



PERMANENT DOCUMENT

**ENEC 303
Annex AU**

Annex AU
to Routine Test Requirements for manufacturers
(as per Article 9 of the Agreement)

Safety requirements of Audio/video, information and
communication technology equipment
covered by EN 62368-1

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Annex AU to PD ENEC 303

Safety requirements of Audio/video, information and communication technology equipment covered by EN 62368-1

1 ROUTINE TESTS (100%)

1.1 Visual check of marking and workmanship.

1.2 Resistance of protective bonding system.

For **class I equipment**, the continuity of the protective bonding system shall be checked between the protective earth contact of the **mains** plug or appliance inlet, or the **protective earthing terminal** in case of a **permanently connected equipment**, and

- the **accessible** conductive parts that need to be connected to the **protective earthing terminal** for compliance with the requirements of the standard, and
- the protective earth contact of the socket-outlets respectively, if provided to deliver **mains** power to other equipment.

NOTE 1 Functional earth is not considered a part of the protective bonding system and as a consequence, it does not need to be tested.

*The minimum test current is 150 % of the rating of the overcurrent device protecting the **protective bonding conductor** (the **protective current rating**), but not less than 10 A and not more than 25 A (a.c. or d.c.), applied for any duration between 1 s and 4 s. The source shall have a no-load voltage not exceeding 12 V.*

The resistance, calculated from the voltage drop, shall not exceed 0,1 Ω .

*It is permitted to include the power cord (if any) in the resistance measurement and, if the result exceeds 0,1 Ω , to subtract the resistance of the **protective earthing conductor** of the power cord.*

NOTE 2 Care should be taken that the contact resistance between the tip of the measuring probe and the conductive part under test does not influence the test result.

1.3 Electric strength test

Routine tests for electric strength shall be carried out between circuits connected to the mains (primary circuits) and accessible conductive parts. For accessible circuits not connected to the mains (secondary circuits), it is permitted to test separately, before final assembly, subassemblies and components, such as transformers, if the

relevant insulation cannot be tested in the complete equipment, provided that the complete equipment complies with EN 62368-1 as appropriate.

The insulation of the equipment shall be checked by the following test.

For an equipment supplied by an a.c. mains, an a.c. test voltage of substantially sine-wave form, having mains frequency, or a d.c. test voltage or a combination of both with a peak value as specified in Table 1 is applied.

For equipment supplied by a d.c. mains, a d.c. voltage according to Table 2 is applied.

The test voltages given are the minimum test voltages to be applied. Higher voltages are allowed at the discretion of the manufacturer provided the insulation is not damaged due to overstress by the voltage applied.

NOTE 1 Applying an electrical strength test voltage that is too high may result in deterioration or partial damage of the insulation.

The test voltage is applied between the supply terminals connected in parallel and terminals regarded as accessible, and accessible conductive parts respectively, that may become hazardous live (ES3) in the event of an insulation fault as a result of incorrect assembly.

NOTE 2 Terminals regarded as accessible and accessible conductive parts may be connected together during the electric strength test.

Table 1 – Test voltage for equipment with a.c. mains

Application of test voltage	Test voltage V (peak) a.c or d.c.	
	Rated mains voltage ≤ 150	Rated mains voltage > 150
Accessible parts connected to protective earth	1 130 (800 r.m.s.)	2 120 (1 500 r.m.s.)
Accessible parts not connected to protective earth	2 120 (1 500 r.m.s.)	3 540 (2 500 r.m.s.)

Functional earth is not considered to be protective earth. Accessible parts connected to functional earth have to be tested as not being connected to protective earth.

Table 2 – Test voltage for equipment with d.c. mains

Application of test voltage	Test voltage V d.c.	
	Up to and including 60 V	Over 60 V up to and including 10 kV
Accessible parts connected to protective earth	No test	see Va in Table 3
Accessible parts not connected to protective earth	No test	see Vb in Table 3

Functional earth is not considered to be protective earth. Accessible parts connected to functional earth have to be tested as not being connected to protective earth.

