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Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 31: Product safety requirements and tests

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ELECTRICITY METERING EQUIPMENT (AC) – GENERAL REQUIREMENTS, TESTS AND TEST CONDITIONS –

Part 31: Product safety requirements and tests

INTERPRETATION SHEET 1

This interpretation sheet has been prepared by subcommittee WG11: Electricity metering equipment, of IEC technical committee TC13: Electrical energy measurement and control.

The text of this interpretation sheet is based on the following documents:

DISH	Report on voting
13/1787/DISH	13/1789/RVDISH

Full information on the voting for the approval of this interpretation sheet can be found in the report on voting indicated in the above table.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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6.7.1.3 – Requirement pertaining to classification of impulse withstand voltages (overvoltage categories)

This subclause specifies the following:

The impulse withstand voltage (overvoltage category, OVC) is used to classify equipment energized directly from the mains.

[…]

ICS 19.080; 91.140.50

IEC 62052-31:2015-09/ISH1:2019-06(en)

For metering equipment, overvoltage category III is taken as a basis for determining clearances. See also 1.4 and Annex K.

Background:

- in substations, auxiliary supply circuits of the meter may be energized from a d.c. supply, from an Uninterruptable Power Supply (UPS) or a dedicated a.c. supply that is independent of the mains to which the current and voltage circuits of the meter are connected;
- similarly, auxiliary circuits of the meter – like control circuits – may be connected to such circuits.

For equipment connected to such circuits generally OVC II applies.

This gives rise to the following question: Does OVC III apply to all HLV mains circuits and auxiliary circuits of the meter?

Interpretation

In general, meters shall be designed for OVC III. However, under the conditions described in the Background above, dimensioning the auxiliary supply and auxiliary circuits to meet OVC III requirements – as specified in 6.7.3 and 6.7.4 – is not justifiable.

They can be dimensioned to meet OVC II requirements provided that those circuits are clearly marked on the meter and identified in the Installation manual, User Manual and Maintenance manual and suitable warnings are provided.

It is then the responsibility of the installer to make sure that the circuits designed for OVC II are not connected to circuits that require OVC III or higher.

As IEC 62052-31:2015 specifies the insulation requirements and tests for OVC III only, such circuits shall be designed and tested according to the relevant clauses of IEC 61010-1.

NOTE During the upcoming revision of IEC 62052-31, requirements and tests for OVC II will be added.

6.8 – Insulation requirements between circuits and parts

This subclause specifies the following:

The following mains circuits shall be considered as hazardous live (HLV) circuits:

- *voltage and current circuits of direct connected and transformer operated meters;*

  NOTE 2 Current circuits of CT operated meters are generally earthed.
- *neutral circuits;*
- *relays / control switches switching mains voltage;*
- *auxiliary supply circuits intended for connection to the mains.*

Background: Current circuits of transformer operated meters are generally earthed.

This gives rise to the following question: According to IEC 62052-31, what insulation requirements apply between current circuits of transformer operated meters and other circuits and parts?

Interpretation

The current text is ambiguous:

- on the one hand, it says that voltage and current circuits of direct connected and transformer operated meters shall be considered as HLV circuits,
- on the other hand, Note 2 says that current circuits of CT operated meters are generally earthed. Therefore, they are not Hazardous Live circuits.

The text shall be interpreted as below:

The following mains circuits shall be considered as hazardous live (HLV) circuits:

- *voltage circuits;*
- *current circuits of direct connected meters;*
- *current circuits of current transformer operated meters unless they are earthed in which case they shall be considered as ELV non-mains circuits;*
- *neutral circuits;*
- *relays / control switches switching mains voltage;*
- *auxiliary supply circuits intended for connection to the mains.*

Consequently, Table 20 applies.

Table 20 – Insulation requirements between any two circuits

Table 20 with Note 6 specifies Functional / Basic insulation between any two SELV / PELV circuits and supplementary or basic insulation if one of the circuits is an independent circuit or is adjacent to a conductive part which may be earthed when the equipment is installed.

Part of Table 20 is reproduced below:

Table 20 – Insulation requirements between any two circuits

	HLV mains-circuit [1]	ELV circuit	SELV circuit	PELV circuit
HLV mains-circuit [1]	F/B [1) 6)] Table 8 Table 9	B Table 8 Table 9	D, R Table 8 Table 9	D, R Table 8 Table 9
ELV circuit	B Table 8 Table 9	F/B [6)] Table 13 Table 14	B, S Table 13 Table 14	B, S Table 13 Table 14
SELV circuit	D, R Table 8 Table 9	B, S Table 13 Table 14	F/B [6)] Table 13 Table 14	F/B [8)] Table 13 Table 14
PELV circuit [2)]	D, R Table 8 Table 9	B, S Table 13 Table 14	F/B [8)] Table 13 Table 14	F/B [6)] Table 13 Table 14

6) Supplementary or basic insulation shall be used if one of the circuits is an independent circuit or is adjacent to a conductive part which may be earthed when the equipment is installed.

This gives rise to the following questions:

a) Why should basic insulation be required at all between SELV / PELV circuits?

b) What is the definition of “independent circuits”?

c) If basic insulation is needed in SELV circuits, what insulation requirements apply?

Interpretation

Answer to question a): Basic insulation or supplementary insulation is required in the cases specified in IEC 60364-4-41:2005,414.4 and in all cases where the specification requires voltage withstand capability between said circuits.

Answer to question b): The independent circuits are those which are so described by the manufacturer (See IEC 60255-27:2013, 10.6.4.2.5).

Answer to question c): As specified in Table 20:

- Table 13 applies for determining clearance and test voltages;
- Table 14 applies for creepage distances.

In specific cases, 6.7.5 applies.

The dimensioning of the insulations shall also take into account requirements specified in other applicable standards, – e.g. IEEE 802.3 for Ethernet communication ports – and may be influenced by transient voltage levels originating from the EMC requirements (such as surge, Electrical Fast Transient / burst).

6.10.3.2 – Requirement pertaining to long term overvoltage withstand

IEC 62052-31:2015 contains a requirement in pertaining to long term overvoltage withstand, as follows:

"Meters and tariff and load control equipment shall withstand the maximum withstand voltage, 1,9 U_n […]"

This has given rise to the following question:Does the long-term overvoltage test apply to the auxiliary power supply circuit of a meter?

Interpretation

The auxiliary supply generally originates from an electrical network separate from the measured mains, as it is expected to keep the meter working when the measured mains network is de-energized, or is under fault conditions. See 3.5.9:

3.5.9
auxiliary supply
a.c. or d.c. electrical power supply, other than the measurand, provided via dedicated terminals

The long-term overvoltage test (6.10.3.2) does not apply to the meter's auxiliary power supply circuit or other auxiliary circuits if these circuits are rated for connection to external networks other than the measured mains supply network.

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