

**MANUFACTURER'S RESPONSIBILITIES AND REQUIREMENTS
FOR FACTORY TESTS**

1.0 **MANUFACTURER'S RESPONSIBILITIES:**

The manufacturer's responsibilities include, but are not limited to:

1.1 Control of UL Mark - Restrict the use of markings that reference UL (either directly or by use of the name, an abbreviation of it, or the UL symbol or Classification Mark, or indirectly by means of agreed-upon markings that are understood to indicate acceptance by UL) to those products that are found by the manufacturer's own inspection to comply with the Follow-Up Service Procedure description. Use of such markings is further limited by the agreements that have been executed by the subscriber and UL.

1.2 Substitution of Plastic Materials - The product description may require the use of a Recognized Plastic with a minimum flammability rating. For these cases, before a plastic material may be used, the current edition of the Recognized Component Directory or Supplement, a copy of the plastic material manufacturer's Component Recognition Report, or a copy of the Component Recognition Card shall be checked to ensure that the plastic material has an acceptable flammability rating as specified at the thickness of use. The Component Recognition Report or Card may only be used if issued after the latest edition of the Recognized Component Directory. A copy of the current edition of the Recognized Component Directory and its Supplement should be checked to ensure that all plastic material manufacturers still have UL Recognition. If a plastic material is not in the Recognized Component Directory or Supplement, a copy of the Recognition Report should be made available.

In all cases where the information is not available in the Recognized Component Directory or Supplement, it is the manufacturer's responsibility to provide the UL Representative with either a copy of the plastic material manufacturer's Component Recognition Report, or the Recognized Component Card, so that the UL Representative can determine the flammability rating and minimum thickness of the plastic material being used.

NOTE: The above does not apply to materials for which the specific manufacturer and type designation of the plastic is described in the Procedure (i.e. Enclosures).

1.3 Substitution of Non-Specified PWB's - Before a printed wiring board may be used, the current edition of the Recognized Component Directory, the Supplement, a copy of the printed wiring board manufacturer's Component Recognition Report, or a copy of the Component Recognition Card must be checked to ensure that the maximum solder temperature and dwell time is as indicated and that the printed wiring board has minimum flammability and operating temperature ratings as specified in the Section General or the individual Section description.

1.4 Production-Line Tests - Conduct Factory Tests detailed in Appendix D.

1.5 Test Equipment Calibration - Determine that the test equipment is functioning properly and have it calibrated at least annually, or whenever it has been subject to abuse (such as being dropped or struck with an object) or its accuracy is questionable. Calibration may be by the manufacturer or an outside laboratory. In either case, it shall be by comparison with a Standard that is traceable to the applicable U.S. or the appropriate country's National Standard. Certification of

calibration shall be maintained by the manufacturer until the next succeeding certification, and shall be readily available for review by the UL Representative. A letter from an outside laboratory or from an off-site manufacturer's calibration lab stating that their lab Standards are directly traceable to their country's National Standard and outlining their traceability path is considered adequate proof of traceability.

1.6 Packaging - Ensure that there are no markings on the carton or package that are, or could be construed to be, in conflict with or an extension of the uses covered in the instruction manual or Procedure.

1.7 Power Supply Cords

A. Non-Detachable Power Supply Cord - A non-detachable power supply cord must be provided as described in each Procedure Section or the Section General.

B. Detachable Power Supply Cord - A detachable power supply cord as described in the individual sections of the Procedure may or may not be shipped with the unit(s). When a cord is provided, it should either:

1. Comply with the specific description in the Procedure or,
2. Be provided for products for use outside of the USA and/or Canada.

In case 2, the manufacturer is to supply the UL Representative with information that allows the Representative to verify that the products are intended to be sold outside of the USA and/or Canada and that the cord is certified or similarly appropriate for use in the destination country.

1.8 User and Installation (Safety) Instructions Provided with Bulk Shipped Equipment

1.8.1 Bulk shipments may be provided with installation instruction sets totaling less than the total number of products in the shipment provided, or none at all provided that the following conditions are met.

