

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**

[IEC 61010-2-051:2018](#)

<https://standards.iteh.ai/catalog/standards/sist/8db915af-2464-4562-adbd->

Exigences de sécurité pour appareils électriques de mesurage, de régulation, et de laboratoire –

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





THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2018 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 21 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 21 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.



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**

[IEC 61010-2-051:2018](https://standards.iteh.ai/catalog/standards/sist/8db915af-2464-4562-adbd-715989721e-9c71-951e3011)

[https://standards.iteh.ai/catalog/standards/sist/8db915af-2464-4562-adbd-](https://standards.iteh.ai/catalog/standards/sist/8db915af-2464-4562-adbd-715989721e-9c71-951e3011)

**Exigences de sécurité pour appareils électriques de mesurage, de régulation, et de laboratoire –
Partie 2-051: Exigences particulières pour appareils de laboratoire utilisés pour mélanger et agiter**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 19.080; 71.040.20

ISBN 978-2-8322-6061-6

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	3
1 Scope and object.....	5
2 Normative references.....	5
3 Terms and definitions	5
4 Tests.....	5
5 Marking and documentation	5
6 Protection against electric shock.....	6
7 Protection against mechanical HAZARDS.....	6
8 Resistance to mechanical stresses.....	7
9 Protection against the spread of fire	8
10 Equipment temperature limits and resistance to heat.....	8
11 Protection against HAZARDS from fluids and solid foreign objects.....	8
12 Protection against radiation, including laser sources, and against sonic and ultrasonic pressure	8
13 Protection against liberated gases and substances, explosion and implosion	8
14 Components and subassemblies.....	8
15 Protection by interlocks.....	8
16 HAZARDS resulting from application.....	9
17 RISK assessment	9
Annexes	9
Bibliography	10

ITeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 61010-2-051:2018
<https://standards.iteh.ai/catalog/standards/sist/8db915af-2464-4562-adbd-f184104f722/iec-61010-2-051-2018>

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

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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 fourth edition cancels and replaces the third edition published in 2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) adaptation of changes introduced by Amendment 1 of IEC 61010-1;
- b) added tolerance for stability of AC voltage test equipment to Clause 6;

- c) added required RISK assessment for equipment intended to be used with flammable, hazardous, or toxic fluids to Clause 17.

The text of this International Standard is based on the following documents:

CDV	Report on voting
66/642/CDV	66/667/RVC

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

This document 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) and its Amendment 1 (2016).

This Part 2-051 supplements or modifies the corresponding clauses in IEC 61010-1 so as to convert that publication into the IEC standard: *Particular 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.

[IEC 61010-2-051:2018](https://standards.iteh.ai/catalog/standards/sist/8db915af-2464-4562-adbd-f184f0f4f722/iec-61010-2-051-2018)

[https://standards.iteh.ai/catalog/standards/sist/8db915af-2464-4562-adbd-](https://standards.iteh.ai/catalog/standards/sist/8db915af-2464-4562-adbd-f184f0f4f722/iec-61010-2-051-2018)

[f184f0f4f722/iec-61010-2-051-2018](https://standards.iteh.ai/catalog/standards/sist/8db915af-2464-4562-adbd-f184f0f4f722/iec-61010-2-051-2018)

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 and additional list items are lettered from aa).

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

1.1.1 Equipment included in scope

Replacement:

Replace the text, except the first paragraph, with the following new text:

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 can contain heating elements.

NOTE If all or part of the equipment falls within the scope of one or more other Part 2 standards of the IEC 61010 series as well as within the scope of this document, consideration is given to those other Part 2 standards. The standard for equipment which contains heating devices is IEC 61010-2-010.

2 Normative references

[IEC 61010-2-051:2018](https://standards.iteh.ai/catalog/standards/sist/8db915af-2464-4562-adbd-f184f0f4f722/iec-61010-2-051-2018)

This clause of Part 1 is applicable.

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

Addition:

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 with the following new text:

The user shall be made aware that the protection provided by the equipment can 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 except as follows:

iTeh STANDARD PREVIEW
(standards.iteh.ai)

6.8.3.1 The AC voltage test

Replacement: <https://standards.iteh.ai/catalog/standards/sist/8db915af-2464-4562-adbd-f184f0f4f722/iec-61010-2-051-2018>

Replace the first sentence with the following new sentence:

The voltage tester shall be capable of maintaining the test voltage throughout the test within $\pm 5\%$ of the specified value.

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" with the following:

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

Addition:

Add the following new 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 other than HAND-HELD 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 can 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 can occur with equipment used to mix flammable materials, or where the transfer of mechanical energy to a 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) with the following new text:

- 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 and solid foreign objects

This clause of Part 1 is applicable except as follows:

Addition:

Add the following new 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 new 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 on explosive atmospheres.

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:

15.1 General

Addition:

Add, after the first paragraph, the following new paragraph:

As an alternative method, for interlock systems containing electric/electronic or programmable components (E/E/P components) the reliability and design requirements can be determined by applying for example IEC 62061 (SIL) or ISO 13849 (all parts) (PL) or other solutions providing equivalent functional safety.

16 HAZARDS resulting from application

This clause of Part 1 is applicable.

17 Risk assessment

This clause of Part 1 is applicable except as follows:

Addition:

Add the following new text at the end of the first sentence:

RISK assessment is required for mixers or stirrers intended to be used with flammable fluids or with containers or flasks with hazardous or toxic fluids.

IEC Annexes 2018

[https://standards.iteh.ai/catalog/standards/sist/8db915af-2464-4562-adbd-](https://standards.iteh.ai/catalog/standards/sist/8db915af-2464-4562-adbd-f1840e4f722/iec-61010-2-051-2018)

The annexes of Part 1 are applicable.