

**Underwriters Laboratories Inc.®**

An independent, not-for-profit organization testing for public safety

April 25, 1996**Revision pages for****Standard for****Halon 1211 Recovery/Recharge Equipment****UL 2006, Second Edition**

Attached to this transmittal notice is a revision of the Second edition of UL 2006.

A CHANGE ON A PAGE DATED APRIL 25, 1996 IS INDICATED BY A SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEM, PRECEDED AND FOLLOWED BY AN ASTERISK.

THESE NEW AND REVISED REQUIREMENTS ARE NOW IN EFFECT.

The new and revised requirements are substantially in accordance with UL's bulletin on this subject dated August 17, 1995. The bulletin is now obsolete and may be discarded.

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

With the inclusion of the accompanying material, the standard consists of pages dated as shown in the following checklist:

Page	Date
1	May 30, 1995(Reprinted: April 25, 1996)
2, 3	April 25, 1996
4 – 28	May 30, 1995
29, 30, 30A, 30B	April 25, 1996
31 – 50	May 30, 1995
51, 52	April 25, 1996
53 – 61	May 30, 1995
62 – 64, 64A	April 25, 1996
65 – 67, A1	May 30, 1995

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1

UL 2006

Standard for

Halon 1211 Recovery/Recharge Equipment

First Edition – February, 1991

Second Edition

May 30, 1995

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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CONTENTS**FOREWORD****INTRODUCTION**

1 Scope	5
2 General	5
3 Glossary	6
4 Installation and Operating Instructions	7

CONSTRUCTION

5 General	7
6 Assembly	8
7 Enclosure	9
8 Protection Against Corrosion	15
9 Accessibility of Uninsulated Live Parts and Film-Coated Wire	15
10 Supply Connections	20
11 Internal Wiring	23

ELECTRICAL COMPONENTS

12 Current-Carrying Parts	25
13 Insulating Material	25
14 Switches and Controllers	25
15 Lamps and Lampholders	26
16 Fuseholders	26
17 Receptacles	26
18 Receptacle Overcurrent Protection	27
19 Capacitors	27
20 Motors	27
21 Overload- or Thermal-Protective Devices	29

SPACINGS

22 High-Voltage Circuits	29
23 Low-Voltage Circuits	30B

PROTECTION AGAINST INJURY TO PERSONS

24 General	30B
25 Sharp Edges	31
26 Enclosures and Guards	31
27 Materials	32
28 Rotating or Moving Members	33
29 Parts Subject to Pressure	33
30 Pressure-Relief Devices	35
31 Switches, Controls, and Interlocks	36
32 Stability	37
33 Strength of Handles	38
34 Surface Temperature	38

35 Storage Containers	39
-----------------------------	----

PERFORMANCE

36 General	39
37 Leakage Current Test	39
38 Starting Current Test	42
39 Input Test	43
40 Temperature Test	43
41 System Contamination Test	47
42 Filter-Drier Test	48
43 Efficiency Test	49
44 Grounding Continuity Test	50
45 Dielectric Voltage-Withstand Test	51
46 Rain Test	52
47 Strain Relief Test	55
48 Tests for Halon 1211 Hoses	55
49 Switches and Controls Test	58
50 Abnormal Operation Test	59
51 Gaskets and "O" Rings Tests	59
52 Accelerated Aging Tests on Gaskets, Sealing Compounds, and Adhesives	60
53 Metallic Coating Thickness Test	61

MANUFACTURING AND PRODUCTION TESTS

54 Dielectric Voltage-Withstand Test	62
55 Grounding Continuity Test	64A
56 Pressure Vessel Assembly Test	64A
57 Start-to-Discharge of Pressure-Relief Device Test	64A
58 Pressure Tests	64A

MARKING

59 General	65
60 Cautionary	66

APPENDIX A

Standards for Components	A1
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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.

21 Overload- or Thermal-Protective Devices

21.1 An overload- or thermal-protective device shall have a current and voltage rating not less than the load that it controls.

21.2 A protective device such as a fuse, the functioning of which requires renewal or replacement, shall be in a readily accessible location. A protective device shall be wholly inaccessible from outside the product without opening a door or cover.

Exception: The operating handle of a circuit breaker, the operating button of a manually operable motor protector, and similar parts may project outside the enclosure.

SPACINGS

22 High-Voltage Circuits

22.1 The following electrical spacing requirements apply to high-voltage circuits, as defined in 3.2(a).

22.1 revised April 25, 1996

22.2 Unless specifically noted otherwise, the spacings between uninsulated live parts of opposite polarity and between an uninsulated live part and a dead metal part shall be not less than the values indicated in Table 22.1.

22.3 **22.3 deleted April 25, 1996**

22.4 **22.4 deleted April 25, 1996**

22.5 **22.5 deleted April 25, 1996**

22.6 **22.6 revised and relocated as 22.12 April 25, 1996**

Table 22.1
Electrical spacings in refrigerated and/or
air-handling compartments

Ratings		Minimum spacing in Inches (mm)			
Volt-Amperes	Volts	Through air ^a	Over surface ^a	To enclosure ^c	
2000 or less	300 or less	1/8 ^b (3.2)	1/4 (6.4)	1/4	(6.4)
	301–600	3/8 (9.5)	1/2 (12.7)	1/2	(12.7)
More than 2000	150 or less	1/8 ^b (3.2)	1/4 (6.4)	1/2	(12.7)
	151–300	1/4 (6.4)	3/8 (9.5)	1/2	(12.7)
	301–600	3/8 (9.5)	1/2 (12.7)	1/2	(12.7)

^a At points other than field-wiring terminals, the spacings for heater elements only may be as indicated below provided the elements are not subject to moisture, such as may result from condensation on cooled surfaces:

1/16 inch (1.6 mm) Through Air and Over Surface for heaters rated 0–300 volts.

1/4 inch (6.4 mm) Through Air and Over Surface for heaters rated 301–600 volts.

^b The spacings between wiring terminals of opposite polarity or between a wiring terminal and ground shall be not less than 1/4 inch (6.4 mm), except that if short-circuiting or grounding of such terminals will not result from projecting strands of wire, spacing need not be greater than that given in the above Table, Wiring terminals are those connected in the field and not factory wired.

^c Includes fittings for conduit or metal-clad cable.

Table 22.1 revised April 25, 1996

22.7 The "Through Air" and "Over Surface" spacings given in Tables 22.1 and 22.2 at an individual component part are to be based on the total volt-ampere consumption of the load or loads which the component controls. For example, the spacings at a component which controls only the compressor motor are based on the volt-amperes of the compressor motor. The spacings at a component which controls loads in addition to the compressor motor are based on the sum of the volt-amperes of the loads so controlled, except that spacings at a component which independently controls separate loads are based on the volt-amperes of the larger load. The volt-ampere values for the loads referred to above are to be determined by the marked rating of the loads, except that for loads which are not required to have a marked rating, the measured inputs is to be used in determining the volt-ampere values.