1.8.1.1 Bulk Shipment to Distribution Center - Bulk shipments from a manufacturing facility covered by the Follow-Up Service Procedure describing the product to an off-site distribution center need not have the user/installation instructions provided with the shipment if appropriate safety instructions will be added to individual products at the distribution center before final redistribution to the consumer. It is the dual responsibility of the manufacturer and distribution center to have a system in place to insure that all instructions required by the Follow-Up Service Procedure are provided with the product before final distribution to the consumer, but this system will not be subject to UL Follow-Up Service.

Example: A product shipped in a bulk lot to an overseas distribution center where appropriate installation instructions in the local language are added before final redistribution.

1.8.1.2 Bulk Shipment to Single Destination Which Controls Installation of Equipment and Manages Distribution of Instructions - Bulk shipments from a manufacturing facility covered by the Follow-Up Service Procedure describing the product to a single destination, where the redistribution and installation of the product, including distribution

of instructions, is under the control of the customer, may include one set of use/installation instructions as a minimum if information is provided that the user/installation instructions (original or copies) should be made available to the users of the equipment, as needed.

Alternatively, user/installation instructions need not be provided with such a shipment if appropriate safety instructions will be sent separately to single destination which controls installation of the equipment. For such cases, it is the responsibility of the manufacturer to have a system in place to insure that all instructions required by the Follow-Up Service Procedure are provided to the consumer, but this system will not be subject to UL Follow-Up Service.

Example: A product shipped in bulk lots to a corporate customer where the equipment will be redistributed and installed locally by the corporate customer, and copies of user/installation instructions are not needed for all users of the equipment. 1.8.1.3 Bulk Shipment to Single Destination Which Does Not Control Installation - Bulk shipments from a manufacturing facility covered by the Follow-Up Service Procedure describing the product to a single destination, where redistribution and installation of the product is not controlled, should be provided with individual sets of use/installation instructions for each product, unless subjected to special consideration.

Example: A product shipped in bulk lots to a wholesale or retail outlet where the installation of the equipment will not be under the control of the wholesaler or retailer.

- 1.8.2 Compliance with these guidelines will be determined through a review of the content of the equipment's installation instructions during the product investigation, and information supplied to the UL Inspection Center Representative during inspection visits. Other options which provide an equivalent level of safety may be considered based on the application.
- 1.9 Product Variations - In the event that a nonconformance to the Procedure is found, a Variation Notice will be issued. A Variation Notice is a means of communication with the applicant and manufacturer, and forms a record of those items where nonconformance to the Procedure has been found.

When a product does not comply with the Follow-Up Service Procedure, the manufacturer shall either:

- A. Remove any markings referencing UL from the product, packaging, instructions, etc.; or
- B. Suitably modify all products that do not comply with the Follow-Up Service Procedure, or
- C. Hold shipment pending further instructions from Underwriters Laboratories.

Exception: When nonconformances are the result of an obvious error in the Follow-Up Service Procedure description and a hazardous situation clearly does not exist, affected products may be accepted.

In the event of a disagreement between the manufacturer and the UL Representative as to whether or not a product is conforming, the manufacturer shall hold production at the factory pending resolution of the variations. The applicant or manufacturer has the right to appeal a decision with which he disagrees and should contact the appropriate UL

Office to resolve any disagreements. Should Underwriters Laboratories grant temporary authorization for the continued use of the UL Mark, such temporary authorization shall only be for the time needed to review and/or process the Procedure revisions, or as otherwise specified to cover a particular lot or production run.

2.0 REQUIREMENTS FOR FACTORY TESTS:

The following Production-Line Tests shall be conducted on the products covered by this Procedure. During production, the test equipment shall be checked for proper operation at least once during each shift. When the tests are not performed concurrently, it is preferred that the Dielectric Voltage-Withstand Test be performed after the Grounding Continuity Test.

2.1 Production-Line Grounding Continuity Test:

2.1.1 General

2.1.1.1 For Listed NWGQ, NWGQ7, QQGQ, QQGQ7, WYQQ, WYQQ7, QQJE, and QQJE7 products: Except as may be noted under "Exceptions" on Page 15 of Appendix D, the manufacturer shall subject 100 percent of production of all of the following products to a routine Production-Line Grounding Continuity Test as described in section 2.1.3.

