

Simple Apparatus and the ATEX Directives

Introduction

Simple apparatus has been in use as a valuable part of intrinsically safe systems for at least forty years, and the use of this apparatus has to be reassessed with the introduction of the two ATEX directives. The situation was explored in November 2000 at a meeting of the CENELEC sub-committee SC31-3 and the relevant technical advisor to the Brussels Directorate (Noel O'Riordan) and a statement which amplified the guidance given to the same committee in October 1999 was agreed. These two statements remain the accepted interpretation of the directive.

The original guidance was:

"Simple apparatus" will use the phrase from the directive "is not capable of causing an explosion through its own potential source of ignition" thus indicating but not stating that certification to the ATEX Directive is not required. That simple apparatus need not be marked in accordance with Clause 27 of EN 50014: 1997 will be stated."

The final agreed interpretation was:

"Simple apparatus is considered not to require certification by a notified body. The responsibility for compliance with the relevant parts of the standard rests with the persons claiming compliance, who may be a manufacturer or user. Certification to the ATEX Directive is not required because of the low levels of energy, which are added to the intrinsically safe circuit by this apparatus. Simple apparatus is required to be clearly identified when it is installed".

The intention is that simple apparatus is confined to pieces of apparatus that are fundamentally simple. Their safety should be readily verifiable by visual inspection and reference to available data by a competent engineer.

Where a manufacturer considers that certification by a notified body is desirable then this is permitted. In these circumstances, the apparatus shall be certified in the same manner as more complex apparatus in accordance with EN 50020 and the ESRs of the ATEX Directive and be marked accordingly."

The intention of these two statements has been carried through into the apparatus and system standards, they are the accepted interpretation of the ATEX directive on this subject.

Standards

The most recent apparatus standard is the CENELEC standard EN50020: 2002, which details the requirements of simple apparatus in clause 5.4. This clause is reproduced in full in Appendix II but the complete standard needs to be consulted for comprehensive understanding because of the numerous cross references. The only difference from the IEC requirement in IEC60079-11 is that the clause requiring compliance with the Category 1 standards has been added.

At this time (July 03) the next edition of the IEC/ CENELEC system standard IEC 60079-25 has been given a positive vote and is moving toward publication later in the year. The system standard is not directly relevant to the ATEX apparatus directive, but is utilised when producing documentation for the risk analysis required by the user directive. The system standard does not make any specific reference to the inclusion of simple apparatus but it is necessary to include the known inductive and capacitive parameters (as indicated in clause 5.4b) of EN 50020) in the assessment of the system. In the specific case of a FISCO system, the simple apparatus should have an inductance not greater than 10µH and a capacitance not greater than 5nF, and can then be regarded in the same way as any field device. The 1,5V, 100mA and 25mW limitation is normally considered to apply to the total capability of all the simple apparatus within a single system. Apparatus conforming to these limitations can be added to an intrinsically safe system without the necessity to reconfirm the safety analysis of the system. The system standard does confirm the requirement to clearly identify the simple apparatus and suggests that the minimum requirement is 'a traceable plant identification label'

Conclusion

The continued use of simple apparatus in intrinsically safe circuits is compatible with both ATEX directives and the relevant Brussels's directorate has confirmed this. The accepted current practice remains unchanged

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Extract from BS EN 50020: 2002

5.4 Simple apparatus

The following apparatus shall be considered to be simple apparatus:

- a) passive components, for example switches, junction boxes, resistors and simple semiconductor devices
- b) sources of stores energy with well-defined parameters, for example capacitors or inductors, whose values shall be considered when determining the overall safety of the system;
- c) sources of generated energy, for example thermocouples and photocells, which do not generate more than 1,5V, 100mA and 25mW. Any inductance or capacitance present in these sources of energy shall be considered as in b).

Simple apparatus shall conform to all relevant requirements of this standard but is not considered to contain a potential source of ignition capable of causing an explosion and need not be marked in accordance with clause 12. In particular, the following aspects shall always be considered:

- a) simple apparatus shall not achieve safety by the inclusion of voltage and/or current-limiting and/or suppression devices;
- b) simple apparatus shall not contain any means of increasing the available voltage or current, for example circuits for the generation of ancillary power supplies;
- c) where it is necessary that the simple apparatus maintains the integrity of the isolation from earth of the intrinsically safe circuit, it shall be capable of withstanding the test voltage to earth in accordance with 6.4.12. Its terminals shall conform to 6.3.1;
- d) non-metallic enclosures and enclosures containing light metals when located in the hazardous area shall conform to 7.3 and 8.1 of EN 50014;
- e) when simple apparatus is located in the hazardous area, it shall be temperature classified. When used in an intrinsically safe circuit within their normal rating and at a maximum ambient temperature of 40°C, switches, plugs, sockets and terminals can be allocated a T6 temperature classification for Group II applications. Other types of simple apparatus shall be temperature classified in accordance with clauses 4 and 6 of this standard;
- f) where simple apparatus is to be located such that Category 1 G or M1 equipment is normally required, then the apparatus shall also comply with the additional requirements of EN 50284 or EN 50303 as applicable.

Where simple apparatus forms a part of an apparatus containing other electrical circuits, then the combination of apparatus shall be considered as a whole.

NOTE: Sensors, which utilise catalytic reaction or other electro-chemical mechanisms, are not normally simple apparatus. Specialist advice on their application should be sought.

NOTE: The USA still uses the older definition of simple apparatus with the '1,2V, 100mA, 25mW and 20µJ' limitations. This makes very little practical difference but has to be taken into account if a system for world-wide use is being designed.

NOTE: If you have any queries, please contact your local MTL representative or email us at Technical Support Group@mtl-inst.com