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Subjects 1238 (87)

1655 Scott Blvd.
Santa Clara, CA 95050
December 16, 1996

TO: Electrical Council of Underwriters Laboratories Inc.,
Fire Council of Underwriters Laboratories Inc.,
Subscribers to UL's Standards Service for:
Control Equipment for Use with Flammable Liquid Dispensing Devices
Power-Operated Dispensing Devices for Petroleum Products

SUBJECT: Adopted Requirements for the Second Edition of the Standard for Control Equipment
for Use With Flammable Liquid Dispensing Devices, UL 1238; ESTABLISHED
EFFECTIVE DATE

UL has reviewed all comments received in response to the Subjects 1238 (87) bulletin dated July 29, 1996, and has decided to adopt the requirements essentially as proposed. The text of the adopted requirements is shown in Appendix A.

Questions regarding interpretation of requirements should be directed to the responsible UL Staff. Please see Appendix B of this bulletin regarding designated responsibility for the subject product categories.

ESTABLISHED EFFECTIVE DATE

These new and revised requirements are now in effect.

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Subjects 1238 (87)

-2-

December 16, 1996

This bulletin should only be kept with your copy of Standard UL 1238 until revision pages incorporating these requirements are issued. UL anticipates issuing revision pages by January, 1997.

UNDERWRITERS LABORATORIES INC.

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1238____CGB

APPENDIX A

ADOPTED REQUIREMENTS AND ESTABLISHED EFFECTIVE DATE FOR THE
SECOND EDITION OF THE STANDARD FOR
CONTROL EQUIPMENT FOR USE WITH FLAMMABLE LIQUID DISPENSING DEVICES,
UL 1238

20 Separation of Circuits

20.1 A factory-installed conductor shall be separated by a barrier or segregated as specified in 20.2 from a factory-installed conductor and from an uninsulated live part used in a different circuit.

Exception: Conductors provided with insulation rated for the highest voltage involved are not required to comply with this requirement.

20.1 revised December 16, 1996

20.2 Segregation of a conductor shall be accomplished by clamping, routing, or equivalent means that provides permanent separation from a conductor or an uninsulated live part of a different circuit.

20.2 revised December 16, 1996

20.3 The equipment shall be constructed so that a field-installed conductor of any circuit is segregated as specified in 20.5, or separated by a barrier (see 20.4) from:

- a) A field-installed conductor connected to any other circuit, unless:
 - 1) Both circuits are Class 2 or Class 3, or both circuits are other than Class 2 or Class 3 and
 - 2) The conductors of both circuits are insulated for the maximum voltage of either circuit.
- b) An uninsulated live part of any other circuit.

Exception No. 1: Field-installed conductors that come into contact with the wiring terminals of other circuits comply with the intent of this requirement when provided with marked instructions that specify the use of Type RH, TW, RFH-2, or conductors that have been determined to be equivalent in accordance with the National Electrical Code, ANSI/NFPA 70.

Exception No. 2: Field-installed conductors having insulation less than that provided with the wires specified in Exception No. 1, and that come into contact with low-voltage wiring terminals comply with the intent of this requirement when the short-circuiting of such terminals does not result in a risk of fire or electric shock.

- c) Any part that is sharp or exceeds the temperature rating of the field-installed conductor and is capable of damaging the field-installed conductor. See 10.1.6 and 38.4.
- d) A factory-installed conductor connected to any other circuit, unless the conductors of both circuits are insulated for the maximum voltage of either circuit.

Exception: The field-installed conductors are not required to be separated by a barrier when installation instructions are included that explain the proper procedure for maintaining separation and which, upon investigation, are found to achieve the required separation.

20.3 revised December 16, 1996

20.4 With respect to 20.3, when the intended uses of the device are such that in some applications a barrier is required while in other applications no barrier is required, a removable barrier, or one having openings for the passage of conductors, is not prohibited from being employed. Instructions for the use of such a barrier are to be a permanent part of the device.

