



## Comments on sub clause 145.4.1 of IEEE draft 802.3bt/D2.4

Presenter: Arkadiy Peker  
Co-author : Yair Darshan  
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# Comments #121,122

## **Comment**

In the text “Accessible external conductors are specified in subclause 6.2.1 b) of IEC 60950-1 and IEC 62368-1.”  
There are few issues:

Comment 121:

Text on a line 16 specifies subclause of IEC60950 but does not specifies subclause IEC62368. For consistency we should specify similar subclause in IEC 62368

Comment 122:

It refer to IEC60950 **AND** IEC 62368 and therefore it means that BOTH standards need to be met. Instead of IEC60950 **AND** IEC 62368 , we should use IEC60950 **OR** IEC 62368

[See more details in Annex A.](#)

### **Suggested Remedy:**

**Change from:**

“Accessible external conductors are specified in subclause 6.2.1 b) of IEC 60950-1 and IEC 62368-1”

**To:**

“Accessible external conductors are specified in sub clause 6.2.1 b) of IEC 60950-1 or sub clause 5.4.10.1 b) IEC 62368-1”

## Comment #123 (page 204,line 18)

- Current text:

*This electrical isolation shall withstand at least one of the following electrical strength tests:*

- a) 1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1 and IEC 62368-1.*
- b) 2250 V dc for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1 and IEC 62368-1.*
- c) An impulse test consisting of a 1500 V, 10/700  $\mu$ s waveform, applied 10 times, with a 60 s interval between pulses. The shape of the impulses shall be 10/700  $\mu$ s (10  $\mu$ s virtual front time, 700  $\mu$ s virtual time of half value), as defined in IEC 60950-1 and IEC 62368-1 Annex N.*

## Comment #123-continue:

### ■ *Issues with current text:*

There is an ambiguity in current IEEE 802.3bt requirements for electrical isolation compare with IEC 60950 or IEC62368.

- Customers may argue (and we have many such cases) that a product meet UL/IEC electrical isolation requirements but does not meet IEEE802.3. Customers believes that IEEE802.3 requirements are more stringent than UL/IEC and does not allow to remove protective components as it allowed in IEC 60950-1 5.2.2 Note 4 as follows:

“NOTE 4 Components providing a d.c. path in parallel with the insulation to be tested, such as discharge resistor for filter capacitors, voltage limiting devices or surge suppressors, should be disconnected.”

The requirements which allow to remove components as in Note 4 should be added to IEEE specs or at least IEEE802.3bt should have clear referral on this subject to IEC60950 or IEC62368.

We should remove all detailed explanation how to perform electrical isolation test ,compliance criteria and refer to test procedures in IEC60950 or IEC62368.

In this case it would be absolutely clear that IEEE 802.3 does not have special requirements for electrical isolation test and in the same time keep exactly goal of specify necessary testing and compliance criteria with all details of testing including in IEC60950 or IEC 62368.

# Comment #123-remedy: Option1

- Current text:

*“This electrical isolation shall withstand at least one of the following electrical strength tests:*

*a) 1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1 and IEC 62368-1.*

*b) 2250 V dc for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1 and IEC 62368-1.*

*c) An impulse test consisting of a 1500 V, 10/700  $\mu$ s waveform, applied 10 times, with a 60 s interval between pulses. The shape of the impulses shall be 10/700  $\mu$ s (10  $\mu$ s virtual front time, 700  $\mu$ s virtual time of half value), as defined in IEC 60950-1 and IEC 62368-1 Annex N.*

*There shall be no insulation breakdown, as defined in subclause 5.2.2 of IEC 60950-1 and IEC 62368-1, during the test. The resistance after the test shall be at least 2 M”*

- Proposed text (Preferred):

*Verification of the electrical isolation shall be performed according to test procedures and compliance criterias in sub clauses 5.2 .2 and 6.2.2 of IEC60950-1 or 5.4.9 and 5.4.10.2 IEC62368-1*

## Comment #123-remedy: Option2 and 3

### Current text

*“This electrical isolation shall withstand at least one of the following electrical strength tests:*

