



National Differences For

UL 60065.7

Audio, Video and Similar Electronic Apparatus - Safety Requirements

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UL 60065

Audio, Video and Similar Electronic Apparatus - Safety Requirements

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The revisions dated June 13, 2012 are being issued to add Annex I to specify requirements for coin/button cell batteries and to update 14.6.6(a) - maximum current controlled by a non-TV-rated switch.

UL 60065 is an adoption of IEC 60065, Audio, Video and Similar Electronic Apparatus - Safety Requirements (Seventh Edition, issued December 2001), and including Amendment 1 (issued October 2005) and Amendment 2 (issued July 2010).

This document provides a single listing of the National Differences included in the UL adoption of the corresponding IEC standard. Editorial differences appearing in the UL standard are not included in this technical compilation. The complete listing of National Differences is available in the UL standard.

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National Differences

USA - Differences to IEC 60065:2001, Seventh Edition including Pages dated June 13, 2012

1.1.1	Delete reference to Annex L: Electronic flash apparatus for photographic purposes. Replace this with reference to UL 122.
1.1.1	Mains connected apparatus intended for field installation complies with the National Electrical Code, ANSI, NFPA 70.
1.1.3	Requirements of apparatus intended for outdoor use comply with applicable clause of Annex A
1.1.5	Some apparatus covered by these requirements may also be required to comply with applicable requirements in other appropriate standards
1.1.6	Apparatus with nonmetallic enclosures intended to be installed in air-handling spaces shall additionally comply with UL 2043 NOTE Apparatus such as dome cameras and public address system speakers having nonmetallic enclosures that extend inside the air-handling space after installation are subject to this requirement.
4.2.1	The rated supply voltage for single phase apparatus is assumed to be 120V or 120/240V
4.2.4	a) Minimum audio output is not less than 0.5 W per channel unless the maximum audio output is less than 0.5 W per channel
4.2.4.1	An apparatus with multiple modes of operation, multiple signal input sources, or both, is operated according to the manufacturer's instructions to produce the maximum power input
4.2.11	Table 2 - External supply sources are assumed to be capable of delivering 30 A, unless otherwise specified (UL 60065 no-load voltage and internal resistance values)
4.3.4	As an alternative, PTC thermistors may also comply with UL 1434.
5	Test for conductive labels secured in place by adhesive
5.1	Component power supplies and adapters complying with UL 1310, UL 1950, UL 60950, or UL 60950-1 are considered to fulfill items "a" through "i" of this clause.
5.1f	Rated mains frequency marking on apparatus
5.1j	Date of Manufacture marking
5.1k	Factory origin identification marking
5.1l	Combination of two graphical symbols and supplementary marking and/or single graphical symbol marking
5.1m	Equipment rack marking for audio/video systems
5.1n	Class I apparatus having touch current levels greater than 0.75 MIU and equal to or less than 3.5 MIU marked with a high touch current marking.
5.1o	Marking on apparatus having grille/ventilation areas of the top surface that are permitted to have higher temperature rises per Note "b" of Table 3
5.1p	Marking for apparatus intended to be installed in air-handling spaces
5.2c	Output terminals are marked with voltage, frequency and current or power; output terminals installed or interconnected in the field must be marked with the class of wiring
5.2d	Speaker terminals are marked "Class 1 Wiring", "Class 2 Wiring" or "Class 3 Wiring".
5.2d	Operation manual explains risks and proper connecting and insulating techniques when connecting a speaker

