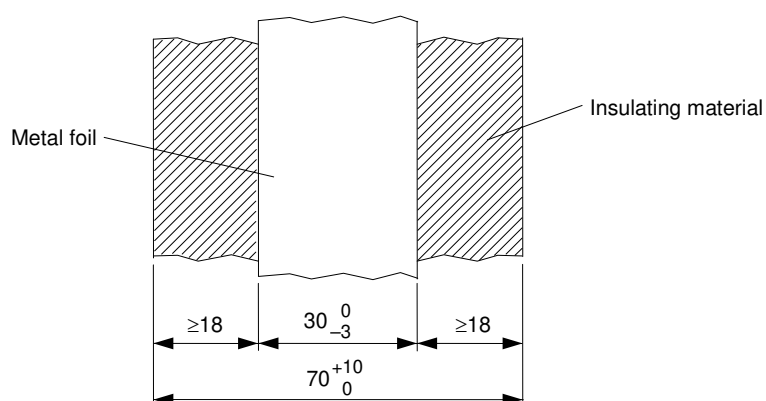*Dimensions in millimeters*

IEC   1556/14

NOTE 1   Figure 17 is slightly modified compared to Figure 6c of IEC 61558-1:2005.

   Figures 15 and 16 are slightly modified compared to Figure 6b from IEC 61558-1:2005.

NOTE 2   See 8.21.

Figure 17 – Position of metal foil on insulating material

Annex A
(normative)

Additional requirements for apparatus
with protection against splashing water

NOTE   The clause numbering of this annex refers to the clauses of this standard

A. 1   General

The requirements of this standard, supplemented or replaced by those contained in this annex, apply to apparatus provided with protection against splashing water.

A.5   Marking and instructions

Add the following item after 5.2 h):

A.5.2 i)   *Protection against splashing water*

Apparatus provided with protection against splashing water shall be marked at least with the designation IPX4 in accordance with IEC 60529.

Compliance is checked by inspection.

A.5.5.2 a)   *Subclause 5.5.2 a) does not apply.*

A.10   Insulation requirements

Modify 10.3 as follows:

A.10.3   Splash and humidity treatment

A.10.3.1   Splash treatment

The enclosure shall provide adequate protection against splashing water.

Compliance is checked by the treatment specified below, which is made on the apparatus fitted with external flexible cords in accordance with the requirements of Clause 16.

The apparatus is subjected to the test described in 14.2.4 a) of IEC 60529:1989.

Immediately after this treatment, the apparatus shall comply with the tests of 10.4 and inspection shall show that water, which may have entered the apparatus, does not cause any damage in the sense of this standard; in particular, there shall be no trace of water on insulations for which CREEPAGE DISTANCES are specified.

A.10.3.2   Humidity treatment

Subclause 10.3 applies, except that the duration of the test is seven days (168 h).

Annex B
(normative)

Apparatus to be connected to the
TELECOMMUNICATION NETWORKS

The requirements of this standard supplemented by the requirements of IEC 62151 as referenced in this annex apply to apparatus within the scope of this standard intended to be connected to TELECOMMUNICATION NETWORKS.

NOTE 1   In countries listed in IEC 62151, special national conditions apply.

NOTE 2   Attention is drawn to the fact that the telecommunication authorities can impose additional requirements on apparatus to be connected to TELECOMMUNICATION NETWORKS. Those requirements generally concern the protection of the networks as well as the USERS of the apparatus.

IEC 62151:2000 Clause 1, except for 1.4, and Clause 2 apply.

IEC 62151:2000 Clause 3 applies, with the following modification:

Replace 3.5.4 by the definition 2.4.10 of this standard.

IEC 62151:2000 Clause 4 applies, with the exception of 4.1.2, 4.1.3 and 4.2.1.2.