22.7 added April 25, 1996

22.8 With reference to 22.6 and 22.7, the spacings To Enclosure are not to be applied to an individual enclosure of a component part within an outer enclosure or cabinet.

22.8 added April 25, 1996

22.9 The spacings indicated in Table 22.2 are applicable only to electrical components mounted in totally enclosed nonrefrigerated and/or nonair handling compartments which are free of moisture, including that caused by condensation. At wiring terminals and for circuits over 250 volts or over 2000 volt-amperes, spacings in Table 22.1 apply.

22.9 added April 25, 1996

Table 22.2
Spacings in non-refrigerated and/or non-air handling
compartments

Ratings		Minimum spacing in Inches (mm)					
Volt-amperes	Volts	Through air		Over surface		To enclosure ^a	
0 – 2000	0 – 125	1/16	(1.6 mm)	1/16	(1.6 mm)	1/4	(6.4 mm)
	125 – 250	3/32	(2.4 mm)	3/32	(2.4 mm)	1/4	(6.4 mm)

NOTE – See 22.9.

^a Includes fittings for conduit or metal-clad cable.

Table 22.2 added April 25, 1996

22.10 All uninsulated live parts connected to different circuits shall be spaced from one another as though they were parts of opposite polarity in accordance with the requirements indicated above and shall be judged on the basis of the highest voltage involved.

22.10 added April 25, 1996

22.11 The above spacing requirements do not apply to the inherent spacings of a component part of the equipment, such as a hermetic motor-compressor, motor, snap switch, controller, attachment-plug cap, and the like, for which spacing requirements are given in a standard for the component. However, the electrical clearance resulting from the assembly of a component into the complete machine, including clearance to dead metal or enclosures, shall be as indicated herein.

22.3 revised and relocated as 22.11 April 25, 1996

22.12 An insulating liner or barrier of fiber or similar material, employed where spacings would otherwise be less than the required values, shall be no less than 0.028 inch (0.7 mm) thick and shall be so located or of such material that it will not be adversely affected by arcing.

Exception No. 1: Fiber no less than 0.013 inch (0.3 mm) thick may be used in conjunction with an air spacing of no less than 50 percent of the spacing required for air alone.

Exception No. 2: Material having a lesser thickness may be used if it has equivalent insulating, mechanical, and flammability properties when compared with materials in thicknesses specified above.

22.6 revised and relocated as 22.12 April 25, 1996

22.13 If higher than rated potential is developed in a motor circuit through the use of capacitors, the rated voltage of the system shall be employed in applying the spacings indicated in this section.

Exception: If the developed steady-state potential as determined in the Temperature and Pressure Test, Section 38, exceeds 500 volts, the developed potential is to be used in determining spacings for the parts affected.

22.13 added April 25, 1996

22.14 The spacing between uninsulated live terminals of the components in an electric-discharge lamp circuit and a dead metal part or enclosure shall be not less than 1/2 inch (12.7 mm) if the potential is 600 volts or less and not less than 3/4 inch (19.1 mm) if the potential is 601 – 1000 volts.

22.14 added April 25, 1996

23 Low-Voltage Circuits

23.1 The following electrical spacing requirements apply to low-voltage circuits, as defined in 3.2(b).

23.1 revised April 25, 1996

23.2 A circuit derived from a source of supply classified as a high-voltage circuit, by having resistance connected in series with the supply circuit as a means of limiting the voltage and current, is not considered to be a low-voltage circuit.

23.3 The spacing for low-voltage electrical components that are installed in a circuit that includes a pressure-limiting device, motor overload protective device, or other protective device, where a short or grounded circuit may result in a risk of fire, electric shock, or injury to persons shall comply with the following:

a) The spacing between an uninsulated live part and the wall of a metal enclosure shall be not less than 1/8 inch (3.2 mm).

b) The spacing between uninsulated live parts regardless of polarity and between the uninsulated live part and a dead metal part, other than the enclosure, that may be grounded when the device is installed, shall be not less than 1/32 inch (0.8 mm) provided that the construction of the parts maintains required spacings.

c) The spacing between wiring terminals, regardless of polarity, and between the wiring terminal and a dead metal part, including the enclosure and fittings for the connection of conduit, which may be grounded when the device is installed, shall not be less than 1/4 inch (6.4 mm).

23.3 revised April 25, 1996

PROTECTION AGAINST INJURY TO PERSONS

24 General

24.1 If the operation and maintenance of a product by the user involves a risk of injury to persons, means shall be provided to reduce the risk.

24.2 When judging a product with respect to the requirement in 24.1, consideration shall be given to reasonably foreseeable misuse of the product.

45 Dielectric Voltage-Withstand Test

45.1 A product shall withstand, without breakdown, a test potential applied for 1 minute between line-voltage live parts and dead metal parts and between live parts of high and low voltage circuits. The test potential shall be 1000 V plus twice rated voltage at any frequency between 40 and 70 hertz.

Exception No. 1: The test potential for units rated at not more than 1/2 horsepower (373 watts output) shall be 1000 V.

Exception No. 2: If the steady-state voltage developed in a motor circuit through the use of capacitor exceeds 500 V, as measured during the temperature and pressure test, the test potential for the parts affected shall be 1000 V plus twice the developed capacitor voltage.

45.1 revised April 25, 1996

45.1.1 Equipment employing a low-voltage circuit shall withstand, without breakdown, a test potential of 500 volts applied for 1 minute between low-voltage live parts and dead metal parts. The test potential shall be at any frequency between 40 and 70 hertz. If components specified in 23.3 are employed in the low-voltage circuit, the dielectric voltage withstand test shall also be conducted between live parts of opposite polarity.

45.1.1 added April 25, 1996

45.1.2 With reference to the previous paragraph, the test between low-voltage parts of opposite polarity is to be conducted on magnet coil windings of the transformer after breaking the inner coil lead where it enters the layer. This opposite polarity test may be waived on the complete assembly provided that the components have been separately subjected to this test.

45.1.2 added April 25, 1996

45.2 *45.2 deleted April 25, 1996*

45.3 A 500 volt-ampere or larger transformer, the output voltage of which is essentially sinusoidal and can be varied, is to be used to determine compliance with the previous paragraphs. The applied potential is to be increased gradually from zero until the required test value is reached and is to be held at that value for 1 minute.

Exception: The requirement of a 500 volt-ampere or larger transformer can be waived if the high potential testing equipment maintains the specified high potential voltage at the equipment during the duration of the test.