20.4 added December 16, 1996

20.5 Field-installed conductors are not prohibited from being segregated from each other, and from uninsulated live parts or factory-installed conductors connected to different circuits of the device. This segregation is to be achieved by arranging the location of openings in an enclosure for the various field-installed conductors with respect to the terminals or other uninsulated live parts and factory- or field-installed conductors so that a minimum 1/4 inch (6.4 mm) permanent separation is provided.

20.5 added December 16, 1996

20.6 With respect to 20.5, when the number of openings in the enclosure does not exceed the minimum required for the intended wiring of the device, and when such openings are located opposite a set of terminals, it is to be assumed that a conductor entering an opening is to be connected to the terminals opposite that opening. When more than the minimum number of openings are provided, the possibility of a conductor entering an opening other than that opposite the terminal to which it is to be connected and contacting insulated conductors or uninsulated live parts connected to a different circuit is to be investigated in accordance with 10.1.6.

20.6 added December 16, 1996

A P P E N D I X B**DESIGNATED RESPONSIBILITY FOR UL
PRODUCT CATEGORIES**

EQXX, CONTROL, MONITORING AND AUXILIARY EQUIPMENT
EQXX2, CONTROL, MONITORING AND AUXILIARY EQUIPMENT —
COMPONENT
EQXX7, CONTROL, MONITORING AND AUXILIARY EQUIPMENT CERTIFIED FOR
CANADA
EQXX8, CONTROL, MONITORING AND AUXILIARY EQUIPMENT CERTIFIED FOR
CANADA — COMPONENT
ERKQ, RETROFIT ASSEMBLIES
EWTV, FLAMMABLE LIQUID DISPENSING DEVICES, POWER-OPERATED
EWTV7, FLAMMABLE LIQUID DISPENSING DEVICES, POWER-OPERATED
CERTIFIED FOR CANADA
EXAU, FLAMMABLE LIQUID DISPENSING DEVICES, POWER-OPERATED,
REBUILT

The individual shown in the following table is involved with the investigation of products covered under the subject categories. The Primary Designated Engineer (**shown in UPPERCASE letters**) coordinates the establishment and uniform interpretation of UL requirements applicable to the product categories.

Should you have questions regarding the interpretation of the requirements adopted in this bulletin or any adopted requirements that affect your product, you are encouraged to contact the individual at the office to which you normally submit your products.

The Industry Advisory Conference (IAC) Chairman for the subject categories is John Hawley at UL's Northbrook office. The IAC Chairman oversees the significant interpretations made by the Primary Designated Engineer and arbitrates any differences regarding interpretation of UL requirements.

CCN	Office/Subsidiary	Responsible Engineer	Extension
EQXX, EQXX2, EQXX7, EQXX8, ERKQ, EWTV, EWTV7, EXAU	Northbrook	R. A. FLORCZYK	42620

UL 1238

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Control Equipment for Use with Flammable Liquid Dispensing Devices





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Underwriters Laboratories Inc., founded in 1894, is chartered as a not-for-profit organization without capital stock, under the laws of the State of Delaware, to establish, maintain, and operate laboratories for the examination and testing of devices, systems and materials to determine their relation to hazards to life and property, and to ascertain, define and publish standards, classifications and specifications for materials, devices, products, equipment, constructions, methods, and systems affecting such hazards.

UL Standards for Safety are developed under a procedure which provides for participation and comment from the affected public as well as industry. The procedure takes into consideration a survey of known existing standards and the needs and opinions of a wide variety of interests concerned with the subject matter of the standard. Thus manufacturers, consumers, individuals associated with consumer-oriented organizations, academicians, government officials, industrial and commercial users, inspection authorities, insurance interests and others provide input to UL in the formulating of UL Standards for Safety, to keep them consonant with social and technological advances.

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March 15, 1996

Standard for

Control Equipment for Use With Flammable Liquid Dispensing Devices

UL 1238, Second Edition

Accompanying this transmittal notice is a copy of the second edition of UL 1238.

