

ISO DIS7176/19: Wheelchairs for use as seats in motor vehicles

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This lecture is intended to provide summary information about the industry performance test standard DIS7176/19, currently under development under the auspices of the International Standards Organization (ISO)

General Provisions:

- Intended to reduce the risk of injury to wheelchair-seated motor vehicle occupants,
- Specifies general design requirements, test procedures, and performance requirements for wheelchairs that are suitable for forward-facing seating in a motor vehicle.



General cont'd:

- A voluntary industry standard,
- Harmonized with CSA-Z604 & ANSI/RESNA-WC/19.



Definitions

- Anchor point - The point (area) on vehicle, WC, WC tiedown, or vehicle seat base to which an anchorage is attached.
- Securement point - The location on WC frame to which a WC tiedown connects.



Definitions

- Four-point tiedown: - WC tiedown system that attaches to the WC frame at four separate points and attaches to the vehicle at four separate anchor points.
- WTORS: - WC tiedown and occupant restraint system.



ISO DIS 7176/19: Scope:

- Manual WCs, powered WCs, scooters, tilt-in-space WCs, (ISO 9999 12-21 series).
- Forward-facing WC-seated adult occupant.



ISO DIS 7176/19: Scope:

- WCs for use in both public and private vehicles.
- WCs secured by variety of tiedown devices.
- occupant restraint by pelvic and upper torso belts.



ISO DIS7176/19: Requirements:

- Securement Points:
 - four securement points for tiedowns shall be clearly marked.
 - securement points on W/C shall comply with standard tiedown geometry.

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The specified geometry complies with the geometry of the four point strap-type tiedown devices as specified in ISO-10542-2.

ISO DIS7176/19: Requirements:

- Pelvic Restraint:
 - Allow independent pelvic restraint to cross pelvis to anchor points within 30-75° range.
 - If integrated, provide a pelvic restraint angle within the 30-75° range.

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Integrated means that the pelvic belt is attached to the wheelchair frame, versus attachment to the vehicle or tiedown device, the latter being an independent pelvic restraint.

