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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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General specifications for laboratory centrifuge

实验室离心机通用技术条件

(English Translation)

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1 Scope

This Standard specifies the terms and definitions, classification, conditions of use, requirements, test methods, inspection rules, marking, packaging, transportation and storage of laboratory centrifuges.

This Standard applies to laboratory centrifuges (hereinafter referred to as centrifuges) whose rated maximum speed is not more than 30 000 r/min.

2 Normative references

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

GB/T 191-2008, Packaging - Pictorial Marking for Handling of Goods

GB/T 2829-2002, Sampling procedures and tables for periodic inspection by attributes (Apply to inspection of process stability)

GB/T 3768, Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane

GB 4793.1-2007, Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements

GB 4793.7-2008, Safety requirements for electrical equipment for measurement control and laboratory use - Part 7: Particular requirements for laboratory centrifuges

GB/T 14710, Environmental requirement and test methods for medical electrical equipment

3 Terms and definitions

The following terms and definitions are applicable to this document.

3.1

Laboratory centrifuge

4 Product classification

4.1

Centrifuges are classified into bench-top centrifuges and floor type centrifuges according to their structure.

4.2

Centrifuges are classified into low speed centrifuges, high speed centrifuges and super speed centrifuges according to the rotational speed.

4.3

Centrifuges are classified into refrigerated centrifuges and non-refrigerated centrifuges according to their functions.

5.1 Environmental conditions

The centrifuge shall be used under the following environmental conditions:

- a) indoor;
- b) temperature 5 °C ~ 35 °C;
- c) relative humidity not more than 80%;
- d) atmospheric pressure 86 kPa ~ 106 kPa;
- e) no direct sunlight, nor direct radiation from other heat sources;
- f) pollution level 2, no conductive dust, explosive gas, high-concentration dust or corrosive substances around;
- g) no strong vibration or airflow around.

5.2 Power supply conditions

The power supply for the centrifuge shall meet the following conditions:

- a) rated voltage AC 220 V or 380 V, with the allowable deviation of -10% ~ +10% from the rated value;
- b) rated frequency 50 Hz, with the allowable deviation of $\pm 2\%$ from the rated value.

6.1 Appearance

6.1.1

The surface of the centrifuge shall be flat; characters and signs shall be clear.

6.1.2

The coating layer of the centrifuge shall be uniform in color, without bottom exposure, peeling, blistering, burrs, spots and obvious scratches.

6.2 Weight deviation of rotating components

The nominal weight of centrifuge tubes (bottles), centrifuge cups, and rubber gaskets in each group shall be equal, and the deviation of the actual weight shall not be greater than ± 2 g.

6.3 Relative deviation of rotational speed

Under the rated voltage and the maximum load corresponding to the maximum speed of the centrifuge, the maximum relative deviation of speed of the low speed centrifuge is $\pm 2.5\%$, and the maximum relative deviation of speed of the high speed centrifuge is $\pm 1\%$.

6.4 Speed stability

Under the rated voltage and the maximum load corresponding to the maximum speed of the centrifuge, the instability of speed shall not be greater than 1%.

6.5 Noise

6.5.1

For the noise emitted by the centrifuge under the rated voltage and the maximum load corresponding to the maximum speed, the A-weighted emission sound pressure level LpA at the operator (or observer) position and at a distance of 1 m from the surface of the centrifuge shall not be greater than 70 dB (where the reference sound pressure is 20 μ Pa). If it exceeds, the manufacturer shall specify in its technical documentation the

protective measures to be taken by the responsible department using the equipment.

6.5.2

The A-weighted sound power level LWA (where the reference sound power is 1 pW) of the noise emitted by the centrifuge should be specified in the manufacturer's technical documentation.

6.6 Temperature rise

The temperature rise of the test solution in the centrifuge tube (bottle) shall not exceed 12 °C after the non-refrigerated centrifuge runs for 15 minutes under the rated voltage and the maximum load corresponding to the maximum speed.

6.7 Time for speed raising and reduction

The time for speed raising and reduction of the centrifuge are shown in Table 1.

The centrifuge shall be provided with the door cover self-locking function. When the door cover is opened, the centrifuge cannot be started; when the door cover is closed, and the centrifuge is running, the door cover cannot be opened; in the event of a power failure, there shall be an emergency unlocking device and only special tools can be used to open the door cover.

6.10 Environmental adaptability

Under the condition where the centrifuge is well packaged, carry out the environmental test according to the provisions of GB/T 14710. After the test, open the package for testing, where the results shall meet the requirements of 6.3 ~ 6.9.

7.1 Main test instruments and equipment

Names and requirements of the main test instruments and equipment are as follows:

- a) balance, with the calibration division value of 1 g;
- b) speedometer, with an accuracy of 0.1%;
- c) spot-thermometer, with the maximum allowable error of ± 0.5 °C;
- d) electronic stopwatch, with the maximum allowable error of ± 1 s;
- e) 2-level sound level meter.

7.2 Test conditions

The test conditions of the centrifuge shall meet the following requirements:

- a) The ambient temperature is $20\text{ °C} \pm 5\text{ °C}$;