5.3	An explanation and illustration of safety related graphical symbols used on the apparatus are included in the user instructions preceding any operating instructions
5.4	Important safety instructions are packed with each apparatus
5.4.1	Outdoor use marking for apparatus having no protection against exposure to water
5.4.1e	Deleted
5.4.1h	Reference to IEC 61695 is replaced by UL 61965
5.4.3	When user operation and installation instructions contains instructions for use by skilled persons, the instructions are separate in format and preceded by a precautionary warning statement
6.1	Compliance is checked according to requirements in the U.S. Code of Federal Regulations, Title 21, Chapter 1, Subchapter J, Sections 1010.2, 1010.3, and 1020.10 by measuring the radiation produced by the apparatus employing a production chassis
6.2	References to IEC 60825-1 are deleted
5.2.2	Deleted
7	Table 3: Delete reference to conditions h and i under Table item e for lithium batteries
7	Table 3: Temperature limits for various classes of insulation systems according to UL 60065
7	Table 3, Note a: Materials rated according to UL 746B may be used within their rated temperature
7	Table 3, Note b: For grille/ventilation areas in the top surface directly above internal heatsinks, a temperature rise up to 65 K is allowed
7.2	Applies to thermoplastic materials only. A material temperature rating can be accepted in lieu of the softening temperature.
7.2	The softening test need not be performed on materials used in UL Listed or Recognized components
8.1	Metal parts are corrosion resistant
8.9.1	Sleeving, tape, tubing, and wire insulation comply with UL 224, UL 510, or UL 1441
8.10	Component power supplies and their internal insulation complying with UL 1310, UL 1950 Third Edition, UL 60950, or UL 60950-1 are considered to fulfill the clause
8.17	As an option, winding wire insulation complies with the requirements in UL 2353
8.19.1	An all-pole switch or circuit breaker is not required to have contact separation of 3 mm
8.23	Printed wiring boards involved with the risk of electric shock comply with UL 796.
9.1.1.1a	For audio signals of professional and commercial apparatus, 120 V r.m.s.
9.1.1.1a	For audio signals other than professional and commercial apparatus, 71 V r.m.s.
9.1.1.1b	Touch current carried out in accordance with UL 101 with the measuring instrument described in Annex D did not exceed 0.5 MIU. Delete Note 2.
9.1.1.2	UL articulated finger (figure 18) used instead of the test probe B (IEC 61032)
9.1.1.2	Reference to test probes 18 and 19 of IEC 61032 are deleted
10	Table 5, Note 1: With respect to mains voltages in the range of 105-130 V (r.m.s.), the test voltages are considered to be 1414 V peak for basic and supplementary insulation and 2828 V peak for reinforced insulation
11	Component power supplies and their power transformers complying with UL 1310, UL 1950 Third Edition, UL 60950, or UL 60950-1 are considered to fulfill the clause

11.1	The permissible touch current for terminal contacts has been increased to twice the value given in 9.1.1.1.
11.2.1	Additional fuse testing is not required if the temperature is limited by fuses
12	Component power supply adaptors and their enclosures complying with UL 1310, UL 1950 Third Edition, UL 60950, or UL 60950-1 are considered to fulfill the clause.
12.1.3	Impact test uses the 50 mm steel sphere only
12.1.3	Table 6 - Impact test criteria detailing impact location, impact energy and additional pass/fail results applied according to UL 60065
12.1.4	As an alternative, any number from one to three samples are permitted to be used in any combination that results in a total of three drops
12.1.6	Handle strength test. When polymeric materials are involved, testing is to be conducted before and after the sub-clause 12.1.5 stress relief test.
12.8	Test for enclosures, barriers, components and leads that rely on adhesive
13	Component power supplies and their power transformers complying with UL 1310, UL 1950 Third Edition, UL 60950, or UL 60950-1 are considered to fulfill the clause.
13.4	The material group is verified according to UL 746A
13.4	Reference to the IEC 60112 PTI test is deleted
13.4	Table 11: Inclusion of working voltages less than 50 V r.m.s. or d.c.
13.5.1	Reference to IEC 60249-2 is replaced by UL 796
13.5.2	Coated printed wiring boards comply with UL 746C
13.5.3	Multilayer printed boards comply with relevant requirements in UL 60950-1
14	Annex Y and additional component requirements applied according to UL 60065
14.1	Component power supplies and their resistors complying with UL 1310, UL 1950 Third Edition, UL 60950, or UL 60950-1 are considered to fulfill the clause
14.2	Component power supplies and their capacitors complying with UL 1310, UL 1950 Third Edition, UL 60950, or UL 60950-1 are considered to fulfill the clause.
14.2.1	As an alternative, a component such as a capacitor, a combination capacitor and resistor, or a suppressor may comply with UL 1414.
14.2.2	As an alternative, a capacitor, a combination capacitor and resistor, or a varistor, or a suppressor may comply with UL 1414.
14.2.4	Components subjected to the requirements in 14.2.1 and 14.2.2 also comply with UL 1414 enclosure requirements
14.3	Component power supplies and their inductors and windings complying with UL 1310, UL 1950 Third Edition, UL 60950, or UL 60950-1 are considered to fulfill the clause
14.3.2	Planar transformers comply with the requirements for multilayer boards.
14.4	High voltage materials are rated V-2 minimum
14.4.1	High voltage arcing test replaces the High voltage transformers and multipliers test
14.4.2	Deleted
14.4.3	High voltage component part flame test
14.4.4	High voltage isolating component test
14.5.1.1	Thermal cut-outs comply with UL 873 or UL 60730-2-9
14.5.1.2	Thermal links comply with UL 60691
14.5.1.3	Deleted