The requirements of 4.1.2 shall be replaced by the following requirements:

In a single TNV-0 CIRCUIT or in interconnected TNV-0 CIRCUITS, the voltage between any two conductors of the TNV-0 CIRCUIT or CIRCUITS and, between any one such conductor and earth shall not exceed the values given in 9.1.1.2 of this standard.

NOTE 3 A circuit that meets the above requirements, but that is subject to overvoltages from a TELECOMMUNICATION NETWORK, is a TNV-1 CIRCUIT.

The requirements of 4.1.3 shall be replaced by the following requirements:

In the event of a single failure of BASIC INSULATION or SUPPLEMENTARY INSULATION, or of a component (excluding components with DOUBLE or REINFORCED INSULATION), the voltages between any two conductors of the TNV-0 CIRCUIT or CIRCUITS and between any one such conductor and earth shall not exceed the values given in 9.1.1.2 of this standard for more than 0,2 s. Moreover, the limit values as given in 11.1 shall not be exceeded.

Except as permitted in 4.1.4, one of the methods specified in 4.1.3.1, 4.1.3.2, or 4.1.3.3 shall be used.

Parts of the interface circuit that do not comply with the requirements for TNV-0 CIRCUITS under normal operating conditions shall therefore not be USER ACCESSIBLE.

The requirements of 4.2.1.2 shall be replaced by the following requirements:

NOTE 4   See also Clauses 5 and 6.

Separation of TNV-0 CIRCUITS, TNV-1 CIRCUITS and ACCESSIBLE conductive parts from TNV-2 CIRCUITS and TNV-3 CIRCUITS shall be such that

– under normal operating conditions, the limits specified in 4.2.1.1 a) for TNV-1 CIRCUITS (35 V peak, or 60 V d.c.) are not exceeded on the TNV-0 CIRCUITS, TNV-1 CIRCUITS and ACCESSIBLE conductive parts.

– in the event of a single insulation fault, the limits specified in 4.2.1.1 b) for TNV-2 CIRCUITS and TNV-3 CIRCUITS under normal operating conditions (70 V peak, or 120 V d.c.) are not exceeded on the TNV-0 CIRCUITS, TNV-1 CIRCUITS and ACCESSIBLE conductive parts. However, after 0,2 s the voltage limits of 4.1.2 (35 V peak, or 60 V d.c.) shall apply.

The separation requirements will be met if BASIC INSULATION is provided as indicated in Table B.1, which also shows where 6.1 applies; other solutions are not excluded.

Table B.1 – Separation of TNV circuits

Parts being separated		Separation
TNV-0 CIRCUIT or ACCESSIBLE conductive parts	TNV-1 CIRCUIT	6.1
	TNV-2 CIRCUIT	BASIC INSULATION
	TNV-3 CIRCUIT	BASIC INSULATION and 6.1
TNV-1 CIRCUIT	TNV-2 CIRCUIT	BASIC INSULATION and 6.1
TNV-2 CIRCUIT	TNV-3 CIRCUIT	6.1
TNV-1 CIRCUIT	TNV-3 CIRCUIT	BASIC INSULATION
TNV-1 CIRCUIT	TNV-1 CIRCUIT	functional insulation
TNV-2 CIRCUIT	TNV-2 CIRCUIT	functional insulation
TNV-3 CIRCUIT	TNV-3 CIRCUIT	functional insulation

BASIC INSULATION is not required provided that all of the following are met:

– the TNV-0 CIRCUIT, TNV-1 CIRCUIT or ACCESSIBLE conductive part shall be connected to a PROTECTIVE EARTHING TERMINAL in accordance with this standard; and

– the installation instructions specify that the PROTECTIVE EARTHING TERMINAL shall be permanently connected to earth; and

– the test of 4.2.1.5 shall be carried out if the TNV-2 or TNV-3 CIRCUIT is intended to receive signals or power that are generated externally during normal operation (for example in a TELECOMMUNICATION NETWORK).