- A. Products that are provided with a non-detachable grounding type power supply cord, or
- B. Products that are provided with a grounded type inlet which accepts a detachable power supply cord.
- C. Products that are provided with a grounding type terminal block or field wiring (pigtail leads) for permanent connection to the branch circuit.

2.1.1.2 For Recognized NWGQ2, NWGQ8, QQGQ2, QQGQ8, WYQQ2, WYQQ8, QQJE2, and QQJE8 products: When specifically noted in the individual Procedure sections, the manufacturer shall subject 100 percent of the specified models to a routine Production-Line Grounding Continuity Test as described in section 2.1.3.

2.1.2 Test Equipment

2.1.2.1 Any suitable continuity indicating device (such as an ohmmeter, a battery and buzzer combination, or the like) may be used to determine compliance with the Grounding Continuity Test requirements. Commercial ground continuity testers that pass a current through the grounding path may also be used to determine compliance with the same requirements.

2.1.3 Method

2.1.3.1 Grounding continuity shall be determined between the grounding conductor of the attachment plug cap, and/or the designated main grounding point, and accessible dead-metal parts of the product, using the test equipment indicated above.

2.1.3.2 A single test is sufficient if the accessible metal selected is conductively connected by design to all other accessible metal.

2.1.4 Basis for Acceptability

- 2.1.4.1 There shall be grounding continuity between the parts specified.
- 2.1.5 Procedure In Case of Nonconformance and Records of Nonconformances
- 2.1.5.1 Any unit which does not conform shall be segregated from conforming units until repaired or otherwise brought into compliance. Records of non-conforming test results shall be retained for six (6) months and shall be readily available for review by the UL Representative. The records shall include the model or catalog designation of the product, the date of production of the unit, the date the test was performed, test results and action taken on rejection.
- 2.2 Production-Line Dielectric Voltage-Withstand Test:
- 2.2.1 General
- 2.2.1.1 For Listed NWGQ, NWGQ7, QQGQ, QQGQ7, WYQQ, WYQQ7, QQJE, and QQJE7 products: Except as may be noted under "Exceptions" on Page 14 of Appendix D, the manufacturer shall subject 100 percent of production of all products to a routine Production-Line Dielectric Voltage-Withstand Test as described in section 2.2.3.
- 2.2.1.2 For Recognized NWGQ2, NWGQ8, QQGQ2, QQGQ8, WYQQ2, WYQQ8, QQJE2, and QQJE8 products: When specifically noted in the individual Procedure sections, the manufacturer shall subject 100 percent of the specified models to a routine Production-Line Dielectric Voltage-Withstand Test as described in section 2.2.3.
- 2.2.2 Test Equipment
- 2.2.2.1 The test equipment shall include a means of indicating the test potential, an audible or visual indicator of electrical breakdown, and either a manually operated reset device to restore the equipment after electrical breakdown or an automatic feature that rejects any unacceptable unit. If an ac test potential is applied, the test equipment shall also include a transformer having an essentially sinusoidal output.
- 2.2.2.2 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 indicate the test potential directly.
- 2.2.2.3 If the output of the test-equipment transformer is 500 volt-amperes or more, the test potential may be indicated (1) by a voltmeter in the primary circuit or in a tertiary-winding circuit, (2) by a selector switch marked to indicate the test potential, or (3), in the case of equipment having a single test-potential output, by a marking in a readily visible location to indicate the test potential. When marking is used without an indicating voltmeter, the equipment shall include a positive means, such as an indicator lamp, to indicate that the manually operated reset switch has been reset following a dielectric breakdown.
- 2.2.2.4 Test equipment other than that described above may be used when it is described in the Test Equipment table on Page 13 of Appendix D.
- 2.2.3 Method
- 2.2.3.1 Each product shall withstand without electrical breakdown, as a routine production-line test, the application of an ac potential at a frequency within the range of 40-70 Hz or a dc potential between the primary wiring, including connected components, and:

- A. Accessible dead metal parts that are likely to become energized.
- B. Telecommunication Network Voltage (TNV) circuit wiring, including TNV-1, -2 and -3.

For purposes of these Standardized Appendix Pages, (a) primary wiring encompasses input power systems associated with both a.c. and d.c. mains, and centralized d.c.; and (b) TNV also encompasses any circuits designated TEL.