45.3 revised April 25, 1996

45.4 If the charging current through a capacitor or capacitor-type filter connected across the line, or from line to earth ground, is large enough to make it impossible to maintain the required alternating-current test potential, the capacitors and capacitor-type filters may be tested as described in the next paragraph.

45.4 added April 25, 1996

45.5 The capacitors and capacitor-type filters mentioned in the previous paragraph are to be subjected to a direct-current test potential of 1414 volts for equipment rated 250 volts or less or 1414 volts plus 2.828 times the rated circuit voltage for equipment rated at more than 250 volts. The direct-current test potential is to be maintained for 1 minute without breakdown.

45.5 added April 25, 1996

45.6 Components providing a d.c. path in parallel with the insulation to be tested, such as discharge resistors for filter capacitors and voltage limiting devices (transient voltage suppressors), may be disconnected during the test.

45.6 added April 25, 1996

46 Rain Test

46.1 Equipment exposed to weather shall be subjected to a rain exposure without creating a risk of electric shock due to current leakage or insulation breakdown.

46.2 The equipment is to be installed in accordance with the manufacturer's instructions and subjected to the rain exposure under conditions most likely to cause entrance of water into or onto the electrical components. The duration of exposure is to be 1 hour.

46.3 The rain test apparatus is to consist of three spray heads mounted in a water supply pipe rack as shown in Figure 46.1. Spray heads are to be constructed in accordance with the details shown in Figure 46.2. The water pressure for all tests is to be maintained at 5 psig (34 kPa) at each spray head. The distance between the center nozzle and the equipment is to be approximately 5 feet (1.5 m). The equipment is to be brought into the focal area of the three spray heads in such a position and under such conditions that the greatest quantity of water will enter it. The spray is to be directed at an angle of 45 degrees to the vertical toward the louvers or other openings closest to current-carrying parts. The equipment is to be operated so that electrical components are energized.

46.4 Following the rain test exposure, the equipment shall have an insulation resistance of not less than 50,000 ohms measured between current-carrying parts and noncurrent-carrying parts, and shall withstand the Dielectric Voltage-Withstand Test, Section 45.

52.5 Sealing compounds are to be applied to the surface they are intended to seal. A representative sample of the surface with the sealing compound applied is to be subjected to a test involving exposure to air at 87°C (190°F) for a period of 7 days. The sealing compound shall not melt, become brittle, or otherwise deteriorate to a degree that will affect its sealing properties as determined by comparing an aged sample to an unaged sample.

52.6 If gaskets are secured by adhesives, samples of the gasket adhesive and mounting surface are to be exposed to:

- a) 87°C (190°F) air oven for 7 days, and
- b) Immersion in distilled water for 3 days.

The force required to peel the gasket from its mounting surface after exposure shall be not less than 50 percent of the value determined on "as-received" samples and in no case less than 2 pounds per inch (350 N/m) of gasket width.

53 Metallic Coating Thickness Test

53.1 This test is to be conducted when necessary to establish compliance with requirements in 7.6.2 and 7.6.3.

53.2 The solution to be used for this test is to be made from distilled water containing 200 grams per liter of chemically pure chromic acid, CrO_3 and 50 grams per liter of chemically pure concentrated sulfuric acid, H_2SO_4 . The latter is equivalent to 27 milliliters per liter of chemically pure concentrated sulfuric acid, specific gravity 1.84 containing 96 percent of H_2SO_4 .

53.3 The test solution is to be contained in a glass vessel, such as a separatory funnel, with the outlet equipped with a stopcock and a capillary tube of approximately 0.025 inch (0.64 mm) inside bore and 5.5 inches (140 mm) long. The lower end of the capillary tube is to be tapered to form a tip; each drop from which is to be approximately 0.05 milliliter. To preserve an effectively constant level, a small glass tube is to be inserted in the top of the funnel through a rubber stopper and its position adjusted so that the rate of dropping is 100 ± 5 drops per minute when the stopcock is open. An additional stopcock may be used in place of the glass tube to control the rate of dropping.

53.4 The sample and the test solution are to be kept in the test room long enough to acquire the temperature of the room, which is to be noted and recorded. The test is to be conducted at a room temperature of 70 to 90°F (21.1 to 32.2°C).

53.5 Each sample is to be thoroughly cleaned before testing. All grease, lacquer, paint, and other nonmetallic coatings are to be removed completely by means of an acceptable solvent. Samples then are to be thoroughly rinsed in water and dried with clean cheesecloth. Care is to be exercised to avoid contact of the cleaned surface with the hands or any foreign material.

53.6 The sample to be tested is to be supported 0.7 – 1 inch (17.8 – 25.4 mm) below the orifice so that the drops of solution strike the point to be tested and run off quickly. The surface to be tested is to be inclined approximately 45 degrees from horizontal.

53.7 After cleaning, the sample to be tested is to be placed under the orifice. The stopcock is to be opened and the time, in seconds, is to be measured with a stopwatch until the dropping solution dissolves off the protective metallic coating and exposes the base metal. The initial appearance of the base metal is recognizable by the change in color at that point.

53.8 Each sample of a test lot is to be subjected to the test at three or more points, excluding cut, stenciled, and threaded surfaces, on the inside surface, and at an equal number of points on the outside surface, at points where the metallic coating may be expected to be the thinnest. On enclosures made from precoated sheets, the external corners that are subjected to the greatest deformation can have thin coatings.

53.9 To calculate the thickness of the coating being tested, the thickness factor appropriate for the temperature at which the test was conducted is to be selected from Table 53.1 and multiplied by the time, in seconds, required to initially expose base metal as determined in 53.7.

MANUFACTURING AND PRODUCTION TESTS

54 Dielectric Voltage-Withstand Test

54.1 **54.1 revised and relocated as 54.10 April 25, 1996**

54.2 **54.2 revised and relocated as 54.11 April 25, 1996**

54.3 **54.3 deleted April 25, 1996**

54.4 **54.4 revised and separated into 54.13 and 54.14 April 25, 1996**

54.5 **54.5 revised and relocated as 54.15 April 25, 1996**

54.6 **54.6 relocated as 54.16 April 25, 1996**

54.7 **54.7 revised and relocated as 54.17 April 25, 1996**

54.8 **54.8 revised and relocated as 54.18 April 25, 1996**

54.9 **54.9 revised and relocated as 54.19 April 25, 1996**

54.10 Each product shall withstand without electrical breakdown, as a routine production-line test, the application of a potential at a frequency within the range of 40 – 70 hertz, or a dc potential

a) Between the primary wiring, including connected components, and accessible dead metal parts that are likely to become energized; and

b) Between primary wiring and accessible low-voltage, 42.4 volts peak or less, metal parts, including terminals.