Table 3 – d.c. test voltages

<i>U</i> d.c.	<i>V_a</i> d.c.	<i>V_b</i> d.c.
> 60	921	1472
62	935	1495
64	947	1517
66	962	1538
68	976	1560
70	988	1581
72	1001	1602
74	1014	1622
76	1027	1643
78	1039	1663
80	1052	1683
85	1082	1731
90	1110	1777
95	1138	1821
100	1167	1865
105	1193	1909
110	1219	1950
115	1244	1991
120	1268	2031
125	1294	2069
130	1316	2107
135	1340	2145
140	1363	2180
145	1386	2217
150	1407	2253
152	1414	2262
^a 155	1414	2286
^a 160	1414	2320
^a 165	1414	2353
^a 170	1414	2387
^a 175	1414	2419
^a 180	1414	2450
^a 184	1414	2476
185	1551	2482
190	1571	2513
200	1608	2573
210	1644	2631
220	1681	2689
230	1717	2746
240	1751	2800
250	1783	2853
260	1817	2906
270	1848	2958
280	1881	3008
290	1910	3057
300	1941	3105
310	1971	3153
320	1999	3200
330	2029	3247
340	2057	3292
350	2084	3336
360	2113	3379
380	2166	3466
400	2219	3549
420	2269	3630
440	2319	3709
460	2367	3787
480	2414	3862
500	2460	3937
520	2506	4009
540	2549	4079
560	2593	4149
580	2636	4217
588	2651	4242
600	2677	4242

NOTE Linear interpolation is permitted between the nearest two points.

^a At these voltages, the values of V_b are determined by the general curve $V_b = 155,86 U^{0,4638}$ and are not $1,6 V_a$.

Before the test voltage is applied, intimate contact shall be made between the equipment and the connection devices.

The voltage applied to the insulation under test may be gradually raised from zero to the prescribed voltage and maintained at that value for 1 s to 4 s.

*During the test, mains switches and functional switches conductively connected to the **mains**, if any, shall be in the on-position and it shall be ensured by suitable means that the test voltage is effectively connected to the equipment.*

No flash-over or breakdown shall occur during the test. The test voltage source shall be provided with a current sensing (over-current) device which, when activated, gives an indication "unacceptable". When loaded up to and including the overcurrent activation point, the voltage source shall still deliver the prescribed voltage.

NOTE The manufacturer may define what the minimum tripping current must be, making sure it is high enough to detect breakdown but at the same time taking into account possible operator safety issues.

Activation of the current sensing device is regarded as a flash-over or breakdown.

1.4 Components

It is assumed that components comply if they bear a certification mark of an ECS certification body.

If components are manufactured by the supplier and do not bear a certification mark, he has to add to each delivery a confirmation that the relevant tests on the components are performed.

The manufacturer of information technology equipment is responsible for the proper performance of the tests.

In any doubt, the certification body is allowed to inspect the component manufacturer.

2 PERIODIC TESTS

A sample of each series/family (same basic construction) shall be subject to complete tests or the main critical tests depending on the results of the pre-license according to the standard at least once a year.

The above mentioned tests have to be specified by the manufacturer in a testing or working instruction.

3 RECORDS

All test results shall be kept available. The choice of support and format for reports is left to the manufacturers; separate forms (one for each equipment), or grouped according to the most suitable parameters (periods of time, model, etc.) are equally acceptable.

The only obligation is the availability of data and their immediate interpretability for all equipment leaving the production line.

For every device tested, the following data shall be filled:

- date of test

- model or type designation of the device
 - serial number of the device or another identifier permitting the identification without ambiguity
 - value of earthing circuit resistance with the corresponding current value (*)
 - value of voltage applied during the electric strength test (*)
- quick-reference information that the whole set of tests has/has not been successful
reference to test equipment used for the tests.

As an alternative to the values referred with an (*) above, the information of the accomplishment of each test (e.g. pass or fail) is permitted, if the pass/fail criteria are described elsewhere on the test report.