At the choice of the manufacturer, it is permitted to treat a TNV-1 CIRCUIT or a TNV-2 CIRCUIT as a TNV-3 CIRCUIT. In this case, the TNV-1 CIRCUIT or TNV-2 CIRCUIT shall meet all the separation requirements for a TNV-3 CIRCUIT.

Compliance is checked by inspection and measurement and, where necessary, by simulation of failures of components and insulations such as are likely to occur in the apparatus. Prior to the tests, insulation that does not meet the requirements for BASIC INSULATION is short-circuited.

NOTE 5   Where BASIC INSULATION is provided and 6.1 also applies to this insulation, the test voltage prescribed in 6.2 is in most cases higher than that for BASIC INSULATION.

Clause 5 of IEC 62151 applies, with the following modification in 5.3.1:

The value 1,6 shall be replaced by the value 1,8.

Clauses 6 and 7 of IEC 62151 apply.

Annex A up to and including Annex C of IEC 62151 apply.

Annex C
(normative)

Band-pass filter for wide-band noise measurement

For wide-band measurement see 6.1 of IEC 60268-1:1985.

The filter shall be a band-pass filter having a frequency response within the limits shown in Figure C.1.

A band-pass filter which has a substantially constant transmission factor between 22,4 Hz and 22,4 kHz, decreasing outside this frequency band at the rates specified for octave-band filters having mid-band frequencies of 31,5 Hz and 16 000 Hz specified in IEC 61260, has a response falling within the limits of this specification.
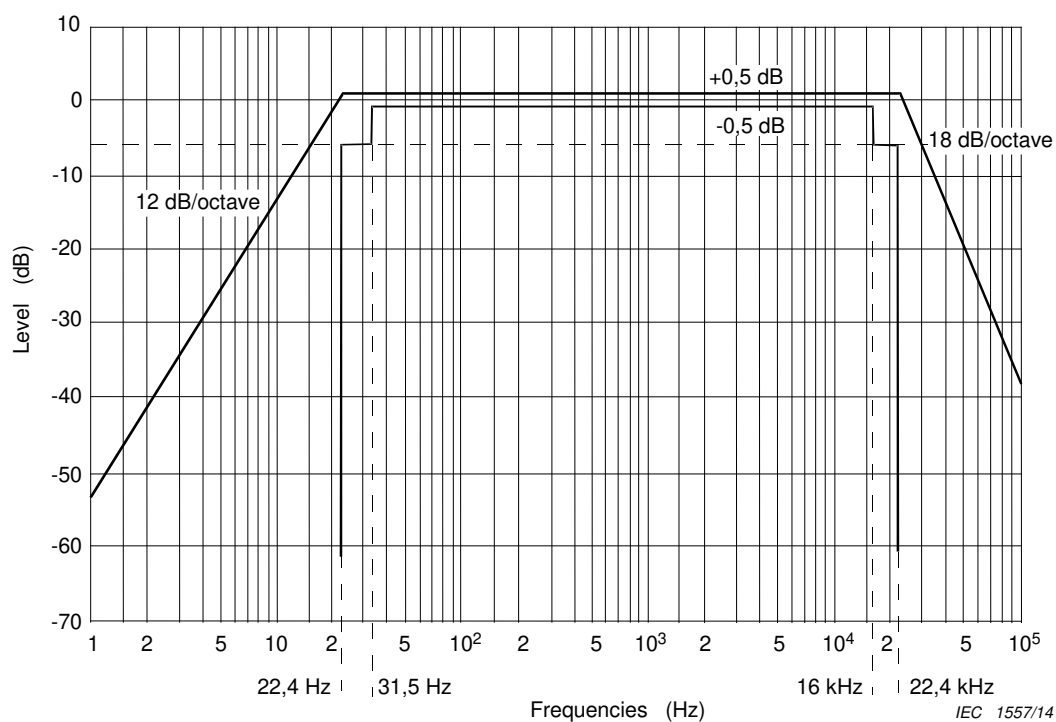
Source: Figure 5 of IEC 60268-1:1985.