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14.5.2.1	Fuse links comply with UL 248-14
14.5.2.2	Reference to IEC 60127 is deleted
14.5.2.2	Pre-arcing time/current characteristic and breaking capacity marking requirements are deleted
14.5.3	As an alternative, a PTC thermistor may comply with requirements of UL 1434
14.5.4	Reference to fuse-links is deleted
14.5.3A	Other protective devices directly connected to the mains have adequate breaking capacity and comply with UL 873, UL 1416, UL 1417 or UL 2111
14.6.1	Switches and relays comply with UL 1054, UL 61058-1 or UL 508
14.6.1	Mains switch or relay are rated for the total rated current consumption of the apparatus
14.6.1	Rating of a mains switch or relay in audio apparatus intended for commercial use
14.6.2 – 14.6.4	Deleted
14.6.5	A switch or relay that controls a mains socket-outlet have a rating equal to the rated current consumption of the apparatus plus the current rating of the socket-outlet
14.6.6	A MAINS switch provided on audio apparatus intended for household use and on all video apparatus shall comply with (a), (b) or (c), and a switch that controls a MAINS connected receptacle shall comply with (b) below. The contacts of a MAINS relay shall comply with (a), (b) or (d), and the contacts of a relay that controls a MAINS connected receptacle shall comply with (b) or (d) below. a) Satisfy the following equation for maximum current controlled by a non-TV-rated switch: $I_p \leq 1,414 I_{\text{switch}}$ Unless $I_{\text{load}} \leq 1/2 I_{\text{switch}}$ and the switch is double or multi pole, with a minimum of two poles controlling mains current, either in series or switching both mains lines, in which case $I_p \leq 10 I_{\text{switch}}$ <i>in which:</i> I_{load} is the worst case r.m.s. current drawn by the unit in operation, I_p is the peak inrush current controlled by the switch or relay, as determined by 14.6.6.1, and I_{switch} is the switch or relay r.m.s. current rating in amperes. b) Be TV-rated unless it is a keylock MAINS switch used in series with a MAINS on-off switch in a commercial apparatus. c) Be located on the back of the apparatus and is not operable from a remote control. d) Comply with the test in 14.6.6.2
14.6.6.1	Peak inrush current test
14.6.6.2	Relay endurance test
14.6.7	Double pole switch controlling a.c. and d.c. circuits
14.7	The jointed test finger (figure 18) is used to determine accessibility and operation of the interlock
14.10.1	Internal rechargeable and non-rechargeable batteries that are replaceable by the user or skilled persons additionally comply with 14.10.2 - 14.10.5.
14.10.1	Test requirements from UL 2054 are added for special battery packs that are removable by the user from the apparatus and may be carried separately from the apparatus - Short circuit test, Abnormal charging test, Forced-discharge test, and 250-N steady force test.
14.10.1	Note: Consumer grade, non-rechargeable carbon-zinc or alkaline batteries are not subjected to the tests specified in 14.10.2 - 14.10.5.

