

European Manufacturing Standard

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UC800

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PAINT PROCESSING OF CAR AND VAN BODIES

1.0 PURPOSE:

This procedure describes the general process and controls for the pre-treatment, electrocoating, priming, painting and corrosion protection of passenger car and van bodies within Paint and Final Assembly Engineering. It must be used in conjunction with GSPAS (where applicable) and the individual Model Paint Process Sheets to provide full processing details.

The designator **SC** indicates that this property is a significant characteristic which effects vehicle capability to satisfy corrosion warranty requirements and which requires special controls.

1.1 Procedure

The procedures described are as follows:-

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2 MATERIALS:

- 2.1 All production, non-production and post-production materials, including necessary additives must be approved in accordance with procedure FAP 03-132.
- 2.2 Only paint materials, which have been approved in accordance with Vehicle Operations Operating Procedure VOP PTG-205 and have undergone a suitable production line trial can be used in paint processing operations.
- 2.3 All materials must have full C2 clearance status from the GMAP computer system and have been approved for use in their specific applications and locations by the responsible Plant Medical, Safety, Fire and Environmental Officers.
- 2.4 A control plan for ongoing production verification is required to assure consistent processing of materials. Appropriate statistical tools such as Statistical Process Control must be used in the analysis of process and product data.
- 2.5 All Paintshop production and non-production materials shall be free of crater inducing materials when tested in accordance with FLTM BI 125-01.

3 PRE-TREATMENT AND PHOSPHATING

3.1 Preliminary Clean-up - BIW Area

Bodies shall be free from foreign material. Exterior surfaces should be solvent wiped to remove residual sealants, grease, oil, chalk and stamping marks etc.

3.2 Treatment of Areas Discoloured by Heat - BIW Operations

Any discolouration caused by welding or brazing on the outer or critical customer visible interior surfaces shall be removed by sanding machine. Final sanding must always be completed with a minimum of 400grit.

The diskings of protective coated steels, such as zinc coated, and galvanized steel must be avoided at all cost, as not to adversely affect the corrosion protection properties of this material.

3.3 Preliminary Cleaning and Fitting of Slave Tooling

The complete body in white surface must be cleaned by an automated process to ensure the absence of oil or alkaline residues, fingerprints, corrosion, weld spatter, mold release agents, dirt and any foreign material. This will avoid cross contamination of the phosphate system and further downstream processes. The approved and released cleaning material, as detailed in the Model Paint Process Sheets (GSPAS) must be used.

To allow satisfactory cleaning and Phosphating of enclosed areas all closures shall be retained in a partially open position by slave tools as depicted on the Model Paint Process Sheets.

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3.4 Phosphating

Phosphating of bodies shall be carried out using an automatic spray, spray-dip or full dip system. All internal and external surfaces of Phosphated bodies must meet the requirements of specification WSS-M3P1-D (Performance, Phosphate Coating, Zinc).

Phosphate coating weights and specification references are described in Paragraph 13.1.

3.5 Phosphate Draining & Dry Off

Carry-over of pre-treatment chemicals into the Electrocoat Tank must be avoided and suitable provisions incorporated to ensure Bodies are fully drained. Conductivity of the residual rinse water carried-over must not exceed 20 $\mu\text{S}/\text{cm}$. Bodies should not be in a partially dried out condition immediately prior to entry into the Electrocoat Bath. A demineralised water spray should be used, where necessary, to avoid this condition.

4 ELECTROCOATING

- 4.1 Bodies shall be completely immersed in the Electrocoat bath with the roof top in the horizontal position and a minimum of 150 mm below the surface level. The system shall be electrically charged to the condition necessary to meet the specified film thickness described in paragraph 13.2

All closures must be positioned with slave tooling, as per the Model Paint Process Sheets, to ensure adequate coverage by Electrocoat Primer.

To meet film build requirements, and to accommodate the progressive introduction of pre-coated steels, the following immersion times are recommended:-

- a) Live (power on) entry systems - 3.0 minutes minimum immersion for any point on the body on entry to the same point on exit. It is recommended that the front leading edge of the roof be used for immersion time measurement.
- b) Dead (power off) entry system - 3.0 minutes minimum immersion from the last point of body on entry to first point of body on exit. It is recommended that the rear edge of the roof is used on entry, and the front leading edge of roof on exit are used for immersion time measurement.

Minimum film thickness and specification references are described in Paragraph 13.2.

4.2 Tank Operating Parameters

These must be optimised on the basis of meeting performance requirements of specification WSK-M64J35-A1/C3 or WSS-M64J39-A1/A5 and producing a smooth crater-free Electrocoat film. Tank control parameters should be within the limits agreed upon by the Material Supplier and Manufacturing Plant Engineering in order to achieve process capability. These shall be monitored by statistical process control techniques and stated in the production control plan.