- a) 1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1 and IEC 62368-1”*

### Proposed text Option 2:

*“This electrical isolation shall withstand at least one of the following electrical strength tests:*

- a) 1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in subclause 5.2.2 (including note 4) of IEC 60950-1 or 5.4.9 of IEC 62368-1.*

### Proposed text Option 3:

*“This electrical isolation shall withstand at least one of the following electrical strength tests:*

- a) 1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1 or 5.4.9 of IEC 62368-1*

*Note : Components providing a d.c. path in parallel with the insulation to be tested, such as discharge resistors for filter capacitors, voltage limiting devices or surge suppressors, should be disconnected according to Note4 of subclause 5.2.2 IEC60950”*

## Comment #124-page 204 line 27

### Comment:

In the text“ *There shall be no insulation breakdown, as defined in subclause 5.2.2 of IEC 60950-1 and IEC 62368-1, during the test. The resistance after the test shall be at least 2 M ohm, measured at 500 V dc*“ there is following issue:

This compliance criteria applies for a) and b) and c) electrical test procedures (lines 20-25 on a page 204). However a) and b) compliance requirements for steady stay tests are different than for c) impulse test.

Requirements a) and b) compliance criteria per paragraph 5.2.2 IEC60950:

*"There shall not be insulation breakdown during test. Insulation breakdown is considered to have occurred when the current that flows as a result of the application of the test voltage rapidly increases in an uncontrolled manner, that is the insulation does not restrict the flow of current"*.

## Comment #124- continue

For requirements c) compliance per paragraph 6.2.23 IEC60950-1:

*"For impulse tests, damage to insulation is verified in one of two ways, as follows:*

- during the application of the impulses, by observation of oscillograms. Surge suppressor operation or breakdown through insulation is judged from the shape of an oscillogram.*
- after application of all the impulses, by an insulation resistance test. Disconnection of surge suppressors is permitted while insulation resistance is being measured. The test voltage is 500 V d.c. or, if surge suppressors are left in place, a d.c. test voltage that is 10 % less than the surge suppressor operating or striking voltage. The insulation resistance shall not be less than 2 MΩ."*

Therefore IEEE requirements that *" The resistance after the test shall be at least 2 Mohm , measured at 500 V dc"* should refer just to impulse test c) and not to steady stay tests a) and b).

*(See more details in Annex B)*



## Comment #124-remedy

### Current text

*“There shall be no insulation breakdown, as defined in subclause 5.2.2 of IEC 60950-1 and IEC 62368-1, during the test. The resistance after the test shall be at least 2 M.”*

### Proposed text:

#### **Option 1 (preferable):**

*If preferable option on comment 123 is accepted than no changes are required and it resolves comment #124. If preferable option on comment 123 will not be accepted, than go for Option 2.*

#### **Option 2:**

*“There shall be no insulation breakdown, as defined in subclause 5.2.2 of IEC 60950-1 or 5.4.9 .2 of IEC 62368-1, during the test for cases a) and b). For impulse test c) compliance criteria according to sub clause 6.2.2.3 of IEC60950-1 or subclause 5.4.10.3 of IEC62368-1”*

## Comment # 125 (page 204 line 27)

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**Note: If resolution of comment 124 (option 1 or 2) is accepted, this solve comment 125 and no need to discuss comment 125.**

### **Issues with current text:**

It specify IEC60950 -1 subclause 5.2.2 but does not specify similar subclause in IEC62368-1 and  
For consistency we should add corresponded IEC62368-1 subclause and change from IEC 60950-1 **AND**  
IEC62368-1 to IEC 60950-1 **OR** IEC62368-1

## Comment # 125- continue

### Current text:

*“There shall be no insulation breakdown, as defined in subclause 5.2.2 of IEC 60950-1 and IEC 62368-1, during the test. The resistance after the test shall be at least 2 MOhm, measured at 500 V dc”*

### Proposed text:

*“There shall be no insulation breakdown, as defined in subclause 5.2.2 of IEC 60950-1 or subclause 5.4.9.2 of IEC 62368-1, during the test. The resistance after the test shall be at least 2 MOhm, measured at 500 V dc”*

# Annex A.

## Backup slides for comments #121 and #122

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# Annex A. Comments #121,122-back up. Rational for changes: transition from IEC60950 to IEC 62368

IEC62368 Covers Scopes of previous (legacy) standards: **IEC 60065**, Audio, Video & Similar Electronic Apparatus –Safety and **IEC 60950-1**, Information Technology Equipment – Safety

**IEC62368 is Not** a simple merger of IEC 60065 & 60950-1! Although many common elements...

## Likely EU/NA Transition (subject to change) : Legacy AV/ICT Standards → 62368-1

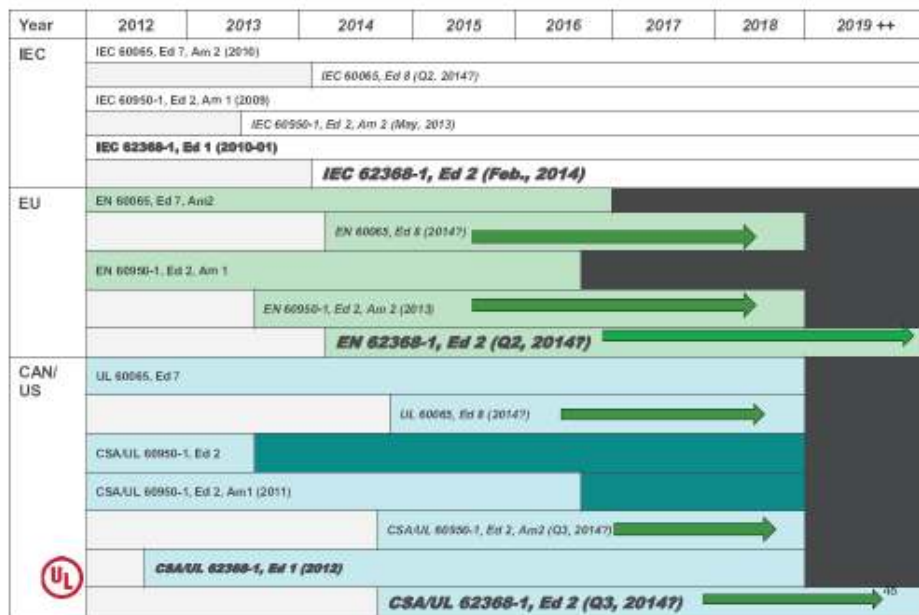


Table III.1 Safety equivalence of IEC 60950-1 and IEC 62368-1

IEC 60950-1	IEC 62368-1
SELV	ES1
TNV-1	ES1 External circuits have impulse testing see NOTES 1 through 3
TNV-2	ES2
TNV-3	ES2 External circuits have impulse testing see NOTES 1 through 3
NOTE 1 Paired conductor (shielded or unshielded) - tested with 1500 V, 10/700. Only differential if one conductor is earthed in the equipment NOTE 2 Any other conductors – tested with mains transient or known external circuit overvoltage impulse whichever is higher. The external circuit is not earthed at either end, but there is an earth reference NOTE 3 Cable distribution network coaxial cable – tested with 4000 V, 10/700 centre conductor to shield cable (shield is earthed at the equipment). Not applicable to power-fed coaxial repeaters.	

# Annex A. Comments #121 –continue, comparison of sub clause 6.2.1b) IEC60950 and 5.4.10.1 b) IEC62368-1

Sub clause 6.2.1b) IEC60950-1

## 6.2 Protection of equipment users from overvoltages on telecommunication networks

### 6.2.1 Separation requirements

Equipment shall provide adequate electrical separation between a TNV-1 CIRCUIT or a TNV-3 CIRCUIT and the following parts of the equipment.

b) Parts and circuitry that can be touched by the test finger, Figure 2A (see 2.1.1.1), except contacts of connectors that cannot be touched by the test probe, Figure 2C (see 2.1.1.1).