NOTE 1   Strong signals just above or below the band-limits can, to some degree, influence the individual frequency response of the filter actually used.

NOTE 2   See 4.1.6.

Figure C.1 – Band-pass filter for wide-band noise measurement
(amplitude/frequency response limits)

Annex D
(normative)

Measuring network for TOUCH CURRENTS

Figure D.1 below shows the measuring network for TOUCH CURRENTS according to IEC 60990.
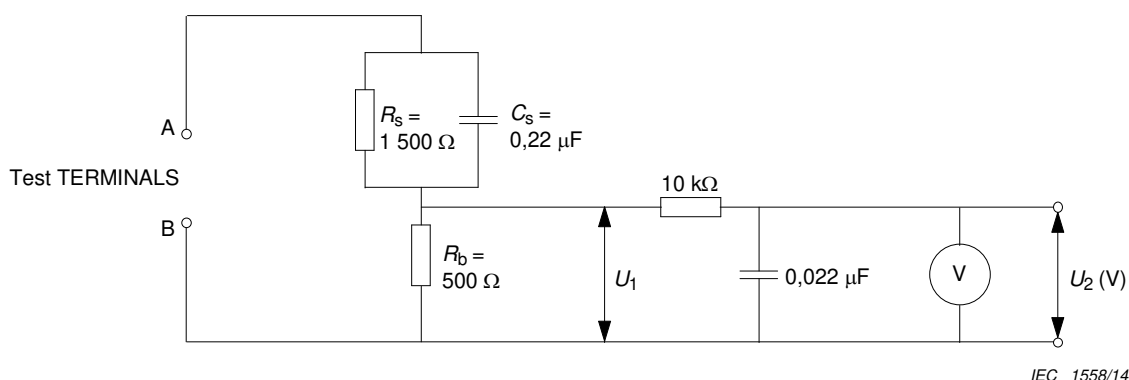
Resistance values in ohms (Ω)

V: Voltmeter or oscilloscope (r.m.s. or peak reading)

Input resistance: $\geq$ 1 MΩ

Input capacitance: $\leq$ 200 pF

Frequency range: 15 Hz to 1 MHz and d.c. respectively

Appropriate measures should be taken to obtain the correct value in case of non-sinusoidal waveforms.

The measuring instrument is calibrated by comparing the frequency factor of U_2 with the solid line in Figure F.2 of IEC 60990 at various frequencies. A calibration curve is constructed showing the deviation of U_2 from the ideal curve as a function of frequency.

TOUCH CURRENT = U_2/500 (peak value).

NOTE   See 9.1.1.2.

Figure D.1 – Measuring network for TOUCH CURRENTS according to IEC 60990

Annex E
(normative)

Measurement of CLEARANCES and CREEPAGE DISTANCES

The methods of measuring CLEARANCES and CREEPAGE DISTANCES which are specified in the following figures are used in interpreting the requirements of this standard.

In the following figures, the value of X is given in Table E.1. Where the distance shown is less than X, the depth of the gap or groove is disregarded when measuring a CREEPAGE DISTANCE.

Table E.1 is valid only if the required minimum CLEARANCE is 3 mm or more. If the required minimum CLEARANCE is less than 3 mm, the value X is the lesser of:

– the relevant value in Table E.1, or

– one-third of the required minimum CLEARANCE.