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4.3 Drain and Rinse

As the body leaves the Electrocoat tank, rinse off immediately with an over tank ultra-filtrate (U/F) spray to remove any cream coat. This should be followed by a further five rinse cycles as follows:

- | | | |
|-------------------------|-------------------|---|
| • 2 nd Rinse | Full Dip | with re-circulated U/F |
| • 3 rd Rinse | Spray | with re-circulated U/F |
| • 4 th Rinse | Spray | with pure U/F |
| • 5 th Rinse | Spray or Full Dip | with demineralised water |
| • 6 th Rinse | Spray | with pure demineralised water with a maximum specific conductivity of 20 µs/cm. |

Rinse cycles may be supplemented by special nozzles to ensure adequate rinsing of critical areas, both externally and internally.

4.4 Ultrafiltration

The ultrafiltration unit should provide sufficient volumes of ultrafiltrate to operate a closed loop rinse system, i.e. no top up material required. Impurities should be discharged to waste to ensure the operating parameters of the bath are maintained at the optimum level.

4.5 Blow-Off

All Bodies should be subjected to an automatic or manual blow-off operation concentrated to remove rinse water runs. Blow-off air must meet the quality and particulate requirements of ISO standard 8573, class 3.

4.6 Baking

Baking cycles are detailed in Paragraphs 12.1, 12.2 and 12.10. The baking schedule is critical since undercuring or overcuring of the Electrocoat film will reduce its performance characteristics.

4.7 Sanding of Electrocoat Defects

Surface defects in the Electrocoat film, which may be visible in subsequent primer and enamel coats, must be removed by local sanding; relevant Model Paint Process Sheets are to be followed. All over sanding, should be avoided, and sand through to metal must be avoided. Paper no coarser than 600 grit should be used for final sanding. Sanded through areas of finished bodies must meet Performance Specification WSS-M2P-180-A requirements.

5.0 SEALING AND BODY PROTECTION

- 5.1 Sealants, including caulking compound, plugs, adhesive tapes and NVH, shall be applied in line with relevant Model Paint Process Sheets and the Model Sealer Manual. Clean areas should be masked with either mechanical or disposable masks. Any surface contamination must be removed by wiping with clean lint free cloths and/or an approved solvent
- 5.2 Under body coating material may be applied, either manually or automatically, to areas shown on individual Model Paint Process Sheets. Clean areas should be masked with either mechanical or disposable masks. Any surface contamination must be removed by wiping with clean lint free cloths or spatulas.

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5.3 Body skid mounting areas that are not coated with underbody material must be protected with an approved repair material prior to the underbody wax application. This may be achieved by brushing or spraying. Film thickness and specification requirements are detailed in the Model Paint Process Sheets and Model Sealer Manual reference Paragraph 13.3

5.4 Pre-gelling of the sealants and underbody coating is recommended to facilitate the removal of excess sealer and underbody coating overspray and also to prevent contamination of automatic ostrich feather machines.

The baking cycle is described in Paragraph 12.3 and 12.11.

6 PRIMER SURFACER APPLICATION

6.1 Cleaning of Electrocoat Primed Bodies

Before entry into the Primer Spraybooth all exterior surfaces should be blown-off with dry oil-free deionised air (to standard ISO 8573 class 3) followed by, an automatic ostrich feather dusting machine with subsequent manual tack wipe using approved tack rags.

6.2 Application of Lower Body Stonechip Protective

Stone chip protective primer should be applied automatically to the areas specified on relevant Model Paint Process Sheets and over coated wet on wet with a minimum of 20µ primer surfacer. Film thickness requirements are detailed in Paragraph 13.4.

6.3 Application of Primer Surfacers & Coloured Primer to Exterior Surfaces

Primer surfacer, solvent based or water based, may be applied manually or automatically and by both electrostatic and non-electrostatic means. Any areas not fully covered by the automatic machines must be sprayed in by hand using the appropriate primer material.

Film thickness requirements are detailed in Paragraph 13.6.

6.4 Booth Operating Conditions

These must be optimised on the basis of meeting the requirements of primer specification ESK-M6J151-A3 or ESK-M62J2-A and achieving quality and manufacturing objectives. Booth control and application parameters should be within the limits agreed upon by the Material Supplier and Manufacturing Plant Engineering in order to achieve process capability. These shall be monitored by statistical process control techniques and stated in the production control plan.

6.5 Application of Enamel Colours in Primer Booth

Apply enamel colours wet on wet to areas specified on relevant Model Paint Process Sheets. Film thickness requirements are detailed in Paragraph 13.7.

6.6 Baking of Primer Surfacers Material

6.6.1 Baking of Solvent Based Primer Surfacers: Stonechip Protective and Wet on Wet Enamels

Allow a minimum of 3 minutes flash-off from the exit of the last spraying zone. Baking cycles are defined in Paragraphs 12.4 & 12.11.