14.10.5	As an alternative, one sample may be subjected to three drops
14.10.6	Location of overcurrent protective device..... :
14.10.6	As an alternative, the overcurrent protective device in the apparatus battery-supply circuit is not required if the apparatus is intended to be connected to a vehicle power outlet using a UL 2089 vehicle battery adapter
14.11	Component power supplies and their optocouplers complying with UL 1310, UL 1950 Third Edition, UL 60950, or UL 60950-1 are considered to fulfill the clause.
14.11	Optocouplers comply with UL 1577
14.11	Optocouplers bridging reinforced insulation comply with requirements for double protection as specified in UL 1577
14.11	External clearances and creepage distances of optocouplers comply with 13.1
14.12	Reference to IEC 61051-2 replaced by UL 1449
14.12	Reference to IEC 60707 replaced by UL 94
14.12	All references to IEC 60151 are deleted
15.1.1	Attachment plug current rating (no less than 125% of the current drawn under normal operating conditions) and voltage rating
15.1.1	Configuration and electrical rating of an attachment plug for apparatus designed to be used on more than one supply voltage by means of a voltage selector
15.1.1	Polarized attachment plug
15.1.1	Wire gauge of conductors and internal wiring connecting mains socket-outlets
15.1.3.1	Means of output connections on an audio amplifier having an open-circuit audio output voltage not limited to 120 V that is permanently connected to the mains
15.1.3.1	Quick Connect Terminals: a) Male tabs firmly mounted in place; b) Mating female connectors provided with the apparatus; c) Strain Relief Test of Clause 16.5; d) Installation instructions provided for assembly of terminal to a conductor and strain relief e) Terminals are appropriate for use with the size and type of wire specified
15.1.3.2	Audio amplifiers having an audio output not limited to 120 V that are connected to the mains by a flexible cord
15.2	Protective earthing conductor termination construction
15.2	Cross-sectional area of the earthing conductor in a supply cord or in an interconnecting cable
15.2	Earthing conductors may have green or green/yellow insulation
15.3.5	Reference to IEC 60950 is replaced by Article 310 of the National Electrical Code, ANSI/NFPA 70
15.3.5	Table 15 - "AWG" replace mm ² values
15.4	Component power supply adaptors complying with UL 1310, UL 1950 Third Edition, UL 60950, or UL 60950-1 fulfill the clause
15.4.2.1	Construction of the mains plug blade assembly complies with UL 1310
15.4.2.1	Direct plug-in units designed for use by travelers comply with UL 1310
16.1	Reference in the first paragraph to "sheathed" flexible cords is deleted
16.1	References to IEC 60227 and IEC 60245 are deleted
16.1	Ampacity and VW-1 marking of mains supply flexible cords

16.1	Table 17A - Cords for apparatus
16.1	Table 17A: Certain supply apparatus may be provided with a supply cord having 0.5 m minimum length
16.2	Power supply cord earthing conductor size
16.2	Reference to IEC 60950, Table 3B is replaced by Article 400 of the National Electrical Code
16.2	Table 18 - Upper current limit in column 1 increased from 16 to 30 A and "AWG" wire sizes used
16.3	c) Flexible cords not complying with 16.1, used as connection between the apparatus and other apparatus are marked VW-1
16.5	When polymeric materials are involved, strain and twist testing is to be conducted before and after the sub-clause 12.1.5 stress relief test.
17.8	Expanded to include all cart/stand parts supplied by the manufacturer, such as casters and brackets. Suitable assembly instructions are required.
17.8	Relevant fixing means are not required when installation is to be done by a skilled person
17.10	Termination of aluminum conductors used as internal wiring
17.11	An accessory was investigated to determine that: a) The accessory, and the combination of the accessory and the apparatus presents no hazard in the sense of this standard, and b) The accessory is provided with installation instructions.
17.11.1	Installation of an accessory by a skilled person: a) The mechanical positioning is accomplished by means of tools normally available or by means of special tools provided as part of the installation kit, b) The electrical connections are made by using existing terminals and connections in the apparatus or the building wiring
18	Non-intrinsically protected picture tubes comply with 18.1, 18.2.2 and 18.3. Intrinsically protected picture tubes with a maximum face dimension exceeding 7.5 cm comply with UL 61965.
18	A bulb of a picture tube having a face diameter of 7.5 cm or more mounted in an enclosure
18	Enclosure opening dimensions
18.1	All tubes are mounted such that the enclosure of the apparatus protects the tube against the effects of implosion.
18.1	Reference to IEC 61965 replaced by UL 61965
19	The tests in 19.1, 19.2 and 19.3 do not cause the apparatus to overturn.
19	The test in 19.2.1 does not cause the apparatus to slide
19	When polymeric materials are involved, testing is to be conducted before and after the sub-clause 12.1.5 stress relief test.
19.1	References to an apparatus in combination with a supplied cart or recommended stand are deleted
19.2	References to an apparatus in combination with a supplied cart or recommended stand are deleted
19.2.1	Glass Slide test
19.3	Horizontal force stability test using Table 20A values from UL 60065
19.5	Reference to the impact hammer in the first compliance paragraph is deleted
19.6	Includes Equipment rack mounting test