54.1 revised and relocated as 54.10 April 25, 1996

54.11 The production-line test shall be conducted in the time and at the potential specified in either Condition A or Condition B of Table 54.1.

54.2 revised and relocated as 54.11 April 25, 1996

Table 54.1
Production-line test conditions

Product rating	Condition A			Condition B		
	Potential, volts ac ^c volts dc		Time, seconds	Potential, volts ac ^c volts dc		Time, seconds
250 volts or less with no motor rated more than 1/2 horsepower (373 watts output)	1000	1400	60	1200	1700	1
250 volts or less with a motor rated more than 1/2 horsepower (373 watts output)	1000 + 2V ^a	1400 + 2.8V ^a	60	1200 + 2.4V ^a	1700 + 3.4V ^a	1
251 – 600 volts	1000 + 2V ^b	1400 + 2.8V ^b	60	1200 + 2.4V ^b	1700 + 3.4V ^b	1
^a Maximum marked voltage but not less than 120 volts if the maximum marked voltage is within the range 105 – 120 volts, and not less than 240 volts if the maximum marked voltage is within the range 210 – 240 volts. ^b Maximum marked voltage. ^c Where there are capacitors across the insulation under test (e.g radio-frequency filter capacitors), it is recommended that d.c. test voltages are used.						

Table 54.1 revised April 25, 1996

54.12 For equipment employing low-voltage circuits, the test is to be conducted with the low-voltage circuit connected to the cabinet, chassis, or other dead metal part so that the potential applied between the high-voltage live parts and dead metal parts will simultaneously be applied between high-voltage live parts and low-voltage circuits.

54.12 added April 25, 1996

54.13 The test shall be conducted when the product is fully assembled. It is not intended that the product be unwired, modified, or disassembled for the test.

Exception No. 1: A part such as a snap cover or a friction-fit knob that would interfere with the performance of the test need not be in place.

Exception No. 2: The test may be performed before final assembly if the test represents that for the completed product. Any component not included shall not affect the results with respect to determination of possible risk of electric shock resulting from miswiring, defective component, insufficient spacings, and the like.

54.4 revised and separated into 54.13 and 54.14 April 25, 1996

54.14 Solid-state and similar components that might be damaged by a secondary effect (induced voltage surge, excessive heating, and the like), of the test may be short-circuited by means of a temporary electrical jumper or the test may be conducted without the component electrically connected, providing the wiring and terminal spacings are maintained. Additionally, components providing a d.c. path in parallel with the insulation to be tested (primary to dead-metal) may be disconnected during the test. Examples of such components are discharge resistors for filter capacitors and voltage limiting devices such as transient voltage suppressors (other than capacitors).

54.4 revised and separated into 54.13 and 54.14 April 25, 1996

54.15 The test equipment shall have a means of:

- a) Indicating the test potential,
- b) An audible or visual indicator of electrical breakdown, and
- c) Either a manually reset device to restore the equipment after electrical breakdown or an automatic reject feature of any noncomplying unit.

When an ac test potential is applied, the test equipment shall include a transformer having an essentially sinusoidal output.

54.5 revised and relocated as 54.15 April 25, 1996

54.16 If the output of the test-equipment transformer is less than 500 volt-amperes, the equipment shall include a voltmeter in the output circuit to directly indicate the test potential.

54.6 relocated as 54.16 April 25, 1996

54.17 If the output of the test-equipment transformer is 500 volt-amperes or more, the test potential may be indicated:

- a) By a voltmeter in the primary circuit or in a tertiary-winding circuit;
- b) By a selector switch marked to indicate the test potential; or
- c) For equipment having a single test-potential output, by a marking in a readily visible location to indicate the test potential. If a marking is used without an indicating voltmeter, the equipment shall include a positive means, such as an indicator lamp, to indicate that the manually reset switch has been reset following a dielectric breakdown.

54.7 revised and relocated as 54.17 April 25, 1996

54.18 Test equipment other than that described in the preceding paragraphs may be used if determined to accomplish the intended factory control.

54.8 revised and relocated as 54.18 April 25, 1996

54.19 During the test,

- a) The primary switch is to be in the on position,
- b) Both sides of the primary circuit of the product are to be connected together and to one terminal of the test equipment, and
- c) The second test-equipment terminal is to be connected to accessible dead metal.

Exception: *A product having circuitry that is resistive, high-impedance winding, or the like and is not subject to excessive secondary-voltage build-up in case of electrical breakdown during the test may be tested:*

- a) *With a single-pole primary switch, if used, in the off position; or*
- b) *With only one side of the primary circuit connected to the test equipment when the primary switch is in the on position or when a primary switch is not used.*

54.9 revised and relocated as 54.19 April 25, 1996

55 Grounding Continuity Test

55.1 Each product shall be tested, as a routine production-line test, to determine that grounding continuity exists between the grounding blade of the attachment plug and the accessible dead metal parts of the product that are likely to become energized.

55.2 Only a single test need be conducted if the accessible metal selected is conductively connected by design to all other accessible metal.

55.3 Any indicating device, such as an ohmmeter, a battery-and-buzzer combination, or the like, can be used to determine compliance with the grounding continuity requirement in 55.1.

56 Pressure Vessel Assembly Test

56.1 Each pressure vessel manufactured shall be visually examined for quality of welds, pipe connection fittings, and general assembly details.

56.2 Each non-ASME coded vessel and ASME vessel coded "UM" shall be tested as described in 56.3 and shall show no evidence of permanent deformation or external leakage.

56.3 The test is to be conducted on a fully assembled vessel after all fabrication, including the attachment of saddles, legs, wheel supports, fittings, or the like, has been completed. For the test, the vessel is to be filled with water to exclude all air and then subjected to the test pressure specified in 56.4 for a period of 20 seconds minimum. The pressure is to be maintained for a longer period if necessary to complete the inspection for leaks.

Exception: The production-line testing can be conducted using an aerostatic pressure if:

- a) Acceptable protection for personnel conducting the test is provided, and*
- b) Suitable means for detection of external leakage are provided.*

56.4 The test pressure for a non-ASME coded vessel is to be 1-1/2 times the start-to-discharge setting of the pressure relief device. The test pressure for an ASME vessel coded "UM" is to be 1-1/2 times the rated working pressure of the vessel.

57 Start-to-Discharge of Pressure-Relief Device Test

57.1 Each non-ASME coded pressure-relief device shall be tested by the manufacturer for the start-to-discharge pressure by subjecting the pressure-relief device to a gradually increasing air pressure until the device begins to open. The start-to-discharge pressure shall be in the range of 90 to 100 percent of its assigned start-to-discharge pressure setting.

