed to achieve acceptable rectification of imperfections in the livery finish, care should be exercised to ensure excessive pressure is avoided as over polishing will raise the gloss level.

2.10 Cleaning Procedures

Copon Hycote PU WB AG coated surfaces can be cleaned in service using non abrasive proprietry cleaners/detergents, to remove dirt, oil and grease. A proprietary graffiti remover will be required to remove any graffiti, again these should be used in accordance with the manufacturers instructions, ensuring the material is not allowed to dwell on the surface once the graffiti is removed.

3. PRODUCT CROSS REFERENCES

Current Product Names	**3M™ Scotchkote™ Name**
Copon Hycote EA9WB Primer	WB Epoxy Primer EA9WB
Copon Hycote PUWBAG	WB Urethane PUWBAG 180

4. PERFORMANCE DATA FOR COPON SYSTEM 39TR-INTRSAG

Property	Method of Test	Requirement	Copon System 39TR.INTRSAG Results
Adhesion	BS EN ISO 2409:1995 Cross-cut test	Classification 1 not to be exceeded	0
Impact Resistance	BS EN ISO 6272:1994 at 23°C(±2°C) & at -15°C(±2°C)	No cracking, flaking, wrinkling, inter-coat adhesion failure or detachment from the substrate.	No cracking, flaking, wrinkling, inter-coat adhesion failure or detachment from the substrate was observed.
Chip Resistance	ASTM D 3170-01	Chipping rating of 4A not to be exceeded.	Not applicable to interior surfaces
Scratch Resistance	BE EN ISO 1518:2001 using a 2kg weight	No penetration of the paint system	No penetration of the paint system using 2.5kg load
Abrasion Resistance	ASTM D 4060-95 500 cycles using a CS10 wheel	Weight loss not to exceed 30mg.	20 mg weight loss
Flexibility	BS EN ISO 1519:1995 6mm diameter mandrel	No cracking, flaking or detachment from the substrate.	No cracking, flaking or detachment from the substrate
Resistance to UV light	ASTM D 4587-01 UV-A 340 lamp for 2000 hours	No change in colour greater than 3 units and no gloss level reduction greater than 10%	No change in colour, gloss level reduction 3%
Resistance to humidity	BS3900-F15:1995 (ISO 11503:1995) Cycle for 2000 hours	No softening, swelling, blistering or under film corrosion	No softening, swelling, blistering or film corrosion
Resistance to salt spray	BS EN ISO 7253:2001 Exposure for 1000 hours	No paint system defects; no corrosion or blistering greater than 2mm from the cut.	No paint system defects; no corrosion or blistering greater than 2mm from the cut
Chemical Resistance	BS EN ISO 2812-1:1995 Method 3 (spotting)	Paint system shall suffer no adverse effects after 24 hours exposure to all relevant cleaning agents, fluids and residues.	No adverse effects after 24 hours exposure to all relevant cleaning agents, fluids and residues.

NOTE: All materials to be purchased via **Promain UK Limited**