20.1a	Deleted
20.1b	Exception for parts such as protection TV lenses, loudspeaker parts, external accessories, and fibrous materials
20.1b	Reference to IEC 60695-11-10 is replaced by UL 94
20.1.2	Sleeving, extruded tubing and insulation on wiring are rated VW-1: a) wiring located in a circuit that is considered a potential ignition source, or b) wiring not located in a circuit that is a potential ignition source but is in contact with wiring located in a circuit that is a potential ignition source
20.1.2	Tape in contact with parts of circuits that are potential ignition sources is flame retardant
20.1.3	Printed wiring boards, on which the available power as the connection exceeds 15 W or the operating voltage exceeds 50 V a.c. or d.c under normal operating conditions, is of flammability category V-1 or better
20.1.3	Reference to IEC 60695-11-10 replaced by UL 94
20.1.3	Exception for printed boards housed in metal enclosures is deleted
20.1.3	Option to use Clause G.1 of Annex G is deleted
20.1.4	Components and parts comply with the relevant flammability category according to UL 94 as specified in table 21
20.1.4	Component power supplies complying with UL 1310, UL 1950 Third Edition, UL 60950, or UL 60950-1 fulfill the clause
20.1.4	Table 21 - Flammability categories for components and parts
20.2.1	Fire enclosure required: 1) circuits and components where the available power exceeds 15 W, 2) inductors and windings conductively connected to the mains, and 3) high-voltage products.
20.2.1	The fire enclosure complies with the flammability requirements of Table 22 according to UL 94 and 746C
20.2.1	Reference to IEC 60695-11-10 or clause G.1 of annex G replaced by UL 94 or UL 746C
20.2.1	Table 22 - Flammability categories for fire enclosures
20.2.2	Internal fire enclosures openings and material requirements
20.2.2	Compliance is checked by inspection and measurement and using the articulated finger probe, figure 18.
20.2.3	Outer enclosures have a minimum flammability rating of HB when an internal fire enclosure is provided
A	Apparatus intended for outdoor use or for wet locations has any of the following attributes: a) provided with a means to be transportable, b) has a mass less than 35 kg, c) can be battery operated, or d) associated literature states or implies such use
A	An apparatus as described in a), b), or c) above that is marked as specified in 5.4.1 a) is not intended for outdoor use or wet location use
A	Apparatus permanently installed outdoors is considered to be for permanent outdoor use
A.5	Clauses A.5, A.5.1 and A.5.4.1 are deleted
A.9.1.1	Touch current test after the water spray test described in A.11.1.1
A.10	Clauses A.10, A.10.2 and A.10.2.1-2 are deleted
A.11.1.1	Apparatus subjected to the water spray test specified in UL 1598

A.16.1	Flexible cords are suitable for outdoor use
A.20.2.1	Enclosures for an apparatus intended for permanent outdoor location comply with requirements for Type 3 enclosures in UL 50
B	IEC 62151 Clause 4 applies except for 4.1.2, 4.1.3, 4.2.1.1 and 4.2.1.2
B	The requirements of 4.2.1.1 are replaced by the requirements of 2.3.1 of UL 60950, Third Edition or UL 60950-1
B	Voltages on the TNV-0 circuits, TNV-1 circuits and accessible conductive parts in the event of a single insulation fault
B	Apparatus intended for connection to telecommunication networks and having ringing voltages applied to the apparatus is subjected to touch current limits per clause 5.1.8.1.1 of UL 60950, 3rd Ed. or 5.1.8.3 of UL 60950-1
B	Telecommunication network that uses outside cable complies with the requirements for protection against overvoltage from power line crosses per 6.4 of UL 60950, Third Edition or UL 60950-1
B	UL 60950, Third Edition or UL 60950-1 Acoustic tests for apparatus containing an earphone held against the ear
B	Apparatus provided with appropriate markings and instructions as described in Annex NAA of UL 60950, Third Edition or UL 60950-1
D	Reference to IEC 60990 replaced by UL 101
D	Add touch current value in MIU where $MIU = U_2 \times 2$ (r.m.s. value)
G	Annex G is deleted
I	Safety requirements for coin/button cell batteries (Annex I provided below)
L	Annex L is deleted
Q	Safety requirements for video apparatus for use in health care facilities
R	Safety requirements for undercabinet apparatus
S	Safety requirements for in-wall mounted apparatus
T	Safety requirements for apparatus with projection lamps
U	Safety requirements for permanently connected apparatus
V	Safety requirements for carts, stands, and similar apparatus for use with specific apparatus covered by this standard
W	Construction details for a 0.02-ohm shunt for use in the peak inrush-current measurement
X	Manufacturing and production-line tests and verification
Y	Standards for components

Annex I DU **(normative)**

Safety requirements for coin/button cell batteries

Added Annex I effective January 2, 2014

The requirements of this standard, supplemented or replaced by those contained in this annex, apply to apparatus with **USER** accessible battery access covers, including **REMOTE CONTROLS**, which contain lithium **COIN / BUTTON CELL BATTERIES** with a diameter of 32 mm or less.

