



Technical Report

# UL/IEC 61010-1 3rd to 3.1 (Amendment 1) Edition Comparison Guide

**An easy to use comparison on changes to UL/IEC 61010-1  
and the impact it will have.**



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As the certification agency that writes the electrical safety standards for lab equipment, UL is here to support you through the transition from the 3rd edition to amendment 3.1 of UL/IEC 61010-1.

In order to keep up with the constant evolution of electrical equipment, the safety requirements standards must be amended to stay up-to-date with emerging technologies.

The UL/IEC 61010-1 3rd Edition standard has recently undergone review and the result is edition 3.1. The comparison guide outlines the affected clauses, discusses the changes made, and highlights the direct impact the new edition has on standards safety for electrical equipment. This guide is designed as an easy to read and complete breakdown of the 3.1 edition that will allow you to successfully incorporate the standard requirements into your processes.

Contact us for more information on IEC 61010-1 3.1

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## Changes made from IEC/UL 61010-1 3rd to 3.1 edition

SUB CLAUSE	DISCUSSION	IMPACT
4.4.1	4.4.1 General (Testing in single fault condition): Testing outside the reference test conditions (see Cl. 4.3) may be necessary to ensure a realistic assessment/testing under worst case condition.	<b>None</b> - Clarification on current practice
5.1.3	Mains Supply Clarification of test parameters for the input test for equipment with varying input current/power: Exclude Inrush (usually after 1 min.) RMS value within a 1 min. (IEC) or 10 s (UL) period.	<b>None</b> - Clarification on current practice
5.2	Warning Markings for Operator Access Areas Symbols are required and text may be provided adjacent to symbol.	<b>Minor</b> - text may be required
5.4.2	Documentation, Equipment Ratings Item d: Instead of referencing 1.4. the required information in the documentation is listed here (e.g. <b>Altitude, Indoor use...</b> )	<b>None</b> - editorial change
5.4.3	Documentation, Equipment installation added: Warning about HAZARDS resulting of <b>improper installation or commissioning</b> Item f: Special Services, examples given e.g. Temperature, pressure,..)	<b>Minor</b> - Manuals may be revised to include additional warnings
6.3.1	Levels in normal condition: Item a) replaced by the previously used values and the North American Deviation: 30 Vrms, 42.4 Vpeak, 60 Vdc.	<b>None</b> - same requirement as in 3rd Edition NA deviation
6.3.2	Levels in single fault condition: Item a) replaced by the previously used values and the North American Deviation: 50 Vrms, 70 Vpeak, 120 Vdc. Figure 2 adjusted to reflect above change. (as North American Deviation Figure 2 DV).	<b>None</b> - same requirement as in 3rd Edition NA deviation
6.6.4	Terminals for stranded conductor's Clarification that this requirement is only intended for field wiring and not for factory wiring only.	<b>None</b> - Clarification
	Test to be conducted with 8 mm insulation removed <b>OR</b> as specified by the Manufacturer	<b>None</b> - Relaxation
6.7.1.3	Creepage Distance: Clarification how a creepage of different material and for different pollution degrees shall be treated. (Lowest CTI/highest PD or one portion is sufficient for the total voltage).	<b>None</b> - Clarification

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Table 4	Linear Interpolation of Creepage Distances is allowed.	None - Relaxation
6.7.2.2	Solid Insulation: AC <b>OR</b> DC-test can be conducted. ( <b>only</b> for CAT II up to 300V)	None
6.8.1	General (Dielectric test) Clarification that impedances may be disconnected for testing.	None - Clarification
6.8.3.1	The a.c. voltage test: Removed the 500 W requirement for the dielectric tester and replaced by the request of a regulated output with a substantially sinusoidal wave form. (Ratio between Peak and RMS is $\sqrt{2} \pm 3\%$ ). Option for a 50 Hz <b>and</b> 60 Hz rated product to conduct the test with 50 Hz <b>OR</b> 60 Hz	None - Relaxation
6.11.4.2	Switches and Circuit breakers: Clarification that circuit breakers shall comply with IEC 60947-2 and switches shall comply with IEC 60947-3	None - Clarification
7.3.4	Limitation of force and pressure, definition of width of body parts: 1.2 cm finger 5.0 cm any other body part	Minor - may require additional testing and evaluation
7.4	Stability Each castor and support foot shall be RATED to support a load <b>not less than</b> its normal load, or the castors and support feet shall be tested according to d) <b>OR</b> e), below	None - Relaxation
9.4	Limited Energy Circuits c. It is separated by at least BASIC INSULATION from other circuits having energy values exceeding criteria a) <b>OR</b> b) above (a: Voltage limits or b: Current limits)	None - common practice
9.6.1	General (Spread of fire, Overcurrent protection) AC or DC dielectric test can be conducted.	None
10.4.1	Temperature test Clarification to conduct the test under worst case conditions (outside reference test conditions) under certain circumstances (e.g. non ventilated oven)	None - common practice
11.6	Specially protected equipment (IP code, IEC 60529) Clarified requirement to fulfill protection against foreign objects (including dust) <b>AND</b> water	Minor - may require additional testing and evaluation
11.7.2	Leakage and rupture at high pressure Exception for refrigerating system now references to EN378-2 and IEC60335-2-89 as applicable.	None - Clarification
	Factor for Test pressure reduced for high pressure:	None - Relaxation