58 Pressure Tests

58.1 Each unit shall be tested and proved tight at not less than the design pressure marked on the equipment. See 59.9.

Northbrook, Illinois • (708) 272-8800
 Melville, New York • (516) 271-6200
 Santa Clara, California • (408) 985-2400
 Research Triangle Park,
 North Carolina • (919) 549-1400



Subject 2083 (1963, 2006)
 (In reply, refer to
 Subject 2083)

333 Pfingsten Road
 Northbrook, IL 60062
 August 18, 1995

TO: Casualty Council of Underwriters Laboratories Inc.,
 Fire Council of Underwriters Laboratories Inc.,
 Subscribers to UL's Standards Service for Halon 1301 Recovery/Recycling Equipment

SUBJECT: Request for Comments on Proposed Requirements for the First Edition of the Standard
 for Halon 1301 Recovery/Recycling Equipment, UL 2083; PROPOSED EFFECTIVE DATE

SUMMARY OF TOPICS

This bulletin proposes the following changes in requirements:

Clarification of the electrical spacings requirements.

Clarification of the Dielectric Voltage-Withstand Tests.

COMMENTS DUE: September 15, 1995

Attached as Appendix A for your review and comment are proposed requirements for UL 2083. 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 category.

Please note that proposed requirements are of a tentative and early nature and are for review and comment only. Current requirements are to be used to judge a product until these requirements are published in final form.

PROPOSED EFFECTIVE DATE

These proposed requirements will not necessitate a review or additional testing of currently Listed products. Therefore, UL proposes that the new requirements become effective upon publication.

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Subject 2083

-2-

August 18, 1995

REQUEST FOR COMMENTS ON PROPOSALS

Please provide the following:

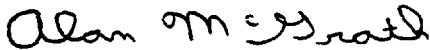
1. Your comments concerning the proposed requirements; and
2. Your comments concerning the proposed effective date, should the proposals be adopted.

Written comments should be sent to the attention of Alan McGrath at UL's Northbrook office, 333 Pfingsten Road, Northbrook, IL 60062-2096. Please reference all correspondence to Subject 2083.

All comments should be sent by September 15, 1995.

Unless specifically requested to do so, UL will not acknowledge comments indicating concurrence with these proposals.

UNDERWRITERS LABORATORIES INC.



ALAN McGRATH (Ext. 43038)
Project Engineer
Standards Department

REVIEWED BY:



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Engineering Group Leader
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SR:JTM

2083BUL.N01

PROPOSED REQUIREMENTS ARE OF A TENTATIVE AND EARLY NATURE AND ARE FOR REVIEW AND COMMENT ONLY. CURRENT REQUIREMENTS ARE TO BE USED TO JUDGE A PRODUCT UNTIL THESE REQUIREMENTS ARE PUBLISHED IN FINAL FORM.

A P P E N D I X A

PROPOSED REQUIREMENTS AND PROPOSED EFFECTIVE DATE FOR THE FIRST EDITION OF THE STANDARD FOR HALON 1301 RECOVERY/RECYCLING EQUIPMENT, UL 2083

For your convenience in review, proposed additions to existing requirements are shown underlined and proposed deletions are shown ~~lined-out~~. Proposed new requirements are identified by (NEW). In the case of extensively revised paragraphs, the original text is identified by (CURRENT) and is ~~lined-out~~, followed by the proposed text identified by (PROPOSED). A paragraph that is proposed to be deleted is identified by (DELETED) and is shown ~~lined-out~~.

1. ELECTRICAL SPACINGS

RATIONALE

UL proposes that the spacing sections, Sections 22 and 23, be revised in order to:

- a) Reflect current technology,
- b) Add alternative constructions,
- c) Achieve consistent wording for similar standards.

IMPACT

If these revisions are adopted, manufacturer's of presently Listed equipment would not have to modify their products. Therefore, a review or retest of presently Listed equipment would not be required.

PROPOSAL

SPACINGS

22 High-Voltage Circuits

~~22.1 Spacing requirements apply only to high voltage circuits.~~

22.1 — 22.6 revised and relocated as 22.7 — 22.16 (date of publication)

~~22.2 Unless specifically noted otherwise, the spacings between uninsulated live parts of opposite polarity and between an uninsulated live part and a dead metal part shall be not less than the values indicated in Table 22.1.~~

22.1 — 22.6 revised and relocated as 22.7 — 22.16 (date of publication)

(CURRENT)

Table 22.1
Spacings

Potential involved, volts	Minimum spacings, inch (mm)					
	Product employing a motor having a diameter 7 inches (178 mm) or less ^a			Product employing a motor having a diameter more than 7 inches (178 mm) through 11 inches (279 mm) ^a		
	Over surface		Through air	Over surface		Through air
0-125	3/32	(2.4) ^b	3/32	(2.4) ^b	1/4	(6.4) ^{c,d}
126-250	3/32	(2.4)	3/32	(2.4)	1/4	(6.4) ^{c,d}
251-600	1/2	(12.7) ^c	3/8	(9.5) ^c	1/2	(12.7) ^c

^a This is the diameter, measured in the plane of the laminations, of the circle circumscribing the stator frame, excluding lugs, boxes, and the like, used solely for the motor mounting, assembly, or connection.

^b For a product having a motor rated 1/3 horsepower (250 W output) or less, these spacings may be not less than 1/16 inch (1.6 mm).

^c Spacings of not less than 3/32 inch (2.4 mm) are acceptable throughout a product with a universal motor only.

^d Film-coated wire is considered to be an uninsulated live part. However, a spacing of not less than 3/32 inch over surface and through air between film-coated wire, rigidly supported and held in place on a coil, and a dead metal part is acceptable in a product rated more than 250 volts or employing a motor having a diameter of more than 7 inches (178 mm). (See note a).