The requirements of this annex do not apply to:

- **PROFESSIONAL APPARATUS**
- **COMMERCIAL APPARATUS**
- Apparatus containing **COIN / BUTTON CELL BATTERIES** which are soldered in place.

I.2.7.15

COIN / BUTTON CELL BATTERY

a small, single cell battery having a diameter greater than its height

Add the following to sub-clause 5.4.1:

- i) If an apparatus contains a user-replaceable **COIN / BUTTON CELL BATTERY**, either of the following symbols shall be placed on the apparatus close to the battery compartment:



In addition, there shall be a warning in the accompanying documentation. The warning shall contain the symbol placed on the apparatus and the following text or equivalent.



WARNING
DO NOT INGEST BATTERY, CHEMICAL BURN HAZARD

or



WARNING
DO NOT INGEST BATTERY, CHEMICAL BURN HAZARD

followed by:

[The remote control supplied with] This product contains a coin/button cell battery. If the coin/button cell battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death.

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Keep new and used batteries away from children. If the battery compartment does not close securely, stop using the product and keep it away from children.
If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.

Add new clause I.21 - COIN / BUTTON CELL BATTERIES

I.21 COIN / BUTTON CELL BATTERIES

I.21.1 Construction

Apparatus shall be designed to prevent children from removing the battery by one of the following methods:

- a) A tool, such as a screwdriver or coin, is required to open the battery compartment; or
- b) The battery compartment door / cover requires the application of a minimum of two independent and simultaneous movements of the securing mechanism to open **BY HAND**.

If screws or similar fasteners are used to secure the door/cover providing access to the battery compartment, the fasteners shall be captive to ensure that they remain with the door/cover. This does not apply to side panel doors on larger devices which are necessary for the functioning of the equipment and which are not likely to be discarded or left off the equipment.

I.21.2 Pre-conditioning tests

One test sample shall be subjected to the following pre-conditioning prior to test. The pre-conditioning test in I.21.2.1 shall be performed first.

I.21.2.1 Stress relief test

If the battery compartment door / cover or opening mechanism utilizes molded or formed thermoplastic materials, the sample consisting of the complete apparatus, or of the complete enclosure together with any supporting framework, is subjected in a circulating air oven to a temperature 10 K higher than the maximum temperature observed on the enclosure during the test of 7.1.3, but not less than 70 °C, for a period of 7 h, then permitted to cool to room temperature.

I.21.2.2 Battery replacement test

The battery compartment shall be opened and closed and the battery removed and replaced ten times to simulate normal replacement according to the manufacturer's instructions. If the battery compartment is secured with a screw, the screws are loosened and then tightened by means of a suitable test screwdriver, spanner or key, applying a continuous, linear torque according to table 20.

I.21.3 Abuse tests

All tests included in this sub-clause shall be performed on one pre-conditioned sample of the apparatus.

I.21.3.1 Drop test

PORTABLE APPARATUS having a mass of 7 kg or less are subjected to three drops from a height of 1.0 m onto a horizontal surface in positions likely to produce the maximum force on the battery compartment. If the apparatus is a **REMOTE CONTROL**, it shall be subjected to ten drops.

The horizontal surface consists of hardwood at least 13 mm thick, mounted on two layers of plywood each 19 mm to 20 mm thick, all supported on a concrete or equivalent non-resilient floor.

I.21.3.2 Impact test

The battery compartment door / cover shall be subject to three 2-Joule impacts.

The impact shall be caused by allowing a solid, smooth, steel ball of 50 ± 1 mm in diameter and with a mass of approximately 500 g to fall freely from rest through a vertical distance, as illustrated in figure 8, and strike the battery compartment door / cover with the specified impact in a direction perpendicular to the enclosure surface.

I.21.3.3 Crush test

REMOTE CONTROL devices held in hand are to be supported by a fixed rigid supporting surface, in positions likely to produce the most adverse results as long as the position can be self supported. A crushing force of 330 ± 5 N is applied for a period of 10 s to the exposed surfaces of the **REMOTE CONTROL**. The force is to be applied by a flat surface measuring approximately 100 by 250 mm.

I.21.4 Compliance

*Compliance is checked by applying a force of 45 ± 1 N for 10 s to the battery compartment door/cover by a rigid test finger according to test probe 11 of IEC 61032 at the most unfavorable place and in the most unfavorable direction. The force shall be applied in only one direction at a time. The battery compartment door/cover shall not open and shall remain functional. The battery shall not become **ACCESSIBLE**.*