- 2.2.3.2 When there are capacitors across the insulation under test, it is recommended that dc test voltages be used.
- 2.2.3.3 The production-line test potential for tests A and B of paragraph 2.2.3.1 shall be in accordance with either Table 1.1 or 1.2 (double-insulated products). The full test potential is to be applied for 1 second. The manufacturer's test conditions may be higher than those shown in Tables 1.1 and 1.2 when necessary to comply with other international product safety certifications.
- 2.2.3.4 The product may be in a heated or unheated condition for the test.
- 2.2.3.5 The test shall be conducted when the product is complete (fully assembled), and it is not intended that the product be unwired, modified, or disassembled for the test, unless otherwise permitted below:
 - (a) A part, such as a snap cover or a friction-fit knob, that would interfere with conducting the test need not be in place.
 - (b) The test may be conducted before final assembly if the test parameters represent that for the completed product.
 - (c) The test need not be performed using the power supply cord provided with the product. However, if the manufacturer's test method employs a test power supply cord, then the continuity of the test power supply cord conductive connections shall be checked once daily.
- 2.2.3.6 For the test, either a sufficient number of control devices are to be closed, or separate applications of the test potential are to be made, so that all parts of the primary circuit are tested.
- 2.2.3.7 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 accessible dead metal, except as permitted below:
 - (a) A product (resistive, high-impedance winding, or the like) having circuitry not subject to excessive secondary voltage buildup in case of electrical breakdown during the test may be tested (1) with a single-pole primary switch, if used, in the off position, or (2) 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.
 - (b) The primary switch is not required to be in the on position if the testing means applies full test potential between the primary wiring and dead metal parts with the switch not in the on position.

2.2.3.8 When authorized by the Exceptions included in Appendix D, Page 15, solid-state 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. Transient voltage suppression devices other than capacitors connected from primary wiring to dead metal may also be disconnected during the test.

2.2.3.9 For products with TNV circuits:

(a) the test may be conducted on the complete unit or on individual subassemblies. For example, separate tests may be conducted between the primary and dead metal of a power supply, and between dead metal and Telecommunication Network Voltage (TNV) circuits of a circuit board with TNV circuits. Complete components and accessories with TNV circuits but without primary circuits do not require testing.

(b) if the circuit wiring is directly referenced to protective earth or to earthed secondary circuits that are electrically isolated from power input circuits, testing of primary to dead metal parts may represent testing primary to TNV circuits.

(c) at the discretion of the manufacturer, testing from primary to dead metal parts, and from primary to TNV may be performed simultaneously.

2.2.4 Basis for Acceptability

2.2.4.1 All products shall withstand the applied potential without an indication of electrical breakdown.

2.2.5 Procedure In Case of Nonconformance and Records of Nonconformances

2.2.5.1 Any unit which does not conform when tested at the values as specified in Table 1.1 or 1.2 shall be segregated from conforming units until repaired or otherwise brought into compliance. Records of non-conforming test results shall be retained for six (6) months and shall be readily available for review by the UL Representative. The records shall include the model or catalog designation of the product, the date of production of the unit, the date the test was performed, test results and action taken on rejection.

TABLE 1.1
DIELECTRIC VOLTAGE-WITHSTAND TEST CONDITIONS
FOR NON-CLASS II (NON-DOUBLE INSULATED) EQUIPMENT

Appliance Voltage Rating	Test Potential V rms	Test Potential V dc	Time Seconds
Rated 60 V dc or less	500	700	1
Rated less than or equal to 130 V rms (184 V dc)	1000	1400	1
Rated more than 130 V rms (184 V dc) and less than or equal to 600 V rms (849 V dc)	1500	2100	1

For products with special constructions and test conditions see Exceptions, on Page 14.

TABLE 1.2
DIELECTRIC VOLTAGE-WITHSTAND TEST CONDITIONS
FOR CLASS II (DOUBLE INSULATED) EQUIPMENT

Appliance Voltage Rating	Test Potential V rms	Test Potential V dc	Time Seconds
Rated less than or equal to 130 V rms (184 V dc)	2000	2800	1
Rated more than 130 V rms (184 V dc) and less than or equal to 600 V rms (849 V dc)	3000	4200	1