

Wheelchairs —

Part 21: Requirements and test methods for electromagnetic compatibility of electrically powered wheelchairs and motorized scooters

ICS 11.180.10; 33.100.01

National foreword

This British Standard reproduces verbatim ISO 7176-21:2003 and implements it as the UK national standard.

The UK participation in its preparation was entrusted to Technical Committee CH/173/1, Wheelchairs, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the ISO title page, pages ii to vi, pages 1 to 15 and a back cover.

The BSI copyright date displayed in this document indicates when the document was last issued.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 15 May 2003

© BSI 15 May 2003

ISBN 0 580 41864 2

Amendments issued since publication

Amd. No.	Date	Comments

INTERNATIONAL STANDARD

ISO
7176-21

First edition
2003-04-15

Wheelchairs —

Part 21:

Requirements and test methods for electromagnetic compatibility of electrically powered wheelchairs and motorized scooters

Fauteuils roulants —

*Partie 21: Exigences et méthodes d'essai pour la compatibilité des
fauteuils roulants électriques et scooters motorisés*



Contents

Page

Foreword.....	iv
Introduction	vi
1 Scope.....	1
2 Normative references	1
3 Terms and definitions.....	2
4 Classification of electrically powered wheelchairs	4
5 Requirements	4
5.1 General	4
5.2 Driving	4
5.3 Charging	5
6 Test apparatus.....	7
7 Preparation of test wheelchair.....	8
7.1 Equipping the wheelchair.....	8
7.2 Supporting the wheelchair	8
7.3 Adjustments	8
7.4 Settings for driving tests.....	9
7.5 Settings for charging tests.....	9
8 Sequence of tests	9
9 Test methods for electromagnetic emissions	9
9.1 Radiated emissions test	9
9.2 Conducted emissions test	9
10 Test methods for electromagnetic immunity	9
10.1 Electrostatic discharge immunity test.....	9
10.2 Charged-frame electrostatic discharge immunity test.....	10
10.3 Radiated immunity test.....	11
10.4 Fast transient/burst immunity test	12
10.5 Surge immunity test.....	12
10.6 Conducted radio-frequency immunity test.....	12
10.7 Voltage dips test	12
10.8 Short interruptions test	14
11 Wheel speed change calculation.....	14
12 Test report	15
13 Disclosure.....	15

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 7176-21 was prepared by Technical Committee ISO/TC 173, *Technical systems and aids for disabled or handicapped persons*, Subcommittee SC 1, *Wheelchairs*.

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

- *Part 21: Requirements and test methods for electromagnetic compatibility of electrically powered*
- *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 overall dimensions, mass and turning 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 electric wheelchairs*
- *Part 11: Test dummies*
- *Part 13: Determination of coefficient of friction of test surfaces*
- *Part 14: Power and control systems for electric wheelchairs — Requirements and test methods*
- *Part 15: Requirements for information disclosure, documentation and labelling*

- *Part 16: Resistance to ignition of upholstered parts — Requirements and test methods*
- *Part 19: Wheeled mobility devices for use in motor vehicles*
- *Part 21: Requirements and test methods for electromagnetic compatibility of electrically powered wheelchairs and motorized scooters*
- *Part 22: Set-up procedures*
- *Part 23: Requirements and test methods for attendant-operated stair-climbing devices*

The following parts are also on the programme of work

- *Part 20: Determination of the performance of stand-up type wheelchairs*
- *Part 24: User-operated stair-climbing devices — Requirements and test methods*

Introduction

Electrically powered wheelchairs should operate without introducing significant electromagnetic disturbances to the environment and without significant degradation of operational performance in the presence of electromagnetic disturbances that can be expected in normal use. Wheelchairs can be expected to operate in traffic areas and therefore should be immune to radio frequency fields from fixed and mobile communications equipment, as well as from other sources of electromagnetic disturbance. Injury could occur in the event of unintentional movement or change in direction of a wheelchair.

This part of ISO 7176 specifies requirements and test methods for wheelchairs to minimize the risks connected with reasonably foreseeable electromagnetic interference and electrostatic discharge and to minimize the risk of producing electromagnetic fields which could impair the operation of other devices or equipment in the wheelchair's usual environment.