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SUBJECT 1204

OUTLINE OF INVESTIGATION

FOR

PARTS CLEANERS

Issue Number: 2

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Summary of Topics

This second issue of the Outline of Investigation for Parts Cleaners, Subject 1204, is being issued to update the references in Appendix A.

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INTRODUCTION

1 Scope

1.1 These requirements cover parts cleaners used for cleaning grease and similar substances from metallic parts.

1.2 These requirements cover electrically operated parts cleaners rated up to 600 V, or manual type parts cleaners with no electrical connection.

1.3 These units are intended for use with flammable or combustible liquids as detailed in the instruction manual provided with the unit.

1.4 These units are intended for installation and use in accordance with the National Electrical Code, NFPA 70, the Flammable and Combustible Liquids Code, NFPA 30, the Uniform Fire Code, NFPA 1, and the International Fire Code, IFC.

1.5 These requirements do not apply to units intended to be installed outdoors, intended for use with solvents that are considered unstable, or the physiological effects of using the equipment with solvents or hazardous waste.

2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this outline shall comply with the requirements for that component. See Appendix A for a list of standards covering components used in the products covered by this outline.

2.1.2 A component is not required to comply with a specific requirements that:

- a) Involves a feature or characteristic not required in the application of the component in the product covered by this outline, or
- b) Is superseded by a requirement in this outline.

2.1.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.1.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

2.2 Units of measurement

2.2.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

2.3 Undated references

2.3.1 Any undated reference to a code or standard appearing in the requirements of this outline shall be interpreted as referring to the latest edition of that code or standard.

3 Glossary

3.1 For the purposes of this outline, the following definitions apply.

3.2 AUTO-IGNITION TEMPERATURE – The minimum temperature at which fuel-air mixtures will ignite spontaneously. This temperature is to be determined either at atmospheric pressure (14.7 psig), or at the maximum pressure present in the area of the fuel-air mixture, whichever is higher. At atmospheric pressure, the auto-ignition temperature of a solvent shall be determined in accordance with the Standard Test Method for Auto-Ignition Temperature of Liquid Chemicals, ASTM E 659.

3.3 COMBUSTIBLE LIQUID – A material that has a fluidity greater than 300 penetration asphalt when tested in accordance with the Standard Test Method for Penetration for Bituminous Materials, ASTM D 5, and that has a closed cup flash point at or above 37.8°C (100°F). Combustible liquids are subdivided as follows:

- a) Class II liquids include those having flash points at or above 37.8°C and below 60°C (140°F);
- b) Class IIIA liquids include those having flash points at or above 60°C and below 93°C (200°F); and
- c) Class IIIB liquids include those having flash points at or above 93°C.

3.4 FLAMMABLE LIQUID – A material that has a fluidity greater than 300 penetration asphalt when tested in accordance with the Standard Test Method for Penetration for Bituminous Materials, ASTM D 5, and that has a closed cup flash point below 37.8°C (100°F) and a vapor pressure not exceeding 2068 mm Hg (40 psia). Flammable liquids are Class I liquids, and are subdivided as follows:

- a) Class IA liquids include those having flash points below 22.8°C (73°F) and having a boiling point below 37.8°C;
- b) Class IB liquids include those having flash points below 22.8°C and having a boiling point at or above 37.8°C; and
- c) Class IC liquids include those having flash points at or above 22.8°C and below 37.8°C.

3.5 FLASH POINT – The minimum temperature at which a liquid gives off vapor in sufficient concentration to form an ignitable mixture with air near the surface of the liquid within the vessel as specified by the appropriate test procedure and apparatus as follows:

- a) The flash point of a liquid having a viscosity less than 45 Saybold Universal Seconds (SUS) at 37.8°C (100°F) and a flash point below 93°C (200°F) as determined in accordance with the Standard Test Method for Flash Point by Tag Closed Cup Tester, ANSI/ASTM D 56 Rev A.

b) The flash point of a liquid having a viscosity of 45 SUS or more at 37.8°C or a flash point of 93°C or higher as determined in accordance with the Standard Test Methods for Flash Point by the Pensky-Martens Closed Cup Tester – IP Designation: 34/99, ANSI/ASTM D 93 Rev A.

c) The Standard Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus, ASTM D 3278, may be used for paints, enamels, lacquers, varnishes, and related units and their components having flash points between 0°C (32°F) and 110°C (230°F) and having a viscosity lower than 150 centistokes at 25°C (77°F).

d) The Standard Test Methods for Flash Point by Small Scale Closed Tester - IP Designation: 303/83 (88), ANSI/ASTM D 3828, may be used for materials other than those for which specific setaflash methods exist.