Table E.1 – Value of X

Pollution degree (see 13.1)	X mm
1	0,25
2	1,0
3	1,5

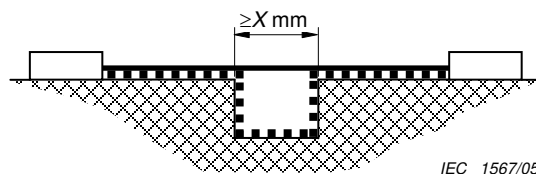In Figures E.1 to E.10, CLEARANCES and CREEPAGE DISTANCES are shown as follows:

■■■■■■■ CREEPAGE DISTANCE ——————— CLEARANCE

IEC   1566/05
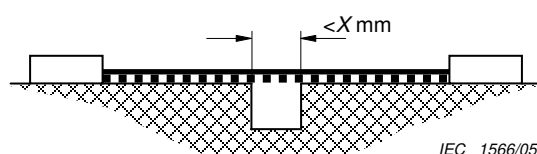
Condition: Path under consideration includes a parallel or converging-sided groove of any depth with width less than X mm.

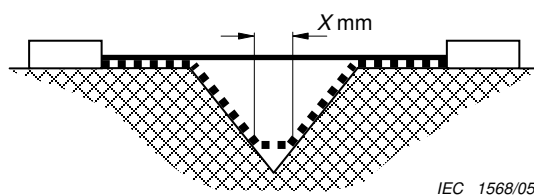Rule: CLEARANCE and CREEPAGE DISTANCE are measured directly across the groove.

Figure E.1 – Narrow groove

IEC   1567/05

Condition: Path under consideration includes a parallel-sided groove of any depth, and equal to or more than *X* mm wide.

Rule: CLEARANCE is the "line-of-sight" distance, CREEPAGE DISTANCE path follows the contour of the groove.
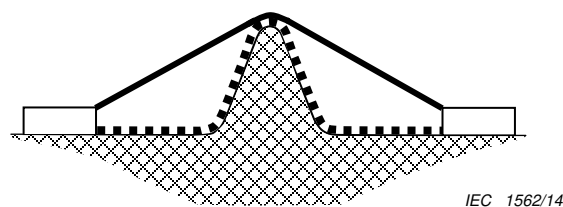
Figure E.2 – Wide groove

IEC   1568/05

Condition: Path under consideration includes a V-shaped groove with internal angle of less than 80° and a width greater than *X* mm.

Rule: CLEARANCE is the "line-of-sight" distance. CREEPAGE DISTANCE path follows the contour of the groove but "short-circuits" the bottom of the groove by a link *X* mm long.
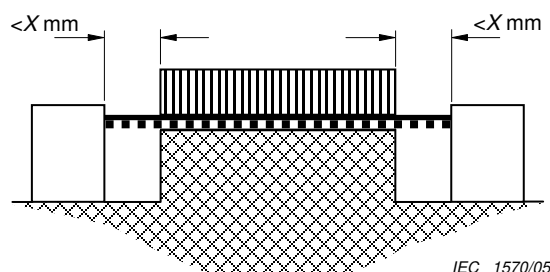
Figure E.3 – V-shaped groove

IEC   1562/14

Condition: Path under consideration includes a rib.

Rule: CLEARANCE is the shortest direct air path over the top of the rib. CREEPAGE DISTANCE path follows the contour of the rib.
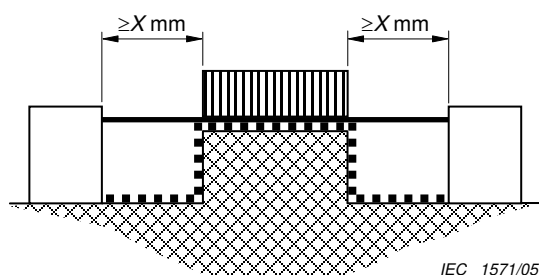
Figure E.4 – Rib

IEC   1570/05

Condition: Path under consideration includes an uncemented joint with grooves less than *X* mm wide on either side.

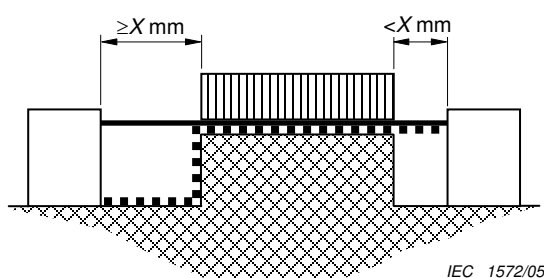Rule: CREEPAGE DISTANCE and CLEARANCE path is the "line-of-sight" distance shown.

