

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

GROUP SAFETY PUBLICATION  
PUBLICATION GROUPEE DE SÉCURITÉ

**Safety requirements for electrical equipment for measurement, control, and laboratory use –  
Part 2-051: Particular requirements for laboratory equipment for mixing and stirring**

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

**Partie 2-051: Exigences particulières pour appareils de laboratoire utilisés pour mixer et agiter**



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT  
FOR MEASUREMENT, CONTROL, AND LABORATORY USE –****Part 2-051: Particular requirements for laboratory  
equipment for mixing and stirring**

## FOREWORD

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International Standard IEC 61010-2-051 has been prepared by IEC technical committee 66: Safety of measuring, control and laboratory equipment.

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

This third edition cancels and replaces the second edition published in 2003. It constitutes a technical revision and includes the following change from the second edition:

- exclusion of equipment, whose size and weight make unintentional movement unlikely, from the drop test in Clause 8,
- added requirement for interlock systems containing electric/electronic or programmable components to Clause 15,
- notes have been re-phrased according to ISO/IEC Directives.

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

FDIS	Report on voting
66/552/FDIS	66/567/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.

A list of all parts of the IEC 61010 series, under the general title: *Safety requirements for electrical equipment for measurement, control, and laboratory use*, may be found on the IEC website.

This Part 2-051 is intended to be used in conjunction with IEC 61010-1. It was established on the basis of the third edition (2010). This Part 2-051 supplements or modifies the corresponding clauses in IEC 61010-1 so as to convert that publication into the IEC standard: *Safety requirements for laboratory equipment for mixing and stirring*.

Where a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. Where the part states “addition”, “modification”, “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. Additional annexes are lettered starting from AA.

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

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

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

## Part 2-051: Particular requirements for laboratory equipment for mixing and stirring

### 1 Scope and object

This clause of Part 1 is applicable except as follows:

#### 1.1 Scope

*Replacement:*

*Replace the text in 1,1 by the following paragraph:*

This part of IEC 61010 is applicable to electrically operated laboratory equipment and its accessories for mechanical mixing and stirring, where mechanical energy influences the shape or size or homogeneity of materials and their accessories. Such devices may contain heating elements.

NOTE 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, consideration is to be given to those other Part 2 standards. The standard for equipment which contain heating devices is IEC 61010-2-010.

### 2 Normative references

This clause of Part 1 is applicable except as follows:

*Addition:*

*Add the following references to the list:*

IEC 62061, *Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems*

ISO 13849, *Safety of machinery – Safety-related parts of control systems*

### 3 Terms and definitions

This clause of Part 1 is applicable.

### 4 Tests

This clause of Part 1 is applicable.

### 5 Marking and documentation

This clause of Part 1 is applicable except as follows:

### 5.4.1 General

*Addition:*

*Add, after item h), the following new item:*

- aa) if a HAZARD could be caused by operating a mixer or stirrer intended for use as HAND-HELD EQUIPMENT, there shall be a warning statement to that effect.

### 5.4.4 Equipment operation

*Additions:*

*Add after item j), the following new item:*

- aa) *instructions for fixing the stirring vessel if specified and sold as part of a mixing system, or if otherwise applicable.*

*Add a new paragraph after the list of items as follows:*

The instructions shall warn against use of the equipment in hazardous atmospheres or with hazardous materials for which the equipment is not designed.

*Replacement:*

*Replace the paragraph before the compliance statement by the following:*

The user shall be made aware that the protection provided by the equipment may be impaired if the equipment is used with accessories not provided or recommended by the manufacturer, or used in a manner not specified by the manufacturer.

## 6 Protection against electric shock

This clause of Part 1 is applicable.

## 7 Protection against mechanical HAZARDS

This clause of Part 1 is applicable except as follows:

### 7.3.2 Exceptions

*Replacement:*

*Replace, in item a), the words "for example drilling and mixing equipment" by the following:*

for example stirrer shafts and impellers extending downwards into material being stirred.

*Addition:*

*Add the following subclauses:*

#### 7.3.101 Speed controls

If a SINGLE FAULT of an electronic speed control could cause a HAZARD, the equipment shall incorporate means to interrupt power or otherwise prevent the HAZARD.



*Conformity is checked by inspection and test.*

### **7.3.102 Movement during operation**

Equipment shall not change position during NORMAL USE.

*Conformity is checked by inspection and test. Equipment which has not moved by more than 5 mm after operation for 10 min is considered to meet the requirement.*

### **7.3.103 Restarting after interruption**

Depending on the operation, a HAZARD may be caused either by re-starting or by not re-starting after interruption of the mixing action. Instructions shall specify whether equipment will re-start or not re-start, both in the case of MAINS interruption and in the case of a fault or mechanical interruption. If after interruption a hazard can occur the equipment shall be equipped with an audible or visible signal to warn that an interruption has occurred.

*Conformity is checked by inspection of documentation.*

### **7.3.104 HAZARDS related to application**

Additional HAZARDS may occur with equipment used to mix flammable materials, or where the transfer of mechanical energy to glass apparatus could lead to breakage.

Instructions for use shall warn against the use of equipment in such applications unless the equipment incorporates appropriate safety devices to prevent a HAZARD in SINGLE FAULT CONDITION. Such safety devices shall be independent from control systems.

Examples of HAZARDS and appropriate safety devices include the following.

a) Where failure of the mixing action could cause a HAZARD, for example in metal-organic reactions, the safety device shall initiate an alarm signal:

- 1) if the drive shaft or mixer fails to turn when the mixer is switched on; or
- 2) when an overload causes the shaft speed to fall below a preset level.

NOTE Speed reduction can be caused by a lack of power or by the operation of an automatic device which reduces the shaft speed in the case of an overload.

b) Where a hazard could be caused by excessive torque applied to high-viscosity material, for example through glass breakage, the safety device shall initiate an alarm signal if the torque rises above a preset level. It is recommended that safety devices work according to the principle of rest-current.

*Conformity is checked by inspection and test.*

## **8 Resistance to mechanical stresses**

This clause of Part 1 is applicable except as follows:

### **8.1 General**

*Replacement:*

*Replace the text of item 3) by the following:*

- 3) *except for FIXED EQUIPMENT, for equipment with a mass over 100 kg, or for equipment whose size and weight make unintentional movement unlikely and which is not moved in NORMAL USE, the appropriate test of 8.3. The equipment is not operated during the tests.*

## 9 Protection against the spread of fire

This clause of Part 1 is applicable.

## 10 Equipment temperature limits and resistance to heat

This clause of Part 1 is applicable.

## 11 Protection against HAZARDS from fluids

This clause of Part 1 is applicable except as follows:

*Addition:*

*Add the following subclause:*

### 11.101 Connections for hoses and pipes

Connectors shall be so designed that hoses can be prevented from detaching, for example by means of hose clamps, and that pipes are adequately restrained.

*Conformity is checked by inspection.*

## 12 Protection against radiation, including laser sources, and against sonic and ultrasonic pressure

This clause of Part 1 is applicable.

## 13 Protection against liberated gases and substances, explosion and implosion

This clause of Part 1 is applicable except as follows:

*Addition:*

*Add the following subclause:*

### 13.2.101 Protection against explosion and explosives

Equipment designed for protection against explosion or to be used with explosives shall, according to the type, the mode of operation and the location, comply with the appropriate requirements of relevant IEC and ISO standards such as the IEC 60079 series, explosive atmosphere standards.

*Conformity is checked as specified in the relevant standards.*

## 14 Components and subassemblies

This clause of Part 1 is applicable.

## 15 Protection by interlocks

This clause of Part 1 is applicable except as follows: