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REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

GROUP SAFETY PUBLICATION

Safety requirements for electrical equipment for measurement, control, and laboratory use –
Part 2-020: Particular requirements for laboratory centrifuges

IEC 61010-2-020:2016-05 RLV(en)

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

Part 2-020: Particular requirements for LABORATORY CENTRIFUGES

FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 61010-2-020 has been prepared by IEC technical committee 66: Safety of measuring, control and laboratory equipment.

This third edition cancels and replaces the second edition published in 2006. It constitutes a technical revision and includes the following significant changes from the second edition:

a) This Part 2 is established on the basis of the third edition (2010) of IEC 61010-1.The changes listed in its foreword affect this Part 2, too.
b) The language has been updated to reflect current terminology for LABORATORY CENTRIFUGES used in the industry today.

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:

CDV	Report on voting
66/542/CDV	66/565A/RVC

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 2-020 is intended to be used in conjunction with IEC 61010-1. It was established on the basis of the third edition (2010).

This Part 2-020 supplements or modifies the corresponding clauses in IEC 61010-1 so as to convert that publication into the IEC standard: *Safety requirements for LABORATORY CENTRIFUGES*.

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", 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 tests: in italic type;*
   - terms used throughout this standard which have been defined in Clause 3: SMALL ROMAN CAPITALS.
2) subclauses, tables or figures which are additional to those in Part 1 are numbered starting from 101; additional annexes are lettered AA, BB, etc.

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.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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.

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

Part 2-020: Particular requirements for laboratory centrifuges

1 Scope and object

This clause of Part 1 is applicable except as follows:

1.1.1 Scope

Replacement:

This Part 2 is applicable to electrically powered LABORATORY CENTRIFUGES.

This group safety publication is primarily intended to be used as a product safety standard for the products mentioned in the scope, but shall also be used by technical committees in the preparation of its publications for products similar to those mentioned in the scope of this standard, in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51.

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, it will also need to meet the requirements of those other Part 2 standards.

1.1.2 Equipment excluded from scope

Addition:

Add the following new item:

aa) IEC 60034 (Rotating electrical machinery);

1.2 Object

1.2.1 Aspects included in scope

Addition:

Add the following ~~five~~ new items:

aa) contact with moving parts (see 7.3);

bb) LABORATORY CENTRIFUGE movement during any DISRUPTION (see 7.3.101);

cc) high energy chemical reaction after ROTOR DISRUPTION (see 7.7.2.2 l));

dd) ineffectiveness of BIOSEALS (see 13.101)

1.2.2 Aspects excluded from scope

Addition:

Add the following ~~two~~ new items:

aa) additional precautions which may need to be observed when centrifuging materials which are flammable or explosive (see 5.4.101);

bb) additional precautions which may need to be observed when centrifuging materials that could react chemically with sufficient vigour to cause a HAZARD (see 5.4.101).

1.4 Environmental conditions

1.4.1 Normal environmental conditions

~~*Modification*~~ *Replacement:*

~~*Modify*~~ *Replace item c) by the following:*

c) temperature 2 °C to 40 °C;

1.4.2 Extended environmental conditions

~~*Modification*~~ *Replacement:*

~~*Modify*~~ *Replace item c) by the following:*

c) ambient temperatures below 2 °C or above 40 °C;

2 Normative references

This clause of Part 1 is applicable except as follows:

Addition:

ISO 3864 (all parts), *Graphical symbols – Safety colours and safety signs*

3 Terms and definitions

This clause of Part 1 is applicable except as follows:

3.1 Equipment and states of equipment

Addition~~s~~:

Add the following ~~three~~ new terms and definitions:

3.1.101
LABORATORY CENTRIFUGE
apparatus intended for laboratory use that applies a centrifuging effect to sample materials

3.1.102
CENTRIFUGE-ROTOR COMBINATION
LABORATORY CENTRIFUGE and ROTOR ASSEMBLY that are intended to operate together and which have to be evaluated together

3.1.103
DISRUPTION
event in which the ROTOR ASSEMBLY, or part of it, fails or becomes detached during rotation

3.2 Parts and accessories

Addition~~s~~:

Add the following ~~eight~~ new terms and definitions:

3.2.101
CHAMBER
enclosed space within a LABORATORY CENTRIFUGE in which the ROTOR ASSEMBLY rotates

3.2.102
ROTOR
primary component of a LABORATORY CENTRIFUGE which holds the material to be subjected to centrifugal force and which is rotated by the DRIVE SYSTEM

3.2.103
BUCKET
sub-assembly of a ROTOR designed to support one or more containers

3.2.104
PROTECTIVE CASING
casing which completely surrounds the ROTOR ASSEMBLY and which includes the LID and its securing devices

3.2.105
LID
access cover of the CHAMBER

3.2.106
ROTOR ASSEMBLY
ROTOR carrying a combination of ROTOR accessories specified by the manufacturer

Note 1 to entry: In the context of a ROTOR ASSEMBLY, ROTOR accessories include all components used with or in the CENTRIFUGE ROTOR for the purpose of holding samples, including adaptors, tubes and bottles.