3.6 IGNITABLE MIXTURE – A vapor-air, gas-air, dust-air mixture or combinations of these mixtures that can be ignited by a static spark.

3.7 LINE VOLTAGE CIRCUIT – A circuit involving a potential of not more than 600 V and having circuit characteristics in excess of those of a low voltage circuit.

3.8 LOW VOLTAGE CIRCUIT – A circuit involving a potential of not more than 30 V (42.4 volts peak) and supplied by a primary battery, by a standard Class 2 transformer, or by an impedance which, as a unit, complies with all of the performance requirements for a Class 2 transformer.

3.9 LOWER FLAMMABILITY LIMIT (LFL) – The minimum concentration of vapor in air at which propagation of flame will occur in the presence of an ignition source. LFL is sometimes referred to as LEL, or lower explosive limit.

3.10 SOLVENT – A flammable or combustible liquid capable of dissolving another substance to form a uniformly dispersed mixture at the molecular or ionic level.

3.11 UNSTABLE LIQUID – A liquid that, in the pure state or as commercially produced or transported, will vigorously polymerize, decompose, undergo condensation reaction, or become self-reactive under conditions of shock, pressure, or temperature.

3.12 VESSEL – A container, tank, or other receptacle intended to contain solvent or other liquids.

CONSTRUCTION

4 General

4.1 Vats, lids, and supporting structures shall be constructed of steel, with a minimum thickness of 1.0 mm (0.04 in). The lid shall comply with the Lid Impact Test, Section 29.

4.2 Parts cleaners shall be provided with a fusible link assembly that will allow the lid to close in the event of a fire. See the Fusible Link Operation Test, Section 27.

5 Solvents

5.1 Parts cleaners can be used with water based solvents or with flammable or combustible solvents.

5.2 The solvents intended for use with the equipment are to be described in the instruction manual supplied with the equipment. See 34.3 and 35.2.

6 Pumps

6.1 General

6.1.1 Pumps for use in parts cleaners shall be of the submersible type and shall comply with 6.2 or 6.3.

6.2 Water based solvent pumps

6.2.1 Pumps for use with water based solvents shall be evaluated to the Standard for Motor-Operated Water Pumps, UL 778.

Exception: Pumps for use with water based solvents and complying with 6.3 are acceptable.

6.2.2 Pumps for use with water based solvents shall be of the magnetically induced type and permanently sealed.

6.3 Flammable and combustible liquid solvent pumps

6.3.1 Pumps for use with solvents other than water based shall be evaluated to the Standard for Power-Operated Pumps for Petroleum Dispensing Products, UL 79.

7 Supply Connections

7.1 General

7.1.1 Electrically powered parts cleaners shall be connected to a source of supply by either a power supply cord or a permanent connection.

7.1.2 Electrically powered parts cleaners connected by a supply cord shall comply with cord connected products, Section 7.2. Electrically powered parts cleaners that are permanently connected shall comply with permanently connected products, Section 7.3.

7.1.3 Electrically powered parts cleaners shall be provided with a connection to ground that complies with Grounding, Section 8.

7.2 Cord connected products

7.2.1 General

7.2.1.1 A cord connected unit shall be provided with a non-detachable cord and an attachment plug for connection to the supply circuit.

7.2.1.2 The power supply cord shall comply with the requirements of the Standard for Cord Sets and Power Supply Cords, UL 817.

7.2.1.3 The power supply cord shall be at least as serviceable as Type SJ cord and be evaluated for exposure to oil.

7.2.1.4 The power supply cord shall not be rated less than the rated voltage and current of the unit. In addition, the attachment plug shall be rated not less than 125 percent of the rated current of the unit.

7.2.1.5 The maximum length of the power supply cord shall be 2.44 m (8 ft).

7.2.2 Strain relief

7.2.2.1 Strain relief shall be provided to restrict a mechanical stress on an attached power supply cord from being transmitted to terminals, splices, or interior wiring.

7.2.2.2 Means shall be provided to restrict an attached power supply cord from being pushed into the enclosure of a unit through the cord entry hole if such displacement is likely to:

- a) Subject the cord to mechanical damage;
- b) Expose the cord to a temperature higher than that for which it is acceptable; or
- c) Reduce spacings, such as to a metal strain relief clamp, below the minimum required values.

