ELECTRICAL CONFORMANCE TESTING STANDARDS

This guide does not replace the requirements for undertaking the testing of electrical equipment to be skilled or instructed and trained and continuously updated or restrained and continuously updated or retrained when necessary on the safety requirements, safety rules and company instructions applicable to their work.

- It will be noted from the flow chart that even if one of the below conditions has been satisfied and hence the requirements of the standard do not have to be applied, other potential risks must be considered.
- EN50191 includes specific information in safety testing procedures with specific figures for prohibition zones and test areas, permissible body currents and contact voltages and barrier requirements which should be adhered to in a testing situation.

	ELECTRICAL STRENGTH	RESISTANCE	EARTH BOND	EARTH LEAKAGE CURRENT
Electrical Equipment for Measurements Control and Laboratory use EN61010	The test voltage used is a function of clearance distances, working voltage and pollution degree for basic insulation appliances is 1350v. Appliances of double insulation should use a test voltage of 2200v Test results: no breakdown	Test voltage: 500 v DC Resistance: Not less that 1 Mohm	Test voltage: Not greater than 12V a.c. or DC Test current: Not less than 1.5 x current capacity of hazardous circuit at the point where the failure of the basic insulation would make the earth point live. Results: The resistance between the tested point and the protective conductor input point should not exceed 0.1. Ohm	

EQUIPTMENT	METHOD OF USE	SUPPLY CONNECTION	MAX LEAKAGE
CLASS I	Hand Held	Domestic Plug socket.	0.75mA
CLASS I	Not Hand Held	Domestic Plug socket.	3.5mA
CLASS I		Indusrtial plug/socket. or permanently connected to the case of the protective conductor> 1mm²	May exceed 3.5mA but not > 5% of the supply current
CLASS II	All		0.25.mA

IT equipment Including electrical business equipment (rated voltage not exceeding 600v) EN60950	Applied voltage is gradually raised from zero to test voltage and held for 60 seconds. Frequency: 50 Hz or 60 Hz for an a.c. test at a voltage level described in Annex A For testing DC circuits (internally derived): r.m.s. test voltage = (DC component of circuit. Voltage peak value of ripple voltage) + v2 Test results: no breakdown	Test voltage: 500VDC Resistance: Not less that 1 Mohm	Test voltage: less than 12V a.c. or DC Test current: Not less than 1.5 x current capacity of hazardous circuit at the point where the failure of the basic insulation would make the earth point live. Results: The resistance between the tested point and the protective conductor input point should not exceed 0.1 Ohm	

EQUIPTMENT	METHOD OF USE	SUPPLY CONNECTION	MAX LEAKAGE
CLASS I	Hand Held	Domestic Plug socket.	0.75mA
CLASS I	Not Hand Held	Domestic Plug socket.	3.5mA
CLASS I		Indusrtial plug/socket. or permanently connected to the case of the protective conductor> 1mm²	May exceed 3.5mA but not > 5% of the supply current
CLASS II	All		0.25mA

Electrical Machines EN 60204	LV Circuits – Test Voltage: 2kV applied for 5 minutes PELV Circuits Test Voltage: 500V for 5 minutes Required results: no breakdown	Test voltage: 500V DC applied for 5 minutes. The measured insulation should not be greater than IMOhm	Test voltage: not greater than 12 V DC Test current: test instrument capable of delivering 200 mA into a short circuit results – pass indicated when not more than 50V can be developed by the circuit voltage across the measured resistance. Earth bonding at test voltage is derived from a PLEV source. Test current: at least 10 amps Frequency: 50 Hz The test voltage is applied for a period of at least 10 seconds and is conducted between PE terminal and the various points that comprise the protective bonding circuit. The results are given as the maximum measured voltage drop for a protective conductor of specific case between 1 and greater than 6mm² in accordance with table 7 of the standard	