~~22.3 The inherent spacings of a component supplied as part of a product, such as a snap switch, lampholder, or motor, are judged under the requirements for that component. The spacings from a component to another component and to the enclosure, and the spacings at wiring terminals are specified in Table 22.1.~~

~~22.1 — 22.6 revised and relocated as 22.7 — 22.16 (date of publication)~~

~~22.4 Motor spacings shall comply with the applicable requirements in the Standard for Electric Motors, UL 1004.~~

~~22.1 — 22.6 revised and relocated as 22.7 — 22.16 (date of publication)~~

~~22.5 In the application of 22.2, 22.3, and Table 22.1 to a motor not rated in horsepower, use is to be made of the appropriate table for the relationships between horsepower and full load current for motors given in the National Electrical Code, ANSI/NFPA 70-1990.~~

~~22.1 — 22.6 revised and relocated as 22.7 — 22.16 (date of publication)~~

~~22.6 An insulating liner or barrier of vulcanized fiber or similar material employed in lieu of spacings shall not be less than 1/32 inch (0.8 mm) thick; and shall be so located or of such material that it will not be adversely affected by arcing.~~

~~Exception: Fiber not less than 1/64 inch (0.4 mm) thick may be used in conjunction with an air spacing of not less than 50 percent of the spacing required for air alone.~~

~~22.1 — 22.6 revised and relocated as 22.7 — 22.16 (date of publication)~~

(NEW)

22.7 The following electrical spacing requirements apply to high-voltage circuits, as defined in 3.2(a).

22.7 added (date of publication)

(NEW)

22.8 Unless specifically noted otherwise, the spacings between uninsulated live parts of opposite polarity and between an uninsulated live part and a dead metal part shall be not less than the values indicated in Table 22.1. The "To Enclosure" spacings given in Table 22.1 are not to be applied to an individual enclosure of a component part within an outer enclosure or cabinet.

22.8 added (date of publication)

(PROPOSED)

Table 22.1
Electrical spacings in refrigerated and/or
air-handling compartments

Ratings		Minimum spacing in inches (mm)		
Volt-Amperes	Volts	Through air ^a	Over surface ^a	To enclosure ^c
2000 or less	300 or less	1/8 ^b (3.2)	1/4 (6.4)	1/4 (6.4)
	301-600	3/8 (9.5)	1/2 (12.7)	1/2 (12.7)
More than 2000	150 or less	1/8 ^b (3.2)	1/4 (6.4)	1/2 (12.7)
	151-300	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)
	301-600	3/8 (9.5)	1/2 (12.7)	1/2 (12.7)

^a At points other than field-wiring terminals, the spacings for heater elements only may be as indicated below provided the elements are not subject to moisture, such as may result from condensation on cooled surfaces:

1/16 inch (1.6 mm) Through Air and Over Surface for heaters rated 0-300 volts.

1/4 inch (6.4 mm) Through Air and Over Surface for heaters rated 301-600 volts.

^b The spacings between wiring terminals of opposite polarity or between a wiring terminal and ground shall be not less than 1/4 inch (6.4 mm), except that if short-circuiting or grounding of such terminals will not result from projecting strands of wire, spacing need not be greater than that given in the above Table. Wiring terminals are those connected in the field and not factory wired.

^c Includes fittings for conduit or metal-clad cable.

Table 22.1 revised (date of publication)

(NEW)

22.9 The "Through Air" and "Over Surface" spacings given in Tables 22.1 and 22.2 at an individual component part are to be based on the total volt-ampere consumption of the load or loads which the component controls. For example, the spacings at a component which controls only the compressor motor are based on the volt-amperes of the compressor motor. The spacings at a component which controls loads in addition to the compressor motor are based on the sum of the volt-amperes of the loads so controlled, except that spacings at a component which independently controls separate loads are based on the volt-amperes of the larger load. The volt-ampere values for the loads referred to above are to be determined by the marked rating of the loads, except that for loads which are not required to have a marked rating, the measured inputs is to be used in determining the volt-ampere values.

22.9 added (date of publication)

(NEW)

22.10 With reference to 22.8 and 22.9, the spacings To Enclosure are not to be applied to an individual enclosure of a component part within an outer enclosure or cabinet.

22.10 added (date of publication)

(NEW)

22.11 The spacings indicated in Table 22.2 are applicable only to electrical components mounted in totally enclosed nonrefrigerated and/or nonair handling compartments which are free of moisture, including that caused by condensation. At wiring terminals and for circuits over 250 volts or over 2000 volt-amperes, spacings in Table 22.1 apply.

22.11 added (date of publication)

(NEW)

Table 22.2
Spacings^a in non-refrigerated and/or non-air handling
compartments

Ratings		Minimum spacing in inches (mm)					
Volt-amperes	Volts	Through air		Over surface		To enclosure ^b	
0 – 2000	0 – 125	1/16	(1.6 mm)	1/16	(1.6 mm)	1/4	(6.4 mm)
	125 – 250	3/32	(2.4 mm)	3/32	(2.4 mm)	1/4	(6.4 mm)
a See 22.11.							
b Includes fittings for conduit or metal-clad cable.							

Table 22.2 added (date of publication)

(NEW)

22.12 All uninsulated live parts connected to different circuits shall be spaced from one another as though they were parts of opposite polarity in accordance with the requirements indicated above and shall be judged on the basis of the highest voltage involved.

22.12 added (date of publication)

(NEW)

22.13 The above spacing requirements do not apply to the inherent spacings of a component part of the equipment, such as a hermetic motor-compressor, motor, snap switch, controller, attachment-plug cap, and the like, for which spacing requirements are given in a standard for the component. However, the electrical clearance resulting from the assembly of a component into the complete machine, including clearance to dead metal or enclosures, shall be as indicated herein.

22.13 added (date of publication)

(NEW)

22.14 An insulating liner or barrier of fiber or similar material, employed where spacings would otherwise be less than the required values, shall be no less than 0.028 inch (0.7 mm) thick and shall be so located or of such material that it will not be adversely affected by arcing.

Exception No. 1: Fiber no less than 0.013 inch (0.3 mm) thick may be used in conjunction with an air spacing of no less than 50 percent of the spacing required for air alone.

Exception No. 2: Material having a lesser thickness may be used if it has equivalent insulating, mechanical, and flammability properties when compared with materials in thicknesses specified above.

22.14 added (date of publication)

(NEW)

22.15 If higher than rated potential is developed in a motor circuit through the use of capacitors, the rated voltage of the system shall be employed in applying the spacings indicated in this section.

Exception: *If the developed steady-state potential as determined in the Temperature and Pressure Test, Section 14, exceeds 500 volts, the developed potential is to be used in determining spacings for the parts affected.*

22.15 added (date of publication)

(NEW)

22.16 The spacing between uninsulated live terminals of the components in an electric-discharge lamp circuit and a dead metal part or enclosure shall be not less than 1/2 inch (12.7 mm) if the potential is 600 volts or less and not less than 3/4 inch (19.1 mm) if the potential is 601 – 1000 volts.

22.16 added (date of publication)

23 Low-Voltage Circuits

23.1 The following electrical spacing requirements apply to low-voltage circuits, as defined in 3.2(b).

23.1 revised (date of publication)

23.2 A circuit derived from a source of supply classified as a high-voltage circuit, by having resistance connected in series with the supply circuit as a means of limiting the voltage and current, is not considered to be a low-voltage circuit.

