INTERNATIONAL ELECTROTECHNICAL COMMISSION

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IEC 60079-11
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Explosive atmospheres - Part 11: Equipment protection by intrinsic safety “i”

INTERPRETATION SHEET 5

This interpretation sheet has been prepared by subcommittee 31G: Intrinsically-safe apparatus, of IEC technical committee 31: Explosive atmospheres.

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

DISH	Report on voting
31G/424/DISH	31G/431/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.

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EXPLOSIVE ATMOSPHERES – Part 11: Equipment protection by intrinsic safety “i”

Background

Figure D.1 of Annex D shows a possible circuit configuration that defines measuring points for current (8) and voltage (12) at the output of an intrinsically safe source. Clause D.2 describes U_{LIM} as the voltage value used for the steady state assessment limited at (5). Clause D.8 defines that the energy is determined during the time when U_{LIM} or I_{LIM} is exceeded.

Depending on the load (9) or (11), the voltage level U_{LIM} could be exceeded at (5) even when the voltage at (12) is below the level of U_{LIM}. In this case, there might be transient energy even when the voltage at (12) is below U_{LIM}.

Question 1

When does the determination of transient energy start and when does it end?

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Answer 1

The start of the determination of the transient energy is when the voltage at (5) exceeds U_{LIM} or when the current in (8) exceeds I_{LIM}. The determination of the transient energy stops when both the voltage at (5) is below U_{LIM} and the current in (8) is below I_{LIM}.

Question 2

What is the purpose of measuring point (12) shown in Figure D.1?

Answer 2

Measuring point (12) is required to measure the output voltage in order to calculate the output power. However, as stated in Answer 1, to determine the start and stop of the measurement of the transient energy, the voltage at (5) is required.

Question 3

What is meant by ‘the peak power of the permitted steady state output’ in the definition of P_{LIM} and how can it be determined?

Answer 3

P_{LIM} is the peak power point of the voltage / current output characteristic used for the steady state spark ignition assessment. This might not be the same as P_O which could be a lower value, for example if a fuse is used so that the current used to establish P_O is lower than I_O.

P_{LIM} can be calculated on the basis of IEC 60079-25:2020, Clause C.2. For example, for resistive limited outputs the following formula can be derived:

$$P_{LIM} = ¼\ U_{LIM} \times I_{LIM}.$$