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Rullstolar –
Del 25: Batterier och batteriladdare för eldrivna rullstolar – Krav och provningsmetoder (ISO 7176-25:2013, IDT)

Wheelchairs –
Part 25: Batteries and chargers for powered wheelchairs – Requirements and test methods (ISO 7176-25:2013, IDT)

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Den internationella standarden ISO 7176-25:2013 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 7176-25:2013.

The International Standard ISO 7176-25:2013 has the status of a Swedish Standard. This document contains the official English version of ISO 7176-25:2013.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

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Denna standard är framtagen av kommittén för Rullstolar, SIS/TK 344/AG 6.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 7176-25 was prepared by Technical Committee ISO/TC 173, *Assistive products for persons with disability*, Subcommittee SC 1, *Wheelchairs*.

ISO 7176 consists of the following parts, under the general title Wheelchairs:

— *Part 1: Determination of static stability*

— *Part 2: Determination of dynamic stability of electric wheelchairs*

— *Part 3: Determination of effectiveness of brakes*

— *Part 4: Energy consumption of electric wheelchairs and scooters for determination of theoretical distance range*

— *Part 5: Determination of dimensions, mass and manoeuvring space*

— *Part 6: Determination of maximum speed, acceleration and deceleration of electric wheelchairs*

— *Part 7: Measurement of seating and wheel dimensions*

— *Part 8: Requirements and test methods for static, impact and fatigue strengths*

— *Part 9: Climatic tests for electric wheelchairs*

— *Part 10: Determination of obstacle-climbing ability of electrically powered wheelchairs*

— *Part 11: Test dummies*

— *Part 13: Determination of coefficient of friction of test surfaces*

— *Part 14: Power and control systems for electrically powered wheelchairs and scooters — Requirements and test methods*

— *Part 15: Requirements for information disclosure, documentation and labelling*

— *Part 16: Resistance to ignition of upholstered parts*

— *Part 19: Wheeled mobility devices for use as seats in motor vehicles*

— *Part 21: Requirements and test methods for electromagnetic compatibility of electrically powered wheelchairs and scooters, and battery chargers*

— *Part 22: Set-up procedures*

— *Part 23: Requirements and test methods for attendant-operated stair-climbing devices*

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— *Part 25: Batteries and chargers for powered wheelchairs*

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— *Part 28: Requirements and test methods for stair-climbing devices*

Introduction

Since the reliability and performance of an electrically powered wheelchair depend on the operation, performance and reliability of the battery set and the battery charger, it is important to ensure that wheelchair batteries and chargers are suitable for the purpose and that the wheelchair, batteries and charger are compatible. It is also important to ensure that risks arising from the use of wheelchair batteries and their chargers are eliminated or reduced as far as is practicable. Consequently, it is essential that performance requirements and safety requirements for wheelchair batteries and battery chargers are available.

Battery chargers are divided into three types: off-board, carry-on and on-board. Operating, transport and storage situations can differ for these types, so it is appropriate to apply different requirements to them.

Wheelchairs —

Part 25:
Batteries and chargers for powered wheelchairs

WARNING — This part of ISO 7176 calls for the use of procedures that might be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve those carrying out or commissioning the tests from legal obligations relating to health and safety. Prior to carrying out tests that could cause batteries or chargers to exhibit dangerous behaviour, it is recommended that the likely outcome is assessed and appropriate arrangements made to minimise risk.

1 Scope

This International Standard specifies requirements and test methods for batteries and battery chargers intended for use with electrically powered wheelchairs. It is applicable to lead acid batteries and chargers intended for use with them. Requirements for chargers are applicable to those with a rated input voltage not greater than 250 V a.c. and a nominal output voltage not greater than 36 V.

NOTE 1 Requirements for other battery chemistries (nickel and lithium based batteries) and suitable chargers are under consideration.

NOTE 2 Requirements regarding safety are applicable to all battery chargers intended for use with electrically powered wheelchairs.

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.