A CHANGE IS INDICATED BY A SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEM. THE REVISION IS CONSIDERED NON-SUBSTANTIVE AND IS BEING ISSUED TO ELIMINATE THE OXYGEN BOMB TEST. THE OXYGEN BOMB TEST IS NO LONGER APPROPRIATE IN MOST CASES DUE TO THE ADDITION OF ANTIOXIDANTS TO RUBBER AND POLYMERIC COMPOUNDS. THEREFORE, UL IS ELIMINATING THE OXYGEN BOMB TEST AND REPLACING IT WITH AN AIR OVEN AGING TEST WHICH IS USED FOR THERMOPLASTIC COMPOUNDS.

THIS EDITION OF THE STANDARD IS NOW IN EFFECT.

Revised and/or additional pages may be issued from time to time.

MARCH 15, 1996

1

UL 1238

Standard for

Control Equipment for Use With Flammable Liquid Dispensing Devices

First Edition – August, 1975

Second Edition

March 15, 1996

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc.

Revisions of this standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest published set of revision pages.

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FOREWORD

A. This Standard contains basic requirements for products covered by Underwriters Laboratories Inc. (UL) under its Follow-Up Service for this category within the limitations given below and in the Scope section of this Standard. These requirements are based upon sound engineering principles, research, records of tests and field experience, and an appreciation of the problems of manufacture, installation, and use derived from consultation with and information obtained from manufacturers, users, inspection authorities, and others having specialized experience. They are subject to revision as further experience and investigation may show is necessary or desirable.

B. The observance of the requirements of this Standard by a manufacturer is one of the conditions of the continued coverage of the manufacturer's product.

C. A product which complies with the text of this Standard will not necessarily be judged to comply with the Standard if, when examined and tested, it is found to have other features which impair the level of safety contemplated by these requirements.

D. A product employing materials or having forms of construction differing from those detailed in the requirements of this Standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be judged to comply with the Standard.

E. UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of UL represent its professional judgment given with due consideration to the necessary limitations of practical operation and state of the art at the time the Standard is processed. UL shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard.

F. Many tests required by the Standards of UL are inherently hazardous and adequate safeguards for personnel and property shall be employed in conducting such tests.

INTRODUCTION

1 Scope

1.1 These requirements cover electrical equipment used for the control of flammable liquid dispensing devices rated 600 volts or less. Such control equipment is intended to be installed in ordinary locations in accordance with the National Electrical Code, NFPA 70.

1.2 These requirements also cover electrical control equipment that is capable of being installed in or over a hazardous area as defined by the Flammable and Combustible Liquids Code, NFPA 30. Electrical control equipment for installation in a Class I, Division 1 or Division 2 hazardous area shall comply with the applicable requirements of the Standard for Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations, UL 886; and the Standard for Switches for Use in Hazardous (Classified) Locations, UL 894.

1.3 These requirements cover general-use field-installed equipment. They also cover controls intended to be factory installed on or in certain devices as operating controls. Typical devices covered by these requirements include:

- a) Control Consoles – Prepay, post-pay, remote totalizing, or remote actuating and monitoring devices located indoors or within a structure some distance from the dispensing device.
- b) Credit Acceptance Units – Dollar bill, coin, token, pulse, or credit card activated devices which are capable of being installed on, adjacent to, or away from the dispensing device.
- c) Communication Units – Visual, pulse, or audio devices which allow the transmittal of data or information. Such devices include audio or visual systems between the service station attendant and the customer, and data processing systems between the service station and a remote data processing terminal.
- d) Electric Computer Resets – Electrically authorized or electrically operated devices which reset a mechanical computer.

1.4 These requirements do not cover safety or emergency controls which automatically or manually interrupt the operation of a dispensing device.

1.5 The term "device" refers to any equipment covered by this standard.

1.6 These requirements do not cover purely mechanical systems such as hose nozzle attachments and pneumatic or hydraulic actuators.

1.7 A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involve a risk of fire, electric shock, or injury to persons shall be evaluated using the appropriate additional component and end-product requirements as determined necessary to maintain the acceptable level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific provisions of this standard cannot be judged to comply with this standard. Where considered appropriate, revision of requirements shall be proposed and adopted in compliance with the methods employed for development, revision, and implementation of this standard.

2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this standard shall comply with the requirements for that component.