3.2.107
DRIVE SYSTEM
all components of the CENTRIFUGE associated with the provision of torque to, or the rotational support of, the ROTOR ASSEMBLY

3.2.108
BIOSEAL
device or mechanism additional to, or integral with, a ROTOR or BUCKET and a closure assembly, and which is designed to prevent the escape of contents, for example micro-biological material, during centrifuging

3.5 Safety terms

Addition~~s~~:

Add the following ~~two~~ new terms and definitions:

3.5.101
CLEARANCE ENVELOPE
space around a LABORATORY CENTRIFUGE which is needed for safety

3.5.102
MCA
MAXIMUM CREDIBLE ACCIDENT
planned event chosen to represent worst-case conditions for a test that will evaluate the inherent mechanical safety of a CENTRIFUGE-ROTOR COMBINATION (see 7.7 and Annex BB)

4 Tests

This clause of Part 1 is applicable~~, except as follows~~.

~~**4.3.1 Environmental conditions**~~

~~*Addition:*~~

~~*Add the following new note:*~~

~~NOTE Consideration should be given to operating refrigerated centrifuges at the maximum humidity specified in 1.4.1 d) and 1.4.2 d) because of condensation concerns (see 11.101).~~

5 Marking and documentation

This clause of Part 1 is applicable except as follows.

5.1.2 Identification

~~*Modification*~~ *Replacement:*

~~*Modify*~~ *Replace item b) by the following:*

b) serial number or other means to identify the production batch of the equipment.

Addition:

Add the following new subclause:

5.1.101 ROTORS and accessories

All OPERATOR-replaceable ROTORS and ROTOR ASSEMBLIES, including ROTOR ACCESSORIES, shall be marked with the manufacturer's or supplier's name or registered trade mark, and identification code (such as id code, serial number or batch number).

If components are too small, or are not suitable for such marking, the required information shall be marked on the original packaging, as well as being stated in the documentation.

NOTE ~~1~~ Packaging can be the outer box, an insert, etc.

~~NOTE 2 Each ROTOR should be marked with a serial number or with other means to identify uniquely the production batch.~~

~~NOTE 3 Where~~ If the manufacturer specifies that an individual part, for example a BUCKET, is to be fitted only to a specific ROTOR or in specific ROTOR positions for balance or some other reason, each BUCKET and ROTOR position should be identified by marking with corresponding numbers or letters.

~~NOTE 4 ROTOR accessories designed to be used together as a set, for example in terms of weight, should be marked with an identification of that same set.~~

Conformity is checked by inspection.

5.4.2 Equipment ratings

Addition:

Add the following ~~three~~ new items:

aa) a list of all ROTORS and ROTOR accessories specified for use with a LABORATORY CENTRIFUGE, together with their RATED rotational frequencies;

bb) any restrictions by the manufacturer warning against the use of particular materials to be centrifuged;

cc) density and volume limits for ROTOR ASSEMBLY loading and, if applicable, derating instructions.

5.4.3 Equipment installation

Addition:

Add, after item a), the following ~~five~~ sub-items:

i) floor or bench area required for the CLEARANCE ENVELOPE for the intended use (see 7.4.101);

~~NOTE Subclause 7.3.101 limits the permitted movement of a LABORATORY CENTRIFUGE to 300 mm, in the event of a DISRUPTION. The manufacturer's instructions should therefore include a requirement for the user to mark this boundary around the CENTRIFUGE, or that laboratory management procedures should require that no person or any hazardous materials be within such a boundary while the LABORATORY CENTRIFUGE is operating.~~

ii) total weight of the CENTRIFUGE;

iii) instructions for site preparation;

iv) methods for levelling of the CENTRIFUGE;

v) means for securing to the mounting surface.