Figure E.5 – Uncemented joint with narrow groove

IEC   1571/05

Condition: Path under consideration includes an uncemented joint with a groove equal to or more than X mm wide each side.

Rule: CLEARANCE is the "line-of-sight" distance. CREEPAGE DISTANCE path follows the contour of the groove.
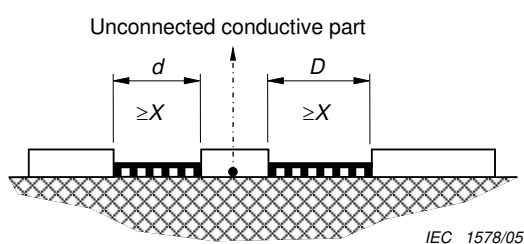
Figure E.6 – Uncemented joint with wide groove

IEC   1572/05

Condition: Path under consideration includes an uncemented joint with a groove on one side less than X mm wide and a groove on the other equal to or more than X mm wide.

Rule: CLEARANCE and CREEPAGE DISTANCE paths are as shown in Figure E.7.

Figure E.7 – Uncemented joint with narrow and wide grooves

IEC   1578/05

Condition: Insulation distance with intervening, unconnected conductive part.

Rule: CLEARANCE is the distance $d + D$, CREEPAGE DISTANCE is also $d + D$. Where the value of d or D is smaller than X it shall be considered as zero.
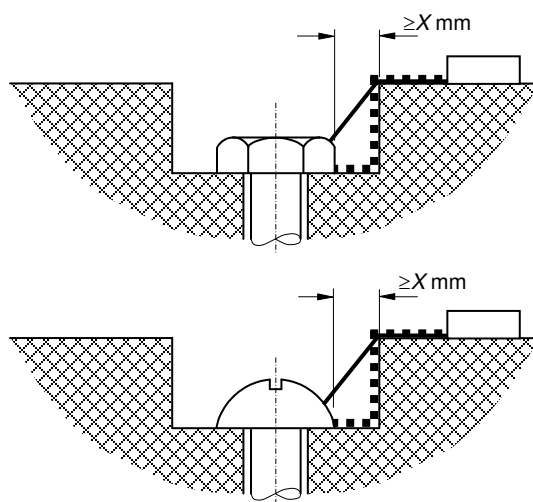
Figure E.8 – Intervening, unconnected conductive part
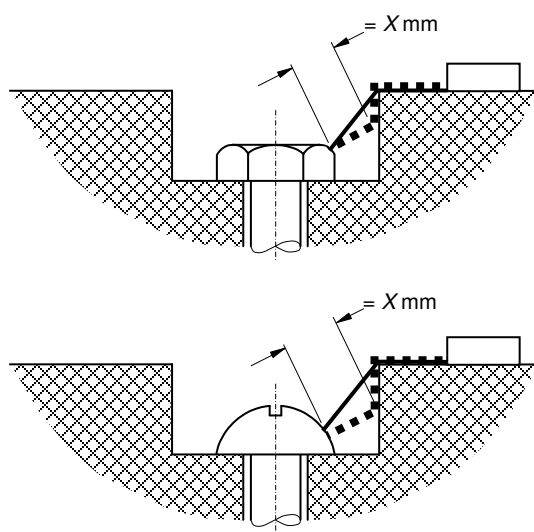
IEC   1559/14

Gap between head of screw and wall of recess too narrow to be taken into account.
Measurement of CREEPAGE DISTANCE is from screw to wall where the distance is equal to X mm.

Figure E.9 – Narrow recess

IEC   1560/14

Gap between head of screw and wall of recess wide enough to be taken into account.

Figure E.10 – Wide recess