

INTERNATIONAL STANDARD

IEC 61010-2-061

Second edition
2003-06

GROUP SAFETY PUBLICATION

**Safety requirements for electrical equipment
for measurement, control, and laboratory use –**

**Part 2-061:
Particular requirements for laboratory atomic
spectrometers with thermal atomization
and ionization**

*Règles de sécurité pour appareils électriques
de mesurage, de régulation et de laboratoire –*

*Partie 2-061:
Prescriptions particulières pour spectromètres de
laboratoire avec vaporisation et ionisation thermiques*



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE –

Part 2-061: Particular requirements for laboratory atomic spectrometers with thermal atomization and ionization

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61010-2-061 has been prepared by IEC technical committee 66: Safety of measuring, control and laboratory equipment.

This second edition cancels and replaces the first edition published in 1995, of which it constitutes a technical revision.

It has the status of a group safety publication in accordance with IEC Guide 104.

The text of this standard is based on the following documents:

FDIS	Report on voting
66/326/FDIS	66/331/RVD

Full information on the voting for the approval of this standard 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.

This Part 2-061 is intended to be used in conjunction with IEC 61010-1. It was established on the basis of the second edition (2001). Consideration may be given to future editions of, or amendments to, IEC 61010-1.

This Part 2-061 supplements or modifies the corresponding clauses in IEC 61010-1 so as to convert that publication into the IEC standard: *Safety requirements for laboratory atomic spectrometers with thermal atomization and ionization.*

Where a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. Where this part states “addition”, “modification” or “replacement”, or “deletion”, the relevant requirement, test specification or note in Part 1 should be adapted accordingly.

In this standard:

- 1) the following print types are used:
 - requirements: in roman type;
 - NOTES: in small roman type;
 - *conformity and test: in italic type;*
 - terms used throughout this standard which have been defined in clause 3: SMALL ROMAN CAPITALS;
- 2) subclauses, figures, tables and notes which are additional to those in Part 1 are numbered starting from 101.

The committee has decided that the contents of this publication will remain unchanged until 2007. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

IEC 61010-2-061:2003

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SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE –

Part 2-061: Particular requirements for laboratory atomic spectrometers with thermal atomization and ionization

1 Scope and object

This clause of Part 1 is applicable except as follows:

1.1 Scope

1.1.1 Equipment included in scope

Replacement:

This part of IEC 61010 applies to electrically powered laboratory atomic spectrometers with thermal atomization.

NOTE 1 Examples include atomic absorption spectrometers, emission flame photometers, atomic fluorescence spectrophotometers, inductively coupled plasma spectrometers, microwave coupled plasma spectrometers and mass spectrometers, all with thermal atomization and ionization (including tubing and connectors which are provided by the manufacturer for connection to external supplies).

NOTE 2 If all or part of the equipment falls within the scope of one or more other part 2 standards of IEC 61010 as well as within the scope of this standard, it will also need to meet the requirements of those other part 2 standards.

1.1.2 Equipment excluded from scope

Addition:

Add as the first paragraph:

This standard does not apply to thermal atomization detectors (flame ionization detectors) used in gas chromatography.

2 Normative references

This clause of Part 1 is applicable.

3 Definitions

This clause of Part 1 is applicable except as follows:

Additional definitions:

3.2.101

SPRAY CHAMBER

chamber in which droplets of sample in aerosol are allowed to separate so that the droplets of necessary size can be passed onward to the burner, with the remainder draining to waste

3.2.102

GAS LOCK

device to allow drainage of waste sample liquid, and to prevent unintentional escape of gas from the SPRAY CHAMBER through its drain outlet (see for example Figure 101)

3.5.101**FLASH-BACK**

event during which the flame travels back through the burner with the result that the gas in the mixing chamber is caused to ignite.

4 Tests

This clause of Part 1 is applicable except as follows:

Additional subclauses:

4.4.2.101 Sampling probe tip

Any system designed to withdraw a sampling probe tip after sampling has been completed shall be overridden, so as to leave the tip in its most exposed position when a sample vessel is removed.

Exceptions:

The withdrawal system need not be overridden if the sampling probe:

- a) cannot cause a HAZARD to the OPERATOR when it is exposed,
- b) is designed in such a manner that no SINGLE FAULT can cause the tip to remain exposed after sampling has been completed.

4.4.2.102 Failure, or partial failure, of the MAINS supply

The voltage of the power supply to the equipment from the MAINS supply shall first be reduced to just less than 90 % of the RATED voltage, and shall then be switched off.

5 Marking and documentation

This clause of Part 1 is applicable except as follows:

Additional subclause:

5.1.101 Gas and liquid connections

The following shall be unambiguously marked adjacent to the connector on the equipment (see 5.2):

- a) the identity of the gas or liquid;
- b) the maximum permitted pressure.

NOTE Such markings may be specific (for example acetylene, propane, water) or generic (for example fuel gas, oxidant gas, coolant, waste liquid).

Where no internationally recognized symbol (such as a chemical formula) exists, the equipment shall be marked with symbol 14 of Table 1 together with an unambiguous text in English. The documentation accompanying the equipment shall provide an adequate translation of this text (where it is required) in the language of the country in which it is to be installed, to assure that the installer or OPERATOR is able to connect the equipment correctly.

