



Soil and Cleaner Resistance of Automotive Materials

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 is a two-part procedure. Part A is used to determine the cleanability of materials after having been exposed to a specific soil and cleaned. Part B measures the ability of the material to resist damage (e.g., color change, surface behavior) from applying specific liquid cleaners to a cloth and rubbing it on the surface. Part B also is used to visually determine if there is a color transfer to the cleaning cloth after having been rubbed on the surface of the material with the liquid cleaner.

1.2 Applicability. This procedure is applicable to all materials that may be soiled or cleaned during normal use. The tested material must have an appearance that is acceptable to the customer for appearance and haptics after having been cleaned according to this procedure. For Part A, any ring formation after cleaning is undesirable and should be noted on the report in the comment section of the Material specification.

2 References

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

2.1 External Standards/Specifications.

ISO 105-A02

ISO 105-A03

ISO 105-F09

ISO 105-X12

2.2 GM Standards/Specifications.

GMW6992

GMW15377

2.3 Additional References.

- Material Safety Data Sheets (MSDS) CAS 64742-49-0, CAS 9004-82-4
- Swiss Federal Laboratories for Materials Science and Technology (EMPA), Dübendorf, Switzerland (www.empa.ch)

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.

3.2 Equipment.

3.2.1 Crockmeter as described in ISO 105-X12. The apparatus should have a cylindrical rubbing finger.

3.2.2 Cotton rubbing cloth, per ISO 105-F09.

3.2.3 Glass stirring rod.

3.2.4 Dose syringe graduated in milliliters (mL).

3.2.5 Analytical balance, accurate to 0.01 g.

3.2.6 Thermometer, accurate to 0.1 °C.

3.2.7 Spatula.**3.2.8** Suitable cutting tools for preparation of test specimens.**3.2.9** Gray scale for color change ISO 105-A02.**3.2.10** Gray scale for staining ISO 105-A03.

3.2.11 For cleaning soils (Part A), a toothbrush with soft bristles may be used. Any equivalent small brush having soft bristles approximately 15 mm in length is acceptable if the bristles do not damage the surface during cleaning.

3.3 Test Vehicle/Test Piece.**3.3.1 Soiling Agents.**

Note: All volumes are approximately 1.0 mL, weights are ± 0.5 g (except petroleum jelly). Gently massage soil into material with the smooth rounded end of a stirring rod. The soil should not be spread more than approximately 5 mm in diameter.

- Code A: Sewing machine oil (3 drops to 4 drops)
- Code B: Petroleum jelly, colorless (0.05 g)
- Code C: Instant coffee (mixed 2.5 g $\pm$ 0.1 g coffee to 240 mL $\pm$ 5 mL deionized (DI) water. Apply hot coffee when the temperature is between 60 °C to 80 °C (1 mL))
- Code D: Ketchup (1 mL)
- Code E: Dark blue or black ballpoint pen. Draw an ink spot that is circular and approximately 5 mm in diameter
- Code F: Brown soft drink (cola) (1 mL)
- Code G: Regular soy sauce (3 drops to 4 drops)
- Code H: Potting soil fine grained (1 g mixed with 5 mL distilled water)
- Code I: Salt, saturated non-iodized sodium chloride (NaCl) solution (1 mL)
- Code J: Chocolate ultra-high temperature (UHT) milk (1 mL) with 1.5% fat, with pure cacao powder, or equivalent
- Code K: Red drink prepared from Kool-Aid, Frigeo Brause or equivalent with sugar (1 mL); chromophobic dye staff shall be E163
- Code L: Black permanent marker ink. Sharpie brand or equivalent may be used. Draw an ink spot that is circular and approximately 5 mm in diameter
- Code M: EMPA Swissatest Indigo sulfur black denim for soiling Number 128/1 or 128/2. The soil and heat age shall be as described in GMW15377

3.3.2 Cleaning Agents.

- Code 0: Deionized water
- Code 1: Naphtha, Material Safety Data Sheet (MSDS) CAS 64742-49-0 or equivalent
- Code 2: Soap detergent, MSDS CAS 9004-82-4 or equivalent, to contain no optical brighteners, neutral pH (0.5% by weight in distilled water)
- Code 3: Glacial Acetic acid diluted in DI water to a concentration of approximately 2% by weight
- Code 4: Ammonia in DI water to a concentration of approximately 5% by weight
- Code 5: Isopropyl alcohol approximately 70%

3.4 Test Time. Twenty-four hours (24 h) for sample conditioning and 2 h for testing.

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Personnel trained in accordance with the laboratory accreditation and standard operating procedure requirements.

4 Procedure

Procedure A: Soil Resistance. The specified amount of a soil is applied to one (1) specimen. The soil is rubbed into the material using a glass stirring rod with a rounded tip. The soil must remain on the specimen for a specified