2.1.2 A component need not comply with a specific requirement that:

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

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

2.1.4 Specific components are recognized as being 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 for which they have been recognized.

2.1.5 Except for portable equipment, provision shall be made for securely mounting control equipment in position. Bolts, screws, or other parts used for mounting equipment shall be independent of those used for securing components of the equipment to the frame, base, or panel.

2.2 Units of measurement

2.2.1 When a value for measurement is followed by a value in other units in parentheses, the second value is only approximate. The first stated value is the requirement.

2.2.2 Unless otherwise indicated, all voltage and current values mentioned in this standard are root-mean-square (rms).

3 Glossary

3.1 For the purpose of this standard, the following terms apply.

3.2 ABBREVIATIONS – For the purpose of this standard, the following definitions apply:

alternating current – ac
American Wire Gage – AWG
direct current – dc
Galvanized Sheet Gage – GSG
hertz – Hz
Manufacturers Standard Gage – MSG
National Electrical Code, ANSI/NFPA 70 – NEC
Pounds per square inch gauge – psig
Root-mean-square – rms

3.3 BRANCH CIRCUIT – That portion of the building wiring system beyond the final overcurrent device on the power-distribution panel protecting the circuit to the field-wiring terminals in a permanently connected device or to the receptacle outlet for cord-connected devices.

3.4 CIRCUITS, ELECTRICAL –

a) **Secondary** – Those circuits supplied from transformer output windings which are electrically isolated, i.e., insulated from ground.

b) **Class 2 (Low-Voltage)** – A circuit involving a potential of not more than 42.4 volts peak supplied by:

- 1) An energy-limiting Class 2 transformer;
- 2) A nonenergy-limiting Class 2 transformer and an overcurrent protective device that has been evaluated for limiting energy to Class 2 levels;
- 3) The combination of an isolated transformer secondary winding and a fixed impedance or reliable regulating network which complies with the applicable performance requirements for an energy-limiting Class 2 transformer;
- 4) A dry cell battery having output characteristics no greater than those of an energy-limiting Class 2 transformer; or
- 5) The combination of a rechargeable battery and a fixed impedance or reliable regulating network which complies with the applicable performance requirements for an energy-limiting Class 2 transformer.

c) **Line-Voltage** – Any field connected source of supply other than battery power, nominally 50 – 60 Hz, 115, 208, or 230 volts, is classified as a line-voltage circuit.

3.5 CORD- AND PLUG-CONNECTED DEVICE – A device intended for connection to the branch-circuit power line by means of a supply cord. Such a device is intended to be moved for reasons of interchange or servicing.

3.6 GENERAL PURPOSE ENCLOSURE – A metallic or nonmetallic enclosure that is not required to be explosion proof.

4 Instructions

4.1 A copy of the operating and installation instructions intended to accompany each device, or equivalent information, is to be used as a reference in the examination and test of the device. For this purpose, a printed edition is not required.

4.2 The instructions shall include such directions and information as deemed by the manufacturer to be adequate for the proper installation, maintenance, and use of the device.

CONSTRUCTION

5 Frame and Enclosure

5.1 General

5.1.1 Control equipment shall be so formed and assembled that it has the strength and rigidity required to resist the abuses to which it is capable of being subjected, without increasing its fire hazard due to total or partial collapse resulting in reduction of spacings, loosening or displacement of parts, or other serious defects.

5.1.2 The equipment shall be provided with an enclosure of material evaluated for use in this application which shall house all electrical parts that are capable of presenting a risk of fire, electric shock, or injury to persons under any condition of use.

5.1.3 A portion of an overall enclosure is allowed to be omitted when the equipment is intended to be installed in conjunction with other equipment where the latter completes the enclosure, and installation instructions are provided.

5.1.4 Among the factors taken into consideration when an enclosure is being evaluated are its:

- a) Physical strength,
- b) Resistance to impact,
- c) Moisture absorptive properties,
- d) Flammability,
- e) Resistance to corrosion,
- f) Resistance to distortion at temperatures to which the enclosure is capable of being subjected under conditions of normal or abnormal use,
- g) Resistance to solvents, and
- h) Resistance to the generation of dangerous static charges.