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6.6.2 Baking of Water Based Primer Surfacer

Allow a minimum of 6 minutes flash-off from the exit of the last spraying zone. Baking cycles are defined in Paragraphs 12.5 & 12.11.

6.7 Sanding of Primer Surfacer

Dry or wet sand defects locally on exterior and visible interior surfaces, in line with respective Model Paint Process Sheets.

Paper no coarser than 800 grit shall be used for final sanding. Remove sanding residues with clean lint free cloths and demineralised water, tack rag or by vacuum cleaning.

6.8 Repair of Sanded Through Areas of Primer Surfacer

In the case of locally sanded through areas, a repair primer surfacer verified to specification SKM6J9565-A for wet on wet application, or specification WSK-M6J172-A1/A2 (2 pack) may be employed.

7.0 ENAMEL APPLICATION

7.1 Cleaning of Primed Bodies

Before entry into the Enamel Spraybooth all exterior surfaces should be blown-off with dry oil-free deionised air (to standard ISO 8573 class 3) followed by, an automatic ostrich feather dusting machine with subsequent manual tack wipe.

7.2 Body Colour Painting

Solid SVO colours, Basecoats and Clearcoats may be applied either manually or by automatic spray machines. Ideally, automatic systems should cover all exterior surfaces. However adjacent manual spray 'Fill-In' operations should be applied before electrostatic application. Enamel specifications and thicknesses are described in section 13.

7.3 Solid Colours - Solvent Based (MSP Technology)

For optimum efficiency and appearance, paint application should be in one coat using electrostatic bells. If two coat application is required, 60 – 70 % of the film weight should be applied in the first coat and 30 – 40 % in the second (however, this ratio should be optimised for individual colours). 1-minute flash-off between coats is recommended.

Film thickness requirements are detailed in paragraph 13.8. If two coat application is required, 60 – 70 % of the film weight should be applied in the first coat and 30 – 40 % in the second (however, this ratio should be optimised for individual colours). 1-minute flash-off between coats is recommended.

7.3.1 Solid Colour Basecoat - Solvent or Water Based (COB Technology)

For optimum efficiency and appearance, paint application should be in one coat using electrostatic bells. If two coat application is required,

Before application of solvent based clearcoat the solvent based solid basecoat should be flashed-off as per paragraph 7.4.1 and the waterbased solid basecoat should be flashed-off as per paragraph 7.5.1

Film thickness requirements are detailed in Paragraphs 13.8.1.

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7.4 Metallic Basecoats - Solvent Based

Medium solids Basecoat should be applied in two coats. For optimum appearance and usage efficiency, 60-70% of the film build should be applied on the first coat using electrostatic bells, the remaining 30-40% on the second coat by pneumatic or electrostatic spraying (however, this ratio should be optimised for individual colours). 1-minute flash-off between coats is recommended. Alternatively, Basecoat can be applied manually in two coats.

7.4.1 Before application of Solvent Based Clearcoat the following flash-off times are required:

- for medium solid Basecoat - 2 minutes minimum

A heated forced air-drying zone should be employed to assist in basecoat flash off.

Film thickness requirements are detailed in Paragraph 13.9.

7.5 Metallic Basecoats - Water Based

Water based metallic Basecoat should be applied in two coats; the first coat by electrostatic bells and the second coat electrostatically or pneumatically. For optimum usage and appearance 60 – 70 % of the film weight should be applied in the first coat and 30 – 40 % in the second (however, this ratio should be optimised for individual colours). 1-minute flash-off between coats is recommended.

7.5.1 Before application of the solvent based Clearcoat, the water based Basecoat must be:

- flashed-off for 1 minute minimum
- Infra-red heated for 1 minute to 80°C metal temp
- 2 minutes warm air drying at 80°C min metal temperature
- Cooled to 30° C object temperature

Film thickness requirements are detailed in Paragraph 13.9

7.6 Clearcoat - Solvent Based

For optimum efficiency and appearance paint application should ideally be in two coats using electrostatic bells. Each coat should apply approximately 50% of the film weight. For handspray or automatic operations a 1-minute flash-off is required between coats.

Film thickness requirements are detailed in Paragraphs 13.11.

7.7 Booth Operating Conditions

These must be optimised on the basis of meeting the requirements of enamel specifications highlighted in section 13 and achieving quality and manufacturing objectives (paragraph 14.1). Booth control and application parameters should be within the limits agreed upon by the Material Supplier and Manufacturing Plant Engineering in order to achieve process capability. These shall be monitored by statistical process control techniques and stated in the production control plan.

7.8 Masking

Any masking paper or foil should be removed before entry into the baking oven.