23.3 The spacing for low-voltage electrical components that are installed in a circuit that includes a pressure-limiting device, motor overload protective device, or other protective device, where a short or grounded circuit may result in a risk of fire, electric shock, or injury to persons shall comply with (a) and (b) of the following:

a) The spacing between an uninsulated live part and the wall of a metal enclosure shall be not less than 1/8 inch (3.2 mm).

b) The spacing between uninsulated live parts regardless of polarity and between the uninsulated live part and a dead metal part, other than the enclosure, that may be grounded when the device is installed, shall be not less than 1/32 inch (0.8 mm) provided that the construction of the parts maintains required spacings.

(c) The spacing between uninsulated live parts, regardless of polarity, and between an uninsulated live part and a dead metal part, other than the enclosure, which may be grounded when the device is installed, shall be not less than 1/32 inch (0.8 mm) provided that the construction of the parts is such that spacings will be maintained.

23.3 revised (date of publication)

23.4 The spacings in low-voltage circuits that do not contain devices such as indicated in 23.3 are not specified.

2. DIELECTRIC VOLTAGE-WITHSTAND TEST

RATIONALE

UL proposes to revise the Dielectric Voltage-Withstand Test located in the Performance Section of the standard. The revisions are being made to:

- a) Reflect current technology,
- b) Add alternative methods,
- c) Editorially revise the wording of the dielectric voltage-withstand test to provide more uniform wording among UL standards, and to provide a consistent procedure for conducting the test,
- d) Revise the 60 Hz potential to 40 – 70 Hz.

IMPACT

If these revisions are adopted, manufacturers of presently Listed equipment would not have to modify their products. Therefore, a review or retest of presently Listed equipment would not be required.

45 Dielectric Voltage-Withstand Test

~~45.1 A product shall withstand for 1 minute without breakdown the application of a 60 hertz essentially sinusoidal potential between live parts and dead metal parts, between circuits that are different potentials and are not electrically connected, or between live parts of opposite polarity for a test on a capacitor as mentioned in (c), with the product at the maximum operating temperature reached in normal use. The test potential shall be:~~

- ~~a) One thousand volts for a product employing a motor rated 1/2 horsepower (373 W output) or less and 250 volts or less.~~
- ~~b) One thousand volts plus twice the rated voltage for a product employing a motor rated at more than 1/2 horsepower or more than 250 volts.~~
- ~~c) One thousand volts plus twice rated voltage between the terminals of a capacitor used for radio interference elimination or arc suppression.~~

45.1 – 45.3 revised and relocated as 45.4 – 45.10 (date of publication)

~~45.2 The test potential for the secondary circuit of a product employing a transformer or autotransformer shall be:~~

- ~~a) One thousand volts plus twice the operating voltage if the secondary operates at 251 – 600 volts.~~

b) ~~One thousand volts if the secondary operates at 51 – 250 volts.~~

e) ~~Five hundred volts if the secondary operates at 50 volts or less.~~

Exception: This does not apply if the secondary circuit is supplied from a Class 2 transformer.

45.1 – 45.3 revised and relocated (date of publication)

~~45.3 To determine whether a product complies with the requirements in 45.1 and 45.2, the product is to be tested by means of a 500 volt ampere or larger transformer, having an output voltage that is essentially sinusoidal and can be varied. The applied potential is to be increased from zero until the required test value is reached and is to be held at that value for 1 minute. The increase in the applied potential is to be at a substantially uniform rate and as rapid as consistent with its value being correctly indicated by a voltmeter.~~

Exception: A 500 volt ampere or larger capacity transformer need not be used if the transformer is provided with a voltmeter to measure directly the applied output potential.

45.1 – 45.3 revised and relocated as 45.4 – 45.10 (date of publication)

(NEW)

45.4 A product shall withstand, without breakdown, a 40 – 70 Hz potential applied for 1 minute between line-voltage live parts and dead metal parts and between live parts of high and low voltage circuits. The test potential shall be 1000 V plus twice rated voltage.

Exception No. 1: The test potential for units rated at not more than 1/2 horsepower (373 watts output) shall be 1000 V.

Exception No. 2: If the steady-state voltage developed in a motor circuit through the use of capacitor exceeds 500 V, as measured during the temperature and pressure test, the test potential for the parts affected shall be 1000 V plus twice the developed capacitor voltage.

45.4 added (date of publication)

(NEW)

45.5 Equipment employing a low-voltage circuit shall withstand, without breakdown, a 40 – 70 hertz potential of 500 volts applied for 1 minute between low-voltage live parts and dead metal parts. If components specified in 23.3 are employed in the low-voltage circuit, the dielectric voltage withstand test shall also be conducted between live parts of opposite polarity.

45.5 added (date of publication)

(NEW)

45.6 With reference to the previous paragraph, the test between low-voltage parts of opposite polarity is to be conducted on magnet coil windings after breaking the inner coil lead where it enters the layer. This opposite polarity test may be waived on the complete assembly provided that the components have been separately subjected to this test.

45.6 added (date of publication)

(NEW)

45.7 A 500 volt-ampere or larger transformer, the output voltage of which is essentially sinusoidal and can be varied, is to be used to determine compliance with the previous paragraphs. The applied potential is to be increased gradually from zero until the required test value is reached and is to be held at that value for 1 minute.

Exception: *The requirement of a 500 volt-ampere or larger transformer can be waived if the high potential testing equipment maintains the specified high potential voltage at the equipment during the duration of the test.*

45.7 added (date of publication)

(NEW)

45.8 If the charging current through a capacitor or capacitor-type filter connected across the line, or from line to earth ground, is large enough to make it impossible to maintain the required alternating-current test potential, the capacitors and capacitor-type filters may be tested as described in 45.9.

45.8 added (date of publication)

(NEW)

45.9 The capacitors and capacitor-type filters mentioned in 45.8 are to be subjected to a direct-current test potential of 1414 volts for equipment rated 250 volts or less or 1414 volts plus 2.828 times the rated circuit voltage for equipment rated at more than 250 volts. The direct-current test potential is to be maintained for 1 minute without breakdown.

45.9 added (date of publication)

(NEW)

45.10 Components providing a d.c. path in parallel with the insulation to be tested, such as discharge resistors for filter capacitors and voltage limiting devices, should be disconnected during the test.

45.10 added (date of publication)

3. PRODUCTION LINE DIELECTRIC VOLTAGE WITHSTAND TEST

RATIONALE

UL proposes to revise the Dielectric Voltage-Withstand Test located in the Manufacturing and Production Tests Section of the standard. The revisions are being made to:

- a) Reflect current technology,
- b) Add alternative methods,
- c) Achieve consistent wording for similar standards,
- d) Revise the 60 Hz potential to 40 – 70 Hz.