5.4.4 Equipment operation

Addition:

Add the following ~~five~~ new items:

aa) loading and balancing procedures;

bb) ROTOR changing procedure;

cc) any specific requirement for an OPERATOR to be present at stated phases of the centrifuging procedure;

dd) necessary safeguards for personnel. ~~Examples of~~ Instructions shall include at least the following:

- not to lean on a LABORATORY CENTRIFUGE;
- not to stay within the CLEARANCE ENVELOPE longer than necessary for operational reasons;
- not to deposit any potentially hazardous materials within the CLEARANCE ENVELOPE;
- methods for safe operation during open LID procedures (see 7.3.102.2);

ee) instructions for use of BIOSEALS and other biocontainment components, including the proper closure techniques. These instructions shall ~~make clear to the OPERATOR~~ indicate that BIOSEALS and related components are intended to be part of biocontainment systems, ~~such~~ as ~~are~~ specified in international and national biosafety guidelines~~, and cannot~~. They are not to be relied on as the only means of safeguarding workers and the environment when handling pathogenic micro-organisms.

5.4.5 Equipment maintenance

Addition:

~~*Renumber the note to the first paragraph as Note 1 and*~~ *Add the following new* ~~*second*~~ *paragraph* ~~*and Note 2*~~*:*

Where applicable, the instructions shall specify:

aa) inspection of any means of fixing the equipment to the mounting surface and the condition of the mounting surface itself;

bb) safeguards for the OPERATOR during cleaning;

cc) inspection of the PROTECTIVE CASING;

dd) inspection of the ROTOR ASSEMBLY, and safety considerations;

ee) checking the continuity of the PROTECTIVE BONDING;

ff) frequency of inspection, routine maintenance and the method of replacement of BIOSEALS and other biocontainment components.

~~NOTE 2 These instructions should make clear to the OPERATOR that regular maintenance of BIOSEALS and other biocontainment components as specified in the instructions is especially important to ensure safety in day to day use.~~

Addition:

Add the following ~~*three*~~ *new subclauses:*

5.4.101 Hazardous substances

The instructions for use shall state the precautions to be observed when the materials to be used with a LABORATORY CENTRIFUGE are known to be toxic, radioactive, or contaminated with pathogenic micro-organisms.

NOTE ~~1~~ This information is relevant to the safety of both OPERATORS and service personnel.

The use within the LABORATORY CENTRIFUGE of the following materials shall be prohibited in the instructions for use:

a) flammable or explosive materials;

b) materials which could react chemically with sufficient vigour to cause a HAZARD.

~~NOTE 2 CENTRIFUGES may be specifically designed to be safe when handling such materials, but such centrifuges are not within the scope of this standard.~~

Conformity is checked by inspection.

5.4.102 Cleaning and decontamination

Documentation shall include:

a) a statement that, if hazardous material is spilt on or inside the equipment, the user has responsibility for carrying out appropriate decontamination;

b) manufacturer's recommendations for cleaning and, where necessary, ~~decontamination~~ decontaminating, together with the recognized generic names of recommended materials for cleaning and decontaminating:

c) the following statement:

"Before using any cleaning or decontamination methods except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment"

d) the following statement:

Cleaning and decontamination may be necessary as a safeguard before LABORATORY CENTRIFUGES, ROTORS, and any accessories are maintained, repaired, or transferred. Manufacturers may provide a format for users to document that such treatment has been carried out

NOTE Be advised, there are national guidelines and the internationally recognized "Laboratory Biosafety Manual", published in 1993 by the Wor5ld Health Organization in Geneva, which gives information on decontaminants, their use, dilutions, properties, and potential applications.

Conformity is checked by inspection.

5.4.103 Effects of chemicals and environmental influences

To ensure continued safe use of a LABORATORY CENTRIFUGE the documentation shall identify damage which could result from, for example:

a) the effect of chemicals;

b) environmental influences, including natural ultra-violet radiation likely to be encountered;

c) corrosion, and other weakening of construction materials that are part of the PROTECTIVE CASING or other ~~safety~~ protective components.

~~NOTE Assessment may be based on existing data, for example that supplied by a materials supplier. The manufacturer may have to arrange for additional tests with regard to the intended use of the LABORATORY CENTRIFUGE.~~

Conformity is checked by inspection of the documentation and the relevant data and/or additional testing (if needed).

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.

7.1 General

Addition:

~~*Renumber the existing note as Note 1 and*~~ *Add the following new note* ~~*2:*~~

NOTE ~~2~~ 101 A DISRUPTION, resulting in damage to a part of the PROTECTIVE CASING, for example a LID-locking mechanism, is considered to be a SINGLE FAULT CONDITION.

7.3 Moving parts

Addition:

Add the following ~~*four*~~ *new subclauses.*

7.3.101 LID

7.3.101.1 Requirements

The LID shall be locked closed when the ROTOR drive is energized, and shall remain locked until the circumferential velocity of the ROTOR ASSEMBLY is not more than 2 m/s (see Annex BB).