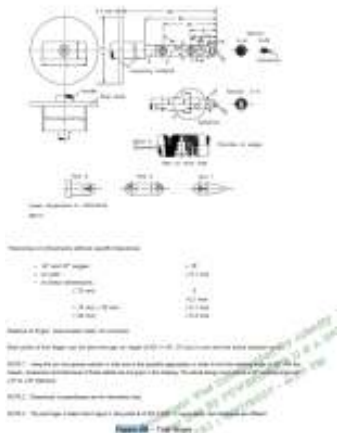


Figure 2A – Test finger

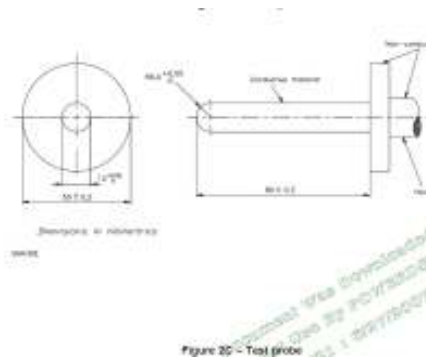


Figure 2C – Test probe

Sub clause 5.4.10.1 b) IEC62368-1

## 5.4.10 Safeguards against transient voltages from external circuits

### 5.4.10.1 Requirements

Adequate electrical separation shall be provided between **external circuits** of equipment as indicated in Table 14, ID number 1, Figure 30 and:

b) **accessible** parts and circuitry, except for the pins of connectors. However, such pins shall not be **accessible** under **normal operating conditions** by the blunt probe of Figure V.3;

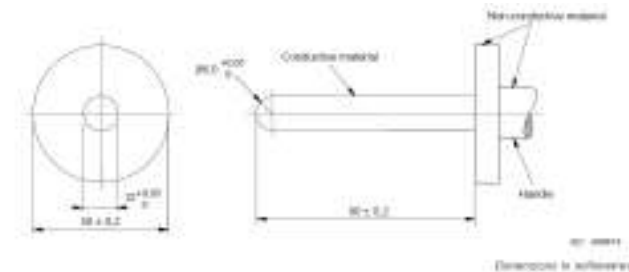


Figure V.3 – Blunt probe

# Annex B.

## Back up slides for comment #124

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## Annex B. Additional information: Compliance criterias from IEC60950-1 and IEC62368-1 for Steady stay test

- **From 5.2.2 IEC60950-1**  
**Compliance criteria for steady stay test**

*There shall be no insulation breakdown during the test.*

*Insulation breakdown is considered to have occurred when the current that flows as a result of the application of the test voltage rapidly increases in an uncontrolled manner, that is the insulation does not restrict the flow of the current. Corona discharge or a single momentary flashover is not regarded as insulation breakdown.*

- **From 5.4.9.2 IEC62368-1 Compliance criteria for steady stay test**

*There shall be no insulation breakdown during the test. Insulation breakdown is considered to have occurred when the current that flows as a result of the application of the test voltage, rapidly increases in an uncontrolled manner, that is, the insulation does not restrict the flow of the current. Corona discharge or a single momentary flashover is not regarded as insulation breakdown.*



## Annex B. Compliance criterias from IEC60950-1 and IEC62368-1 for impulse test

### From 6.2.2.3 IIEC60950-1 Compliance criteria for impulse test

*For impulse tests, damage to insulation is verified in one of two ways, as follows:*

- during the application of the impulses, by observation of oscillograms. Surge suppressor operation or breakdown through insulation is judged from the shape of an oscillogram.*
- after application of all the impulses, by an insulation resistance test. Disconnection of surge suppressors is permitted while insulation resistance is being measured. The test voltage is 500 V d.c. or, if surge suppressors are left in place, a d.c. test voltage that is 10 % less than the surge suppressor operating or striking voltage. The insulation resistance shall not be less than 2 MΩ.*

### From 5.4.10.3 IEC62368-1 Compliance criteria for impulse test

*For the impulse tests, insulation breakdown is verified in one of the following two ways:*

- during the application of the impulses, by observation of oscillograms, surge suppressor operation or breakdown through insulation is judged from the shape of an oscillogram.*
- after application of all the impulses, by an insulation resistance test. Disconnection of surge suppressors is permitted while insulation resistance is being measured. The test voltage is 500 V d.c. or, if surge suppressors are left in place, a d.c. test voltage that is 10 % less than the surge suppressor operating or striking voltage. The insulation resistance shall not be less than 2 MΩ .*