5.2 Covers

5.2.1 An enclosure and a part of an enclosure such as a door, cover, or similar parts shall be provided with means for firmly securing it in place.

5.2.2 Sheet-metal screws threading directly into metal shall not be used to attach a cover, door, or other part removed to install field wiring or for operation of the equipment. Sheet-metal screws are allowed to thread into sheet-metal nuts that are permanently mounted and suitably protected against corrosion. Machine screws and self-tapping machine screws are allowed to thread directly into sheet-metal walls.

5.2.3 Sheet-metal screws mounting internal components that are not removed for installation or operation are allowed to thread directly into metal.

5.2.4 A snap-on cover that gives access to exposed live parts and that does not require a tool for removal shall withstand the following tests:

- a) A cover that is capable of being removed with one hand shall not be released when a squeezing force of 14 pounds (62.3 N) is applied at any two points, the distance between which shall not exceed 5 inches (127 mm), as measured by a tape stretched tightly over that portion of the surface of the cover that is capable of being encompassed by the palm of the hand. The test shall be performed before and after ten removal and replacement operations.
- b) A cover shall not become disengaged from the case when a direct pull of 14 pounds (62.3 N) is applied. For this test, the cover is to be gripped at any two convenient points. The test shall be performed before and after ten removal and replacement operations.
- c) A cover shall withstand an impact force of 1 foot-pound (1.4 J) applied to accessible faces of the cover (one blow per face) without being displaced, and there shall not be damage to internal parts or malfunction of the control as a result of this test. The radius of the ball used for this test shall not be less than 1 inch (25.4 mm).

5.2.5 The continuity of the bonding means for a snap-on or fastener-attached cover shall comply with the requirements in 13.1.1 – 13.1.4, 13.2.1, and 13.2.2.

5.2.6 An enclosure cover shall be hinged when it gives access to a fuse, thermal cutout, or any other overload-protective device, the normal functioning of which requires renewal, or when it is required to open the cover in connection with the normal operation of the device.

5.2.7 A door or cover giving access to a fuse or thermal cutout in other than a low-voltage circuit shall shut closely against a 1/4 inch (6.4 mm) rabbet or strips that have been determined to be equivalent, or shall have either turned flanges for the full length of four edges or angle strips fastened to it. Flanges or angle strips shall fit closely with the outside of the walls of the box proper and shall overlap the edges of the box not less than 1/2 inch (12.7 mm). An appropriate construction that affords protection that has been determined to be equivalent or a combination of flange and rabbet is allowable.

5.2.8 Strips used to provide rabbets, or angle strips fastened to the edges of a door shall be secured at not less than two points, not more than 1-1/2 inches (38 mm) from each end of each strip and at points between these end fastenings not more than 6 inches (152 mm) apart.

5.2.9 A hinged cover shall be provided with a spring latch or catch, and not depend solely upon screws or other similar means requiring the use of a tool to hold it closed. For a hinged cover that is provided, although not required, a hasp, sliding latch, or other means for holding the cover closed is allowed to be employed.

5.3 Cast metal

5.3.1 Cast metal for a general purpose enclosure shall be at least 1/8 inch (3.2 mm) thick at every point, of greater thickness at reinforcing ribs and door edges, and not less than 1/4 inch (6.4 mm) thick at tapped holes for conduit; except that, other than at plain or threaded conduit holes, die-cast metal shall not be less than 3/32 inch (2.4 mm) thick for an area greater than 24 square inches (155 cm²) or having any dimension greater than 6 inches (152 mm), and shall not be less than 1/16 inch (1.6 mm) thick for an area of 24 square inches (155 cm²) or less and not having dimensions greater than 6 inches. The area limitation for metal 1/16 inch thick is allowed by the provision of reinforcing ribs subdividing a larger area. Die-cast metal of 0.035 inch (0.9 mm) minimum thickness is allowed to be employed in lieu of 1/16 inch thick die-cast metal when the enclosure will not be used as a splice box and when the voltage rating of the complete control