

TECHNICAL SPECIFICATION



**Explosive atmospheres –
Part 39: Intrinsically safe systems with electronically controlled spark duration
limitation**



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**Explosive atmospheres –
Part 39: Intrinsically safe systems with electronically controlled spark duration
limitation**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –**Part 39: Intrinsically safe systems with electronically controlled spark duration limitation****FOREWORD**

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Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 60079-39, which is a technical specification, has been prepared by subcommittee 31G: Intrinsically safe apparatus, of IEC technical committee 31: Equipment for explosive atmospheres.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
31G/236A/DTS	31G/242/RVC

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60079 series, published under the general title *Explosive atmospheres*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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INTRODUCTION

This part of IEC 60079, which is a Technical Specification, is being issued as a “prospective standard for provisional application” in the field of *Explosive Atmospheres – Intrinsically safe systems with electronically controlled spark duration limitation* because there is an urgent need for guidance on how standards in this field should be used to meet an identified need.

Intrinsically safe systems with electronically controlled spark duration can provide more power available in intrinsically safe circuits while maintaining the level of protection “ib” or “ic”. In addition to limiting the voltage and current (similar to conventional intrinsically safe circuits), the duration of the spark is limited, which also restricts the amount of energy available for ignition.

The general requirements for the installation of IS equipment are applicable to Power-i circuits.

This new technology allows an expansion in the field of industrial applications using the type of protection Intrinsic Safety ‘i’.

This technology, however, requires a new and more extensive approach of the type of protection Intrinsic Safety “i”.

EXPLOSIVE ATMOSPHERES –

Part 39: Intrinsically safe systems with electronically controlled spark duration limitation

1 Scope

This Technical Specification specifies the construction, testing, installation and maintenance of Power-i apparatus and systems which utilise electronically controlled spark duration limitation to maintain an adequate level of intrinsic safety.

This Technical Specification contains requirements for intrinsically safe apparatus and wiring intended for use in explosive atmospheres and for associated apparatus intended for connection to intrinsically safe circuits entering such atmospheres.

This Technical Specification excludes the level of protection “ia” and the use of software-controlled circuits.

This Technical Specification applies to electrical equipment utilising voltages not higher than 40 V d.c. and a safety factor 1,5 for Groups IIB, IIA, I and III. It is also applicable to Group IIC “ic” apparatus with a safety factor 1,0. Group IIC “ib” apparatus with a safety factor 1,5 are restricted to voltages up to 32 V d.c.

This type of protection is applicable to electrical equipment in which the electrical circuits themselves are incapable of causing an explosion of the surrounding explosive atmospheres.

This Technical Specification is applicable to intrinsically safe apparatus and systems which utilise electronically controlled spark duration limitation with the aim of providing more electrical power while maintaining an adequate level of safety.

This Technical Specification is also applicable to electrical equipment or parts of electrical equipment located outside hazardous areas or protected by another type of protection listed in the IEC 60079 series, where the intrinsic safety of the electrical circuits in explosive atmospheres depends on the design and construction of such electrical equipment or parts of such electrical equipment. The electrical circuits located in the hazardous area are evaluated for use in such locations by applying this Technical Specification.

This Technical Specification supplements and modifies the requirements of IEC 60079-0, IEC 60079-11, IEC 60079-14, IEC 60079-17 and IEC 60079-25.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60079-0, *Explosive atmospheres – Part 0: Equipment – General requirements*

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

IEC 60079-14, *Explosive atmospheres – Part 14: Electrical installations design, selection and erection*

IEC 60079-25, *Explosive atmospheres – Part 25: Intrinsically safe electrical systems*

3 Definitions

For the purpose of this document, the terms and definitions given in IEC 60079-0 and IEC 60079-11, as well as the following apply.

3.1

Power-i

intrinsically safe concept where the level of protection is provided by voltage and current limitation and additional electronically controlled spark duration limitation

Note 1 to entry: Power-i contains Power-i devices and Power-i wiring.

Note 2 to entry: Power-i encompasses electric circuits which in the Power-i mode operate with voltage and current values which can exceed the values defined in IEC 60079-11.

3.2

Power-i device

Power-i source, Power-i field device(s) and (if applicable) Power-i terminator

3.3

Power-i terminator

unit to prevent reflections of voltage and current waves at the end of the Power-i wiring

Note 1 to entry: The Power-i terminator is only relevant where data transmission uses the Power-i wiring.

3.4

Power-i source

power supply for Power-i devices providing shutdown of power in case of faults

Note 1 to entry: Operating in two modes: Power-i mode and shutdown mode.

3.5

Power-i field device

device that is connected to one Power-i source via Power-i wiring

Note 1 to entry: Power-i field devices can have additional connections to other devices (e.g. loads).

3.6

Power-i mode

operating mode of the Power-i source delivering the rated Power-i output power

Note 1 to entry: In this mode the values of permitted voltage and current can exceed the values of curves and tables stated in IEC 60079-11.

3.7

shutdown mode

operating mode of the Power-i source after a spark event has been detected

3.8

spark pulse

information resulting from a spark event in the Power-i system

Note 1 to entry: A distinction is made between the make spark pulse and the break spark pulse.