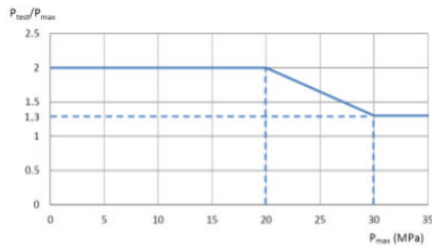


Figure 01: Ratio between test pressure and maximum working pressure

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12.3	Optical radiation (former UV-radiation) Shall be assessed in accordance to IEC 62471.	<b>Medium</b> - may require additional testing and evaluation
13.1	Poisonous and injurious gases and substances Shall not liberate dangerous amounts in normal and <b>single fault condition</b>	<b>Minor</b> - may require additional testing and evaluation
14.8	Circuits used to limit transient overvoltage's Any overvoltage limiting circuit shall have suitable strength. The component itself shall function <b>properly</b> after the impulse test	<b>Minor</b> - may require additional testing and evaluation
Annex H, Table H.1	Removal of scratch resistance tests to align with updated IEC 60664-3	<b>None</b> - Relaxation
Annex I, Table I.1	Modified Table to identify TT, TN-C-S and IT systems.  Note: Error within the table for Three-phase three-wire systems with a earthed phase: Voltages 347, 380, 400, 415, 440 and 480 belong to 600 V line-to-neutral voltage and <b>NOT</b> to 300V.	<b>None</b> - Clarification
Annex K, K3.2	Clearance Calculation Example added to explain how <b>additional</b> transients for <b>MAINS</b> circuits shall be calculated which result in slightly smaller clearances.  Additional Transient: Calculation for a mains supply of 230Vac (L to N),  CAT II (2500V <sub>PEAK</sub> ): $U_w = 1.414 * 230 \text{ Vac} = 325 \text{ V}_{\text{PEAK}}$  $U_t = 2500\text{V}_{\text{PEAK}} - 325 \text{ V}_{\text{PEAK}} = 2175 \text{ V}_{\text{PEAK}}$	<b>None</b> - Relaxation
Annex DVE, 1.1	Deleted "equipment rated 1000 volts or less" as voltage limits appear in the associated Part 2's	<b>None</b> - editorial change
Annex DVE, 2.5, 7.1.1	Deleted the consideration for mounting OPEN EQUIPMENT products in a prescribe enclosure for temperature testing as noted in DVE.7.1.1 and relying on installation instruction or referenced test ambient condition.	<b>None</b> - now aligned with part 1
Annex DVE, 3.1.2	Option of using Table 1, symbol 14 instead of the text on the product and adding the marking information in the installation instructions.	<b>None</b> - Relaxation
Annex DVE, 3.1.3.4	Terminal markings information to be noted in the installation instructions as an alternative when a coded correlation marking or Table 1, symbol 14 is used.	<b>None</b> - Relaxation
Annex DVE, 5.1.1	Modification to the Impact Test to align with 6.8 joule requirements for industrial electrical equipment enclosures UL 50, CSA C22.2. No. 94.2, UL 508 and CSA C22.2 No. 14.	<b>Minor</b> - Small increase in impact force
Annex DVE, 8.1.1	Modifications to provide clarification for application of field installed current transformers when used with OPEN EQUIPMENT installed within the same overall enclosure.	<b>None</b> - Clarification
Annex DVE, 8.1.2	Provides additional construction requirements for accessory current transformers when installed within the same overall enclosure as the OPEN EQUIPMENT metering equipment and not already Listed as energy monitoring current transformers.	<b>None</b> - Relaxation



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