7.2.3 Bushings

7.2.3.1 At a point where a flexible cord passes through an opening in a wall, barrier, or enclosing case, there shall be a bushing or similar device that shall be secured in place, and shall have a smooth, well-rounded surface against which the cord may bear. The heat and moisture resistant properties of the bushing material shall be such that the bushing is acceptable for the particular application.

7.2.3.2 If the cord hole is in porcelain, phenolic composition, or other nonconducting material, a smooth, well-rounded surface is considered to be equivalent to a bushing.

7.2.3.3 Ceramic materials and some molded compositions are acceptable generally for insulating bushing, but rubber material (other than in a motor) is not acceptable. Vulcanized fiber may be used if the bushing is not less than 1.2 mm (3/64 inch) thick and if it is formed and secured in place so that it will not be affected adversely by moist conditions.

7.2.3.4 A separate soft rubber, neoprene, or polyvinyl chloride bushing may be used in the frame of a motor or in the enclosure of a capacitor physically attached to a motor – but not elsewhere in a unit, except as indicated in 7.2.3.5 – if the bushing is:

- a) Not less than 1.2 mm (3/64 inch) thick, and
- b) Located so that it will not be exposed to oil, grease, oily vapor, or other substances having a deleterious effect on the compound used.

7.2.3.5 A bushing of any of the materials mentioned in 7.2.3.4 may be used at any point in a unit if used with a type of cord for which an insulating bushing is not required, and if the edges of the hole in which the bushing is mounted are smooth and free from burrs and fins.

7.2.3.6 An insulated metal grommet is acceptable in place of an insulating bushing if the insulating material used is not less than 0.8 mm (1/32 inch) thick and completely fills the space between the grommet and the metal in which it is mounted.

7.3 Permanently connected products

7.3.1 General

7.3.1.1 A unit intended for fixed installation to the building or permanent connection electrically to the power supply shall have provision for connection of one of the wiring systems that, in accordance with the National Electrical Code, NFPA 70, would be acceptable for the unit.

7.3.1.2 The location of a terminal box or compartment, where power supply connections are to be made to a unit intended to be permanently connected, shall be constructed so that these connections may be readily inspected after the unit is installed as intended.

7.3.1.3 A terminal compartment intended for the connection of a supply raceway shall be attached to the unit so that it will not turn with respect to the unit.

7.3.1.4 An electrical component shall not be mounted on a part, such as the cover of a wiring terminal compartment, which must be removed for the purpose of making or inspecting field wiring connections.

Exception: A single electrical component, such as a switch, a pilot light, or a similar device, may be mounted on a wiring compartment cover when:

- a) The component connecting leads are of a length that provides for the making and examination of field-wiring connections;*
- b) None of the component connections are to be field wired;*
- c) Strain relief is provided to prevent stress from being transmitted to the component wiring terminations and complies with the strain relief test described in Section 22;*
- d) The minimum size of the component leads is 18 AWG (0.82 mm²); and*
- e) Wiring termination on the component are recessed or protected by barriers of insulating or similar material that will provide protection from contact with wiring installed in the box, or unintentional contact during installation or inspection of field wiring.*

7.3.2 Wiring terminals

7.3.2.1 A unit intended for permanent connection to the power supply shall be provided with wiring terminals or leads for the connection of conductors having an ampacity of not less than 125 percent of the current rating of the unit when the load is continuous (3 hours or more) and not less than the current rating of the unit when the load will be intermittent.

7.3.2.2 For the purpose of these requirements, wiring terminals are terminals to which power supply or control connections will be made in the field when the unit is installed. It is to be assumed that 60°C (140°F) wire will be used for connections to a continuous load type of unit rated at 80 A or less and an intermittent load type of unit rated at 100 A or less. Wire rated for 75°C (167°F) will be assumed to be used with units rated in excess of these values.

7.3.2.3 A wiring terminal shall be provided with a soldering lug or a pressure wire connector securely fastened in place; for example bolted or held by a screw, except that a wire binding screw may be used at a wiring terminal intended to accommodate a 10 AWG (5.3 mm²) or smaller conductor if upturned lugs or the equivalent are provided to hold the wire in position.

7.3.2.4 A wiring terminal shall not turn or shift in position. Friction between surfaces is not an acceptable means to prevent turning or shifting. Examples of acceptable means are:

- a) The use of two screws or rivets;
- b) Square shoulders or mortises;
- c) A dowel pin, lug, or offset; or
- d) A connecting strap or clip fitted into an adjacent part.