Conformity is checked by inspection.

5.2 Warning markings

Addition:

Add the following new paragraph:

Where hot gases or plasma emerge from equipment, the protective structure provided (for example a chimney, see 10.1), shall be clearly marked by symbol 13 of Table 1, to indicate where excessively hot temperatures may exist.

5.4.3 Equipment installation

Replacement:

Replace 5.4.3 f) "requirements for special services" by the following new item f):

- f) requirements for connection of the equipment to supplies of air, fuel gas (for example hydrogen, acetylene, or propane) and oxidant (for example oxygen or nitrous oxide). See also 11.103;

Addition:

Add after the first paragraph the following new paragraph.

The documentation shall state that the RESPONSIBLE BODY must ensure that the type of connector used at the outlet side of the gas-pressure regulator conforms to applicable national requirements;

- aa) requirements for liquid connection;
- bb) requirements for a fume extraction system to remove exhaust gases which may be hazardous;
- cc) requirements for appropriate filtering or other systems which may be necessary to trap hazardous sample residues present in the exhaust gas stream;

NOTE In the case of equipment using only a propane flame in a ventilated room, and when it is known that samples will not leave any hazardous residues, it may not be necessary to provide an extraction system, since the exhaust gases from a propane flame will themselves not present any hazard.

- dd) the documentation shall state that the RESPONSIBLE BODY must carry out appropriate leakage tests necessary for safety on those gas and liquid connections which the OPERATOR is directed to assemble during installation, NORMAL USE, or maintenance;
- ee) instructions for examining, during installation and maintenance, parts of the external gas supply system including tubing connected to the equipment, in order to confirm that their condition is satisfactory, for example to detect stress cracks;

NOTE Any special national regulations for the safe use of gases and gas cylinders need to be observed.

- ff) instructions for necessary provisions for collection of waste from the SPRAY CHAMBER, including the requirements for any waste container which may be specified by the manufacturer.

NOTE 1 Connections on the outlet side of gas regulators (from which tubing connects to the equipment) vary from country to country and are often covered by national regulations. Variations can include thread type, whether left-hand or right-hand, types of tubing and means of attachment.

NOTE 2 Warning markings are specified in 5.1.5.1 c), 5.1.101, 6.1.2 b), 6.5.1.2 g), 6.6.2, 7.2.c), 7.3, 10.1, 13.2.2.

5.4.4 Equipment operation

Additions:

Add the following two new items at the end of the first paragraph:

- aa) a reminder to the RESPONSIBLE BODY of the responsibility for the correct collection and disposal of waste materials, including the necessity for:

- 1) a suitably sized waste container of appropriately resistant material for the collection of organic solvent waste;

NOTE The proper disposal of waste materials is well documented by national authorities and it is these procedures that should be followed. This part 2 should only bring to the attention of the OPERATOR that potentially hazardous waste materials are present and must be properly disposed of in accordance with national (local) regulations.

- 2) provision for the removal into an appropriate exhaust system of any gases or vapours which may be produced in hazardous concentrations;
- bb) a list of fluids known by the manufacturer to be potentially unsafe if used with the equipment.

Add a new second paragraph as follows:

Documentation shall also indicate that this list cannot be taken to be exhaustive and that, in case of uncertainty about a specific fluid, that fluid shall not be used until confirmation by the manufacturer that it will not present a HAZARD.

Additional subclause:

5.4.4.101 Cleaning and decontamination

Documentation shall indicate:

- aa) that the RESPONSIBLE BODY has the responsibility for carrying out appropriate decontamination if hazardous material is spilt on or inside the equipment;
- bb) manufacturer's recommendations for cleaning and, where necessary, decontamination, together with the recognized generic names of recommended materials for cleaning and decontamination.

The following wording shall appear in the documentation:

“Before using any cleaning or decontamination methods except those specified by the manufacturer, RESPONSIBLE BODIES should check with the manufacturer that the proposed method will not damage the equipment.”

If a manufacturer claims that an item can be decontaminated by steam sterilization, it shall be capable of withstanding steam sterilization under at least one of the time-temperature conditions given in Table 101.

NOTE 1 Manufacturers should be aware of the internationally recognized “Laboratory Biosafety Manual”, published in 1984 by the World Health Organization in Geneva, which gives information on decontaminants, their use, dilutions, and potential applications. There are also national guidelines which cover these areas.

NOTE 2 Cleaning and decontamination may be necessary as a safeguard when spectrometers and their accessories are maintained, repaired, or transferred. Manufacturers should provide a format for RESPONSIBLE BODYS to certify that such a treatment has been carried out.

Table 101 – Time-temperature conditions

Absolute pressure kPa	Corresponding steam temperature		Minimum hold time min
	Nominal °C	Range °C	
325	136,0	134 – 138	3
250	127,5	126 – 129	10
215	122,5	121 – 124	15
175	116,5	115 – 118	30

NOTE “Minimum hold time” means the time the contaminant is at the steam temperature.

Conformity is checked by inspection.