



Compatibility Test of Oils, Greases, Prelubes and Similar Materials with Electrocoat Paint Systems

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This standard shall serve to evaluate the impact of contaminants such as mills oils, greases, prelubes and similar materials on the electrocoat paint system.

1.1.1 Depending on the properties and amount of the material introduced to the electrocoat system, the contaminating effect may appear in the form of surface defects such as craters (depression in surface) or pin holes (pop from inside-out). See Figure 1.

Figure 1: Surface Defects

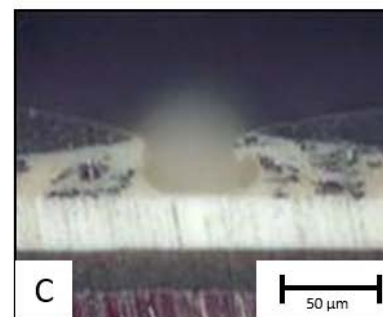
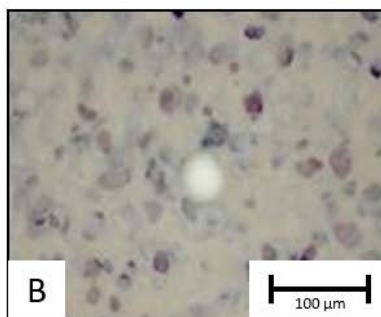
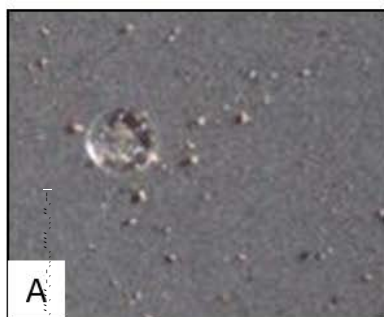


Figure 1 Key:

A = Crater Example

B = Pinhole Example

C = 400x Cross Section of Pinhole

1.1.2 If such defects occur, the defects may also appear/telegraph, through subsequent paint layers (e.g., primer surfacer and topcoat).

1.1.3 This standard will provide the opportunity to compare the effects of different oils, greases, prelubes, etc., as introduced to an electrocoat system versus a known, compatible lubricant as control.

1.2 Applicability. Electrocoat Paint Operation (ELPO).

1.3 Remarks. This standard describes a method for evaluating the impact of metal forming lubricants and other oils or greases, introduced to an electrocoat (ELPO) bath. Lubricants can be trapped in hem flanges or other tight fitting areas and then, be expelled into the ELPO dip tank or onto exposed (exterior) body surfaces during the ELPO cure process, causing contamination defects. These defects which accumulate on appearance (exterior) panels must be repaired to achieve an acceptable paint finish, adding high cost to the paint process.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

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2.1 External Standards/Specifications.

ISO 7056

2.2 GM Standards/Specifications.

GMW3002

GMW3008

GMW16170

GMW16546

GMW3005

GMW3011

2.3 Additional References.

Data sheets for all current, control and NEW lubricants to be evaluated (ID).

(ID) = These references are limited to internal use within General Motors and shall not be accessed outside this company. Contact the GM Responsible Engineer for further instructions.

3 Resources

3.1 Facilities.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.1.3 Laboratory for processing of electrocoat (ELPO).

3.2 Equipment.

3.2.1 Suitable synthetic laboratory agitator.

3.2.2 Beaker. Glass is suitable. Pipettes, 3 L to 5 L (ISO 7056 or similar).

Note: Beaker size is dependent upon the agitator size used and the immersion bath depth of the electrocoat.

3.2.3 Thermostat. Capable of maintaining a selected temperature of ± 2 °C for ELPO.

3.2.4 Drying Oven. Volume: 0.39 m³ minimum, temperature up to +190 °C (374 °F).

3.2.5 Analytical Balance. Weighing accuracy $\approx$ 0.01 g.

3.2.6 Dispersing Apparatus.

3.2.6.1 High speed dispersing device.

3.2.6.2 High speed magnetic stirrer (magnetic bar of 3 cm minimum).

3.3 Test Vehicle/Test Piece.

3.3.1 Test Panels. Standard test panel: according to GMW3011 and GMW16170. Thin film or phosphate pretreated steel panels 100 mm x 300 mm of substrate type, defined by requesting engineer.

3.3.2 Phosphate per specific GM plant where grease, lubricant, etc., may be introduced and for all applicable metal substrates. Panels may be plant or laboratory prepared. Substrates and test procedures for lubricant compatibility with GM pretreatment systems are defined in GMW16546.

3.3.3 Control Lubricant. Current lubricant to be replaced and/or FUCHS RP4107S.

3.3.4 Test Material for ELPO Painting.

3.3.4.1 Approved ELPO (GMW3008), material from the production line or laboratory preparation.

3.3.4.2 New or modified ELPO material. See the data sheets for all current, control and NEW lubricants to be evaluated. Contact the GM Responsible Engineer for further instructions.

3.4 Test Time. Reference the lab test procedures in 4.3.1 and 4.3.2 for timing details.

3.5 Test Required Information. Before any testing is initiated, review testing scope and detail with requesting engineer.

3.6 Personnel/Skills. Skilled technician capable of meeting the requirements of this procedure.

4 Procedure

4.1 Preparation.

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