EQUIPTMENT	METHOD OF USE	SUPPLY CONNECTION	MAX LEAKAGE
CLASS I	Hand Held	Domestic plug socket.	0.75mA
CLASS I	Not Hand Held	Domestic plug socket.	3.5mA
CLASS I		Indusrtial plug/socket. or permanently connected to the case of the protective conductor> 1mm²	May exceed 3.5mA but not > 5% of the I/P current
CLASS II	All		0.25mA

Household electrical appliances EN 60335	Test voltage should be applied at half the test voltage and gradually raised to full test voltage and held for 60 seconds. Frequency:50 Hz at a voltage which produces a substantial sinusoidal voltage. The value of the test voltage (r.m.s.) is shown in Annex B Test results: no breakdown	Test Voltage:500V and should be held for1 minute Resistance: Should not be less than 2MOhm or 7 MOhm	Test voltage: Not greater that 6V a.c. Test current:25 A Test results:The resistance between the tested point and the protective conductor input point should not exceed 0.1 Ohms	

EQUIPTMENT	METHOD OF USE	SUPPLY CONNECTION	MAX LEAKAGE
CLASS I	Hand Held	Domestic plug socket.	0.75mA
CLASS I	Not Hand Held	Domestic plug socket.	3.5mA
CLASS I		Indusrtial plug/socket. or permanently connected to the case of the protective conductor> 1mm²	May exceed 3.5mA but not > 5% of the supply current
CLASS II	All		0.25mA

RESIDUAL VOLTAGE:

1. Should not be greater than 60V , 5 seconds after the switch has been turned off.
2. Opening an interlocked cover should caused exposed voltage to decay to less than 42.4V peak or less than 60V DC or less than 20 Joules energy level within 2 seconds.

When the residual voltage is present on the pins of a plug or socket the conductors of which are unprotected after plug socket separation (ie. Not IP2X) the voltage must decay to 60V in less than 1 second

Annex A

ELECTRIC STRENGTH TESTS FOR IT APPLIANCES	
GRADE OF INSULATION	TEST VOLTAGE, VOLTS A.C. R.M.S.
Functional	1500
Basic, Supplementary	1500
Reinforced	3000

Annex B

ELECTRIC STRENGTH TESTS FOR DOMESTIC HOUSEHOLD APPLIANCES		
POINTS OF APPLICATION	CLASS I APPLIANCES	CLASS II APPLIANCES
1. Between live parts and accessible metal parts separated from live parts by :- a) Basic insulations only b) Double or reinforced insulation	 1000 (1250) 2500	 2500(3750)
2. Between live parts and metal parts separated from live parts by basic insulation only	1000(1250)	
3. Between inaccessible metal parts and the body		2500
Note: A DC test voltage may be used instead of AC, the values of the DC test voltages shall then be 1.5 times those shown in the table (BEAB recommends using the values shown in brackets)		

Annex C

TEST VOLTAGES FOR TYPE TESTING OR FOR POWER TOOLS	
POINTS OF APPLICATION OF TEST VOLTAGE	TEST VOLTAGE (V)
CLASS I TOOLS	
■ Between live parts of different polarity	1500
■ Between live parts and the body	1500
■ Between the body and metal foil in contact with the inner surface of insulating barriers	1500
■ Between the conductors and metal foil in contact with the outer surface of the insulation provided with sleeves or the like	1500
■ Between the inner and outer surfaces of sleeves or the like on the internal wiring	1500
■ Between internal wiring and metal foil in contact with the outer surface of non-removable sleeves of such wiring	3000
CLASS II TOOLS	
■ Between live parts of different polarity	1500
■ Between live parts and other inaccessible metal parts	1500
■ Between the conductors and metal foil in contact with the outer surface of the basic insulation of internal wiring	1500
■ Between inaccessible metal parts and the body	2500
■ Between the body and metal foil in contact with the inner surface of insulating barriers	2500
■ Between the body and either metal foil wrapped around the supply flexible cable or cord inside inlet bushings, cord guards, cord anchorages and the like or a metal rod of the same diameter as the flexible cable or cord inserted in its place	2500
■ Between live parts and parts of the body that are separate from live parts by reinforced insulation	4000

CLARE

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