

Cleaning/Degreasing Agents (GS-34)
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1. Scope

This standard establishes environmental requirements for cleaning/degreasing agents.

For purposes of this standard, cleaning/degreasing agents are defined as cleaners/degreasers marketed as suitable for cleaning soils in production and maintenance applications. Suitable agents do not include those for specialized cleaning/degreasing operations such as the removal of paints, sealants, rust, and adhesives; handwiping parts; preparation of surfaces for electroplating, organic coatings, and parts testing; or the cleaning of hydraulic components, medical supplies, electronics, and optics.

Due to the large number of possible cleaning products, processes, soil types, and cleaning requirements, compatibility of cleaning/degreasing agents with surface materials is not specifically addressed in this standard. Product users shall follow the manufacturers instructions on compatibility.

Military users of this standard are reminded that it only covers the environment and that the selection of a specific degreaser may require clearance from necessary channels such as the appropriate commodity managers and USACHHPM.

All criteria, unless otherwise specified, are based on the stated final degreasing agent concentration.

2. Definitions

ASTM. American Society for Testing and Materials

CPSC. Consumer Product Safety Commission

HSDB. Hazardous Substances Data Bank

Ingredient. any constituent of a product, whether intentionally added or not, including any impurities

ISO. International Organization for Standardization

OECD. Organization for Economic Cooperation and Development

Ozone-Depleting Substance. An ozone-depleting substance is any compound with an ozone depletion potential greater than 0.01 (CFC-11 = 1).

RTECS. Registry of Toxic Effects of Chemical Substances

3. Product-Specific Performance Requirements

The cleaning/degreasing agent shall clean a steel coupon to a level of 2,000 mg/m² by the test method presented in Appendix A for both types of soil specified in the test method. The 2,000 mg/m² level of cleanliness is intended to be a minimum level of performance. Degreaser users may need to conduct their own performance testing to determine if a degreasing agent meets specific cleaning requirements. Aqueous degreasers shall also meet the 95% separation level set out in Appendix B.

4. Product-Specific Health and Environmental Requirements

4.1 Toxic Compounds

The product shall not be toxic to humans. A product is considered toxic if any of the following lethal dose (LD) criteria apply:

Oral LD₅₀ < 5,000 mg/kg

Inhalation LC₅₀ < 20,000 ppm of vapor or gas or 500 mg/L of mist, dust, or fumes

Dermal LD₅₀ < 2,000 mg/kg

The toxicity testing procedures shall follow the protocols put forth in the Organization for Economic Cooperation and Development (OECD) Guidelines for the Testing of Chemicals. These protocols include: Acute Oral Toxicity Test (TG 401), Acute Inhalation Toxicity Test (TG 403), and Acute Dermal Toxicity Test (TG 402). To demonstrate compliance with this requirement, a mixture need not be tested if existing toxicological information demonstrates that each of the ingredients complies. It is assumed that the toxicity of the individual component compounds is additive. Data from the Registry of Toxic Effects of Chemical Substances (RTECS) and from the Hazardous Substances Data Bank (HSDB) will be accepted as well as peer-reviewed primary data.

4.2 Carcinogens and Reproductive Toxins

The product shall not contain any chemicals that are carcinogens or that are known to cause reproductive toxicity. Carcinogens are defined as those chemicals classified by the International Agency for Research on Cancer (IARC) as Group 1 (carcinogenic to humans), Group 2A (probably carcinogenic to humans), or Group 2B (possibly carcinogenic to humans) agents. Chemicals known to cause reproductive toxicity are defined as those listed by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (California Code of Regulations, Title 22, Division 2, Subdivision 1, Chapter 3, Sections 1200, et seq.).

For purposes of this standard, naturally occurring elements and chlorinated organics that may be present as a result of chlorination of the water supply and that are listed as carcinogens or reproductive toxins may be present as impurities if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 CFR Part 141.

4.3 Corrosivity and Causticity

The pH of the degreasing agent concentrate shall be less than 11.0 but greater than 2.5. The pH is measured using a pH meter and Method 9040 in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication, SW-846.