ISO 7176-8, *Wheelchairs — Part 8: Requirements and test methods for static, impact and fatigue strengths*

ISO 7176-21, *Wheelchairs — Part 21: Requirements and test methods for electromagnetic compatibility of electrically powered wheelchairs and scooters, and battery chargers*

IEC 60254-1, *Lead-acid traction batteries — Part 1: General requirements and methods of tests*

IEC 60254-2, *Lead-acid traction batteries — Part 2: Dimensions of cells and terminals and marking of polarity on cells*

IEC 60335-2-29, *Household and similar electrical appliances — Safety — Part 2-29: Particular requirements for battery chargers*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 61076-2-103, *Connectors for electronic equipment — Part 2-103: Circular connectors — Detail specification for a range of multipole connectors (type 'XLR')*

SAE J1495, *Test Procedure for Battery Flame Retardant Venting Systems*

IATA*Special Provision A67*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7176-26 and the following apply.

3.1
battery
one or more cells fitted with devices necessary for use, for example case, terminals, marking and protective devices

[SOURCE: IEV 482–01–04]

3.2
lead acid battery
lead dioxide lead battery
secondary battery with an aqueous electrolyte based on dilute sulphuric acid, a positive electrode of lead dioxide and a negative electrode of lead

Note 1 to entry: Lead dioxide lead batteries are often called accumulators (deprecated).

[SOURCE: IEV 482–05–01]

3.3
nominal voltage
suitable approximate value of the voltage used to designate or identify a cell, a battery or an electrochemical system

[SOURCE: IEV 482–03–31]

Note 1 to entry: For lead acid batteries the nominal voltage is usually two volts multiplied by the number of cells.

3.4
rated d.c. output current
output current assigned to the battery charger by its manufacturer

3.5
rated d.c. output voltage
output voltage assigned to the battery charger by its manufacturer

3.6
rated input voltage
supply mains voltage assigned to the battery charger by its manufacturer

3.7
safety hazard
potential source of physical injury or damage to the health of the user, other persons or animals, or damage to the surroundings, arising directly from the battery charger or battery

Note 1 to entry: Adapted from IEC 60601–1.

3.8
C_5
rated capacity of the battery for a discharge time of 5 h, expressed in ampere hours

Note 1 to entry: C_5 is equivalent to C_N as defined in IEC 60254–1.

Note 2 to entry: IEC 60254–1 states that the nominal capacity, C_N, is a reference value declared by the manufacturer, which is valid for a cell/battery temperature of 30 °C, a discharge time of 5 h, and a cut-off voltage U_f of 1,70 V per cell.

Note 3 to entry: The nominal capacity, C_N, can differ from the actual capacity of the battery.

3.9
***I*$_5$**
the electric current (C_5 / 5), expressed in amperes

Note 1 to entry: The numerical value of C_5 divided by a numerical value of time in hours yields a numerical value of current.

4 Apparatus

4.1 Mean current meter, capable of measuring the arithmetic mean current supplied by a battery charger to an accuracy of 2 % of the measurement, which does not introduce a voltage drop (added to the voltage at the output connector of the battery charger) that exceeds 0,2 % of the nominal battery voltage.

NOTE 1 The measuring device may be an integral part of an electronic load as specified in 4.4.

NOTE 2 It is important to match the averaging time of the meter to any cyclic variations in the charging current.

4.2 Root-mean-square (r.m.s.) current meter, capable of measuring the r.m.s. current supplied by a battery charger to an accuracy of 2 % of the measurement, which does not introduce a voltage drop that exceeds 0,2 % of the nominal battery voltage.

NOTE The measuring device may be an integral part of an electronic load as specified in 4.4.

4.3 Voltmeter, capable of measuring the voltage supplied by a battery charger, to an accuracy of 0,1 % of the measurement.

NOTE The measuring device may be an integral part of an electronic load as specified in 4.4.

4.4 Electronic load, for simulating a battery to the extent necessary to provide the test loads for battery chargers included in the scope of this standard.

EXAMPLE Figure 1 shows an outline schematic for an electronic load that can be used in constant-voltage mode or constant-current mode, with terminals for connection to the output terminals of the battery charger.

In the constant-voltage mode (switch in CV position), the circuit will keep the voltage between the load terminals substantially constant while sinking the current supplied by the battery charger.

In the constant-voltage mode the voltage at the load terminals will be given by

$$V_{REF\_U} \times \frac{R1 + R2}{R2}$$

In the constant-current mode (switch in CC position), the circuit will sink a substantially constant current with the load terminal voltage being the output voltage of the battery charger.

In constant-current mode the load current will be given by

$$\frac{V_{REF\_I}}{R_{SHUNT}}$$