IMPACT

If these revisions are adopted, manufacturers of presently Listed equipment would not have to modify their products. Therefore, a review or retest of presently Listed equipment would not be required.

MANUFACTURING AND PRODUCTION TESTS

51 Dielectric Voltage-Withstand Test

51.1 Each product shall withstand without electrical breakdown, as a routine production-line test, the application of a 40 – 70 hertz or a dc potential between:

- a) The primary wiring, including connected components, and accessible dead metal parts that are likely to become energized, and

b) Between primary wiring and accessible low-voltage metal parts, including terminals.

51.2 The production-line test shall be in accordance with either Condition A or Condition B of Table 51.1.

51.3 The product may be in a heated or unheated condition for the test.

(CURRENT)

Table 51.1
Production-line test conditions

Appliance rating	Condition A		Condition B	
	Potential, volts	Time, seconds	Potential, volts	Time, seconds
1/2 horsepower (373 W output) or less and 250 volts or less	1000	60	1200	1
More than 1/2 horsepower or more than 250 volts	$1000 + 2V^a$	60	$1200 + 2.4V^a$	1
^a V = maximum marked voltage but not less than 240 volts.				

(PROPOSED)

Table 51.1
Production-line test conditions

Product rating	Condition A			Condition B		
	Potential, volts ac ^c volts dc		Time, seconds	Potential, volts ac ^c volts dc		Time, seconds
250 volts or less with no motor rated more than 1/2 horsepower (373 watts output)	1000	1400	60	1200	1700	1
250 volts or less with a motor rated more than 1/2 horsepower (373 watts output)	1000 + 2V ^a	1400 + 2.8V ^a	60	1200 + 2.4V ^a	1700 + 3.4V ^a	1
251 – 600 volts	1000 + 2V ^b	1400 + 2.8V ^b	60	1200 + 2.4V ^b	1700 + 3.4V ^b	1
^a Maximum marked voltage but not less than 120 volts if the maximum marked voltage is within the range 105 – 120 volts, and not less than 240 volts if the maximum marked voltage is within the range 210 – 240 volts. ^b Maximum marked voltage. ^c Where there are capacitors across the insulation under test (e.g. radio-frequency filter capacitors), it is recommended that d.c. test voltages are used.						

51.3.1 Solid-state and similar components that might be damaged by a secondary effect (induced voltage surge, excessive heating, and the like), of the test may be short-circuited by means of a temporary electrical jumper or the test may be conducted without the component electrically connected, providing the wiring and terminal spacings are maintained. Additionally, components providing a d.c. path in parallel with the insulation to be tested (primary to dead-metal) may be disconnected during the test. Examples of such components are discharge resistors for filter capacitors and voltage limiting devices such as transient voltage suppressors (other than capacitors).

51.3.1 added (date of publication)

51.4 The test is to be conducted when the product is complete – fully assembled. It is not intended that the product be unwired, modified, or disassembled for the test.

Exception No. 1: A part such as a snap cover or a friction-fit knob that would interfere with the performance of the test need not be in place.

Exception No. 2: The test may be performed before final assembly if the test represents that for the completed product. Any component not included shall not affect the results with respect to determination of possible risk of electric shock resulting from miswiring, defective component, insufficient spacings, and the like.

51.4 revised (date of publication)

51.5 The test equipment shall include a transformer having an essentially sinusoidal output, a means of indicating the test potential, an audible or visual indicator of electrical breakdown, and either a manually reset device to restore the equipment after electrical breakdown or an automatic reject feature of any unacceptable unit.

51.6 If the output of the test equipment transformer is less than 500 volt-amperes, the equipment shall include a voltmeter in the output circuit to directly indicate the test potential.

51.7 If the output of the test equipment transformer is 500 volt-amperes or larger, the test potential may be indicated by:

- a) A voltmeter in the primary circuit or in a tertiary winding circuit,
- b) A selector switch marked to indicate the test potential, or
- c) A marking in a readily visible location to indicate the test potential of equipment having a single test potential output.

If marking is used without an indicating voltmeter, the equipment shall include a positive means, such as a power-on lamp to indicate that the manually reset switch has been reset following a tripout.

51.8 Test equipment other than that described in 51.5—51.7 the preceding paragraphs may be used if found to accomplish the intended factory control.

51.8 revised (date of publication)

51.9 During the test, the primary switch is to be in the on position, both sides of the primary circuit of the product are to be connected together and to one terminal of the test equipment, and the second test-equipment terminal is to be connected to the accessible dead metal.

Exception No. 1: A product – resistive, high-impedance winding, and the like – having circuitry not subject to excessive secondary-voltage buildup in case of electrical breakdown during the test may be tested with a single-pole primary switch, if used, in the off position, or with only one side of the primary circuit connected to the test equipment when the primary switch is in the on position, or when a primary switch is not used.

~~*Exception No. 2: The primary switch is not required to be in the on position if the testing means applies full test potential between primary wiring and dead metal parts with the switch not in the on position.*~~

51.9 revised (date of publication)

(NEW)

51.10 For equipment employing low-voltage circuits, the test is to be conducted with the low-voltage circuit connected to the cabinet, chassis, or other dead metal part so that the potential applied between the high-voltage live parts and dead metal parts will simultaneously be applied between high-voltage live parts and low-voltage circuits.

51.10 added (date of publication)

APPENDIX BDESIGNATED RESPONSIBILITY FOR UL
PRODUCT CATEGORIES

GLET, EXTINGUISHERS AND EXTINGUISHING SYSTEM UNITS-
 HALON RECOVERY/RECHARGE
 SCFE, REFRIGERATION EQUIPMENT (REFRIGERANT LEAK
 DETECTION EQUIPMENT)
 SCFQ, REFRIGERATION EQUIPMENT (REFRIGERANT
 RECOVERY/RECYCLING EQUIPMENT)
 SCGN, AUTOMOTIVE RECYCLING ONLY EQUIPMENT
 SCHL, REFRIGERATION EQUIPMENT (AUTOMOTIVE
 REFRIGERANT EXTRACTION EQUIPMENT)
 SCIJ, REFRIGERANT RECOVERY EQUIPMENT
 SCKG, REFRIGERANT RECYCLING EQUIPMENT, COMMERCIAL
 SCMA, REFRIGERANT RECOVERY/RECYCLING

The individuals shown in the following tables are 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. The Designated Engineers (**shown in lowercase letters**) work with the Primary Designated Engineer to interpret requirements and maintain standards.

Should you have questions regarding the interpretation of the requirements proposed 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 Don Grob 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
SCFQ	Northbrook	G. WOO	42016

CCN	Office/Subsidiary	Responsible Engineer	Extension
SCFE	Northbrook	L. KETTWICH	42484
	RTP	K. Satterwhite	11337