4.4 Skin and Eye Irritation

The degreasing product concentrate shall not be a skin or eye irritant. A product is considered a skin irritant if it has a mean score of 2 or more for either erythema and eschar formation or edema formation, based on the OECD dermal scoring system (OECD, TG 404). A product is classified as an eye irritant if it causes significant ocular lesions in any type of ocular tissue (i.e., cornea, iris, or conjunctivae) within 72 hours after exposure that persist for at least 24 hours. The product concentrate shall meet all of the following criteria (OECD, 1993):

- o Mean score for cornea opacity of less than 2
- o Mean score for iris lesions of less than 1
- o Mean score for redness of the conjunctivae of less than 2.5
- o Mean score for edema of the conjunctivae (chemosis) of less than 2

4.5 Flammability and Ignitability

The concentrated product shall not be ignitable (i.e., the flashpoint for the compound is above 140° F). In addition, the flash point of the final concentration of the degreasing product shall not be less than 40° F above the manufacturer's recommended usage temperature. The flash point of the degreasing agent shall be determined using either the Cleveland Open Cup Tester (ASTM D92-97), or a Tag Closed Tester (ASTM D56-97).

4.6 Photochemical Smog and Oxidant Production

The compound shall not contain substances that can contribute significantly to the production of photochemical smog and tropospheric ozone. Therefore, the volatile organic content of the product, as used, shall not exceed 50 g/L, as determined by EPA method 24 (40 C.F.R. Part 60).

4.7 Ozone Depletion

The product shall not contain any ozone-depleting substances.

4.8 Toxicity to Aquatic Life

The product shall not be toxic to aquatic life. A compound is considered not toxic to aquatic life if it meets one of the following criteria:

Acute LC50 daphnia or fish > 100 mg/L
Acute LC50 algae > 100 mg/L

For purposes of demonstrating compliance with this requirement, the product shall be tested. However, aquatic toxicity testing is not required if sufficient aquatic toxicity data exists for each of the ingredients of the product to demonstrate that the product mixture complies. Data from the RTECS and from the HSDB will be accepted, as well as peer-reviewed primary data. For the purposes of estimating the potential toxicity of the chemical mixture, it is assumed that the toxicity of the individual component compounds is additive.

Acute toxicity tests for the product shall follow the appropriate protocols put forth in the International Organization for Standardization (ISO) Determination of the Acute Lethal Toxicity of Substances to Freshwater Fish - Part 2 (ISO 7346-2); Determination of the Inhibition of the Mobility of *Daphnia magna* Straus - Acute Toxicity Test (ISO 6341); and/or Fresh Water Algal Growth Inhibition Test with *Scenedesmus subsicatus* and *Selenastrum capricarnutum*. (ISO 8692; 1989).

Exception to this criterion can be made for products that have LC50 and EC50 values that are greater than the solubility of the product in water.

4.9 Aquatic Biodegradability

The biodegradability of the finished product shall be determined using the protocols given in ISO Water-Quality Evaluation in an Aqueous Medium of the "Ultimate" Aerobic Biodegradability of Organic Compounds (ISO 7827: 1994 or ISO 9439: 1990). The compound shall meet the minimum requirement of 80% biodegradation based on dissolved organic content concentration, or 70% of theoretical maximum CO₂ production within 28 days. Exception to this criterion can be made for products that are practically insoluble, i.e., solubility less than 10 mg/L.

4.10 Eutrophication

Phosphates and phosphonates, including sodium salts and potassium salts, shall not be present in the product as used in quantities above 0.5% by weight of total phosphorus.

4.11 Disposal

The manufacturer shall either take back unused or spent products for recycling or disposal or provide the user with specific recycling and disposal instructions.

Appendix A: Test Method for Evaluating the Cleaning Effectiveness of Degreasing Agents

Appendix B: Test Method for Evaluating the Oil Separation Ability of Aqueous Degreasers

Appendix C: Labeling Requirements for Certification by Green Seal

Unless otherwise approved in writing by Green Seal, the following requirements shall apply:

1. The Green Seal Certification Mark shall appear on the product.

2. Whenever the Green Seal Certification Mark appears, it shall be accompanied by a description of the basis of certification. This description shall be in a location, style, and typeface that are easily readable by the consumer. The description shall read as follows:

"This product meets Green Seal's standard for cleaning/degreasing agents based on its reduced hazard to humans, reduced aquatic impacts, reduced smog production, and low ozone depletion potential."

3. Where a product is intended to be diluted with water by the user prior to use, the manufacturer label must state clearly and prominently that dilution is recommended and must state the recommended level of dilution.

4. The label must include detailed instructions for proper use, particularly with regard to the temperature at which the degreasing agent may safely be used and to the use of personal protective equipment.

5. A label must give specific instructions for recycling or disposal.