

**BUREAU OF INDIAN STANDARDS**

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*भारतीय मानक मसौदा*

**व्हीलचेयर**

**भाग 21 विद्युत संचालित व्हीलचेयर और स्कूटर और बैटरी चार्जर की विद्युत चुम्बकीय अनुकूलता के लिए आवश्यकताएँ और परीक्षण विधियाँ**

*Draft Indian Standard*

**Wheelchairs**

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

**[ICS 11.180.10]**

Artificial Limbs, Rehabilitation Appliances and Equipment for  
the Persons with Disability Sectional Committee, MHD 09

Last date for comments:  
5 June, 2024

**NATIONAL FOREWORD**

*(Adoption clause will be added later)*

The text of ISO Standard has been approved as suitable for publication as an Indian Standard Without deviations. Certain conventions are however not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'
- Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their respective places are listed below along with their degree of equivalence for the editions indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 7176-5, Wheelchairs — Part 5: Determination of dimensions, mass and manoeuvring space	IS 18651 (Part 5) : 2024/ISO 7176-5 : 2008 Wheelchairs Part 5: Determination of dimensions mass and manoeuvring space	Identical

ISO 7176-9, Wheelchairs — Part 9: Climatic tests for electric wheelchairs	IS 18651 (Part 9) : 2024/ISO 7176-9 : 2009 Wheelchairs Part 9: Climatic tests for electric wheelchairs	Identical
ISO 7176-15, Wheelchairs — Part 15: Requirements for information disclosure, documentation and labelling	IS 18651 (Part 15) : 2024/ISO 7176-15 : 2008 Wheelchairs Part 15: Requirements for information disclosure documentation and labelling	Identical
ISO 7176-22, Wheelchairs — Part 22: Set-up procedures	IS 18651 (Part 22): 2024/ISO 7176-15: 2014 Wheelchairs Part 22 Set-up procedures	Identical
IEC 61000-3-2, Electromagnetic compatibility (EMC) — Part 3-2: Limits — Limits for harmonic current emissions (equipment input current $\leq 16$ A per phase)	IS 14700 (Part 3/Sec 2): 2020 Electromagnetic Compatibility (EMC) Part 3 Limits Section 2 Limits for harmonic current emissions (equipment input current $\leq 16$ A per phase) ( <i>third revision</i> )	Identical
IEC 61000-3-3, Electromagnetic compatibility (EMC) — Part 3-3: Limits — Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $\leq 16$ A per phase and not subject to conditional connection	IS 14700 (Part 3/Sec 3): 2018 Electromagnetic Compatibility (EMC) Part 3 Limits Section 3 Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply system, for equipment with rated current $\leq 16$ A per phase and not subjected to conditional connection ( <i>second revision</i> )	Identical
IEC 61000-4-2, Electromagnetic compatibility (EMC) — Part 4-2: Testing and measurement techniques — Electrostatic discharge immunity test	IS 14700 (Part 4/Sec 2): 2018 Electromagnetic Compatibility (EMC) Part 4 Testing and measurement techniques Sec 2 Electrostatic discharge immunity test ( <i>second revision</i> )	Identical
IEC 61000-4-3, Electromagnetic compatibility (EMC) — Part 4-3: Testing and measurement techniques — Radiated, radio-frequency, electromagnetic field immunity test	IS 14700 (Part 4/Sec 3) : 2023 Electromagnetic Compatibility EMC Part 4 Testing and Measurement Techniques Section 3 Radiated radio-frequency electromagnetic field immunity test ( <i>second revision</i> )	Identical

IEC 61000-4-4, Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques — Electrical fast transient/burst immunity test	IS 14700 (Part 4/Sec 4) : 2018 Electromagnetic Compatibility (EMC) Part 4 Testing and measurement techniques Sec 4 Electrical fast transient/burst immunity test ( <i>second revision</i> )	Identical
IEC 61000-4-5, Electromagnetic compatibility (EMC) — Part 4-5: Testing and measurement techniques — Surge immunity test	IS 14700 (Part 4/Sec 5) : 2019 Electromagnetic Compatibility (EMC) Part 4 testing and measurement techniques: Sec 5 surge immunity test ( <i>first revision</i> )	Identical
IEC 61000-4-8, Electromagnetic compatibility (EMC) — Part 4-8: Testing and measurement techniques — Power frequency magnetic field immunity test	IS 14700 (Part 4/Sec 8) : 2018 Electromagnetic Compatibility (EMC) Part 4 Testing and measurement techniques Sec 8 Power frequency magnetic field immunity test ( <i>second revision</i> )	Identical
IEC 61000-4-11, Electromagnetic compatibility (EMC) — Part 4-11: Testing and measurement techniques — Voltage dips, short interruptions and voltage variations immunity tests	IS 14700 (Part 4/Sec 11) : 2021 Electromagnetic Compatibility EMC Part 4 Testing and measurement techniques Sec 11 Voltage dips short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase	Identical

The technical committee has reviewed the provisions of the following International Standards referred in this adopted standard and has decided that they are acceptable for use in conjunction with this standard:

*International Standard Title*

IEC 61000-4-6	Electromagnetic compatibility (EMC) — Part 4-6: Testing and measurement techniques — Immunity to conducted disturbances, induced by radio-frequency fields
CISPR 11	Industrial, scientific and medical (ISM) radio-frequency equipment — Electromagnetic disturbance characteristics — Limits and methods of measurement

In the text of this standard, references made to IEC 61000-3-2. IEC has published IEC 61000-3-2:2018+AMD1:2020+AMD2:2024 CSV Consolidated version (Edition 5.2) in 2024. Reference is also made to IEC 61000-3-3 and IEC has published IEC 61000-3-3:2013+AMD1:2017+AMD2:2021 CSV Consolidated version (Edition 3.2) in 2021

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test shall be rounded off in accordance with **IS 2: 2022** 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be same as that of the specified value in this standard.

## **Introduction**

Electrically powered wheelchairs and their battery chargers are meant to operate without introducing significant electromagnetic disturbances into the environment and without significant degradation of operational performance in the presence of electromagnetic disturbances expected in normal use. Wheelchairs are often used near roads and therefore should be immune to radio frequency fields from both static 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 movement of a wheelchair.

This part of ISO 7176 specifies requirements and test methods for wheelchairs and their battery chargers to minimize the risks associated with their exposure to reasonably foreseeable electromagnetic interference and electrostatic discharge and with their production of electromagnetic fields that could impair the operation of other devices or equipment in their usual environment.

The upper frequency limit and test level for radiated r.f. immunity requirements are selected according to the environment in which the wheelchair is used and the related risk. Hence the requirements for a wheelchair while it is driving are consistent with its use as a medical device, but the requirements for charging are consistent with use of the wheelchair and charger as domestic electrical equipment.

## **Scope**

This part of ISO 7176 specifies requirements and test methods for electromagnetic emissions and for electromagnetic immunity of electrically powered wheelchairs and scooters with a maximum speed of not more than 15 km/h intended for indoor and/or outdoor use by people with disabilities. It is also applicable to manual wheelchairs with an add-on power kit. It is not applicable to vehicles designed to carry more than one person.

This part of ISO 7176 also specifies requirements and test methods for the electromagnetic compatibility of battery chargers intended for use with electrically powered wheelchairs and scooters.

A reference configuration is specified for adjustable wheelchairs and scooters in order to enable test results to be used for comparison of performance.

NOTE The term “wheelchair” is used in this part of ISO 7176 to cover electrically powered wheelchairs, scooters and manual wheelchairs with an add-on power kit.

**NATIONAL ANNEX A**  
*(National Foreword)*

**A-1 BIS CERTIFICATION MARKING**

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the Bureau of Indian Standards Act, 2016 and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

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The technical content of the document has not been enclosed as it is identical with the corresponding ISO standard. For details, please refer to ISO 7176-21:2009 or kindly contact:

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