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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Guide for Removal of Oily Soils from Metal Surfaces[1]

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1. Scope

1.1 This guide covers the determination of the amount of an oily surface removed from a metal surface.

1.2 This guide employs the use of a fluorescent dye as a tracer to measure the level of residual oil.

1.3 This guide is designed to evaluate metal cleaners designed or developed for the removal of oily and greasy soils from metal surfaces such as stamping presses, metal cans, metal tanks, and other such items.

1.4 This guide employs the use of a generic oily soil. As there is no one universal oily soil, the choice of the soil and substrate used should be agreed upon by the testing laboratory(s) and those using the data to evaluate cleaning performance prior to testing.

1.5 This guide is not intended for use as an evaluation tool for critical areas, which might include surfaces to be painted.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.*

2. Terminology

2.1 *Definitions:*

2.1.1 *soil*—foreign matter present on a metal surface.

2.1.2 *substrate*—any metal-based surface that is to be cleaned.

2.1.3 *water break*—visual rating of a metal surface rinsed with deionized water whereby the rinse water film breaks into beads or runs off exposing the surface, or both, which is indicative of residual soil.

2.1.4 *water break free*—visual rating of a metal surface rinsed with deionized water whereby the rinse water forms a uniform wetted layer covering the surface.

3. Summary of Guide

3.1 An oily based soil is artificially tagged with a fluorescent dye tracer. The soil is artificially applied to a test metal coupon. The soiled coupon is then cleaned in a beaker of wash liquor using a magnetic stir plate and stir bar. Following cleaning, the metal coupon is immediately removed to a beaker of extraction solvent to remove any remaining residual oily soil. The solvent extract is then measured for fluorescent dye absorbance using a spectrophotometer.

4. Significance and Use

4.1 The guide suggests a laboratory guide for use in the development of cleaners designed to remove oily based soils from metal surfaces. This guide can be used to evaluate the removal of numerous oily type soils from a myriad of metal surfaces. This guide should find use in those industries required to clean, among other, metal cans, rolled metals, large industrial production machinery, and blending vessels.

4.2 This guide employs the use of a fluorescent tracer, which will allow for the accurate quantitative measurement of the amount of soil removed and will assist in the ranking of cleaner performance.

4.3 This guide will provide a fast and efficient test protocol for the determination of oily soil removal by a wet cleaning process. This guide will result in a time savings over other methods which traditionally must allow for a drying step prior to weight loss determinations. Further, the guide will quantitate the level of soil removed, thus providing a means of evaluating the cleanliness of a surface which may not be water break free.

5. Apparatus

5.1 *Beakers*, 150 and 250 mL.

5.2 *Volumetric Flasks*, 100 mL.

5.3 *Magnetic Stir Bars*, 1 in. length, and combination hot plate stirrers.

5.4 *Adjustable Wavelength Spectrophotometer*.

5.5 *Graduated Serological Pipets*.

5.6 *Black Light*.

5.7 *Fluorescent Yellow 131SC Dye*.

5.8 *White Mineral Oil*.

5.9 *Propylene Glycol n-Butyl Ether (PnB)*.

5.10 *Metal Coupon*, 1 by 3 in., 16 gage, #14 finish, 316 stainless steel.

6. Preparation of Soil/Substrate Combination

6.1 Clean metal test coupons in an industry specified standard alkaline surfactant based detergent. Scrub the panels to remove residual soils and avoid surface damage. Rinse the panels with appropriate rinse water followed by terminal rinsing with deionized water. Passivate the cleaned and rinsed coupons in a solution of 20 % by weight nitric acid for a

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