

ICS 13.200  
CCS K09;P63



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

**GB/T 13870.1-2022**

---

**Effects of current on human beings and livestock-Part 1:  
General aspects**

电流对人和家畜的效应 第1部分:通用部分

**(English Translation)**

**Issued on: October 14, 2022**

**Implemented on: May 1, 2023**

---

**Issued by: State Administration for Market Regulation;  
Standardization Administration of China**

## Table of Contents

|                               |   |
|-------------------------------|---|
| Foreword                      |   |
| Introduction                  |   |
| 1 Scope .....                 | 1 |
| 2 Normative references .....  | 1 |
| 3 Terms and definitions ..... | 1 |
| 4 Human body impedance .....  | 3 |

### Foreword

GB/T 13870 "Effect of electric current on people and livestock" is divided into the following 5 parts.

Part 1.General part;

Part 2.Special circumstances;

Part 3.The effect of current passing through the animal's body;

Part 4.Effects of lightning currents passing through human and livestock bodies;

Part 5.Contact voltage thresholds for physiological effects.

This part is the first part of GB/T 13870 "Effect of electric current on people and livestock".

This part is equivalent to adopting IEC 60479-1..2005 (4th edition) "Effects of current on people and livestock-Part 1.General part".

This section is the same in technical content as IEC 60479-1..2005, but contains the following editorial changes.

--- Replace the decimal symbol "," with the decimal symbol ".";

--- Replace "this technical specification" with "this section";

--- Deleted the "preface" of the IEC standard;

--- Rewrite the "Introduction" of the IEC Standard to "Introduction".

This section replaces GB/T 13870.1-1992 "Effects of current on people and livestock-Part 1.General part".

Compared with GB/T 13870.1-1992, this section has the following main changes.

--- AC contact voltage UT of 50/60Hz from 25V to.200V. Under dry, wet conditions such as

saline, 50% of living

The relationship between the subject's total body impedance ZT and large, medium, and small contact surface areas.

--- Figure 16 shows the AC contact voltage UT and contact measured in dry conditions with large contact surface area and hand-to-hand current path.

Oscillogram of current IT. There are related instructions in the main text.

--- The fibrillation data shown in Figure 19 are taken from experiments for dogs, pigs, and sheep, and humans use human impedance ZT (5%),

Current contact voltage UT = 220V to 380V, taken from the statistics of electrical accidents in the transverse direction of the current flowing from hand to hand

Count. There are related instructions in the main text.

--- In Figure 20, curve B is from 10mA to 5mA, the time/current zone of the effect of the agreed AC (15Hz ~ 100Hz) current on people.

area. There are related instructions in the main text.

--- The shed current of 60Hz sine current given in Figure 23 is explained in the main text.

--- About the new structure of the standard human body.

Appendix A, Appendix B, and Appendix C of this part are normative appendixes, and Appendix D is an informative appendix.

This part is proposed and managed by the National Technical Committee for Standardization of Building Electrical Installations (SAC/TC205).

This section is responsible for drafting units. CMC Design & Research Institute.

## introduction

This part is equivalent to adopting IEC 60479-1:2005 (4th edition) "Effects of Electric Current on People and Livestocks Part 1. General Part", IEC

This publication was published as a technical specification, and its contents are explained in the "Introduction" of the technical specification.

This technical specification provides basic guidance on the effects of electric shock currents on people and livestock for use in developing electrical safety requirements.

In order to avoid errors in interpreting this technical specification, it must be stated that the data listed are mainly based on tests performed on animals and by

Data obtained from clinical observations. Only a few short-term electric shock tests have been performed on living people.

Because the data obtained from the research on animals are too conservative, the technical specifications are normal for those with normal physiological conditions including children.

Suitable for everyone, regardless of age and weight.

however. There are other aspects to consider, such as the probability of failure, the probability of contact with a live or faulty part, the contact voltage

Ratio to fault voltage, existing experience, technical feasibility, and economic issues. When specifying safety requirements, these parameters

All must be carefully considered, such as stipulating the working characteristics of protective appliances in electrical installations.

The reason why it takes the form of technical specifications is that it brings together the results obtained so far, and these results are being used by the IEC technical committee 64

It will be used as a basis for developing electric shock protection requirements. Considering the importance of these results, there are good reasons to make it an IEC publication,

So that other IEC committees and countries that need this information can use it as a guide.

This technical specification applies to ventricular fibrillation thresholds that are primarily caused by current death. Recent thresholds for cardiac physiology and fibrillation

Analysis of the results of research work has led to the possibility of a better understanding of the effects of major physical parameters, especially the duration of current flow

influences.

This technical specification contains information on various physiological effects of human impedance and human current thresholds, and this information can be combined for easy reference

It is used to evaluate the AC and DC contact voltage thresholds such as the path of current through the human body, the wet conditions of contact, and the skin contact area. related

Information on the physiological effects of exposure voltage thresholds is included in the IEC 6201 publication.

This technical specification is more applicable to the effect of current. Other non-electrical phenomena when assessing the effects of any event on people and livestock,

This should include consideration of falls, fever, fire or other phenomena. These issues are beyond the scope of this technical specification, but as such, they can

Energy is extremely important.

Recently, research on other physical parameters of the body, especially the waveform and frequency of current and human impedance has been carried out. The technique

This fourth revision of the technical specification should be seen as the result of the logical development and evolution of the third edition.

Chapter 2 (3rd edition) of this technical specification contains little information on human impedance, and also on impedance and contact surface area.

The relationship between them is also limited to dry conditions.

Therefore, under dry, water-wet and saline-wet conditions, when the AC 50Hz contact voltage is 25V, the current path is hand-to-hand.

Ten persons were measured with a medium and small contact surface area. From these measurements, 5%, 50% and 95% of the measured

The object's impedance value.

In view of discomfort and the possibility of danger, use a large contact surface area under dry, water-wet and salt-wet conditions

(Magnitude 1000 mm<sup>2</sup>), and use medium and small contact surface area (magnitude 1000 mm<sup>2</sup> and

100mm<sup>2</sup>), in the case of AC contact voltage from 25V to 200V, only one person was measured. Nevertheless, with the help of

With the use of the deviation function, it is still possible to obtain values about the total impedance Z<sub>T</sub> of the human subject at 5%, 50%, and 95% of the subject. Also use the same

A person also took smaller contact areas (10mm<sup>2</sup> and 1mm<sup>2</sup>) and measured between fingertips.

For large contact surface areas, the contact voltage is between 200V and 700V, and even higher to a gradual value.

The total body impedance Z<sub>T</sub> of the subject under the conditions of 5%, 50%, and 95%, and the Z<sub>T</sub> value measured on the corpse is determined by considering

The temperature of the corpse during this period was 37 ° C for humans, which improved the method used in the second edition of the technical specification.

Provides AC impedance of the human body with large, medium, and small contact surface areas under dry, water-wet, and saline-wet conditions

GB/T 13870.1-2008/IEC /TS 60479-1.1..2005

And new knowledge of human DC resistance  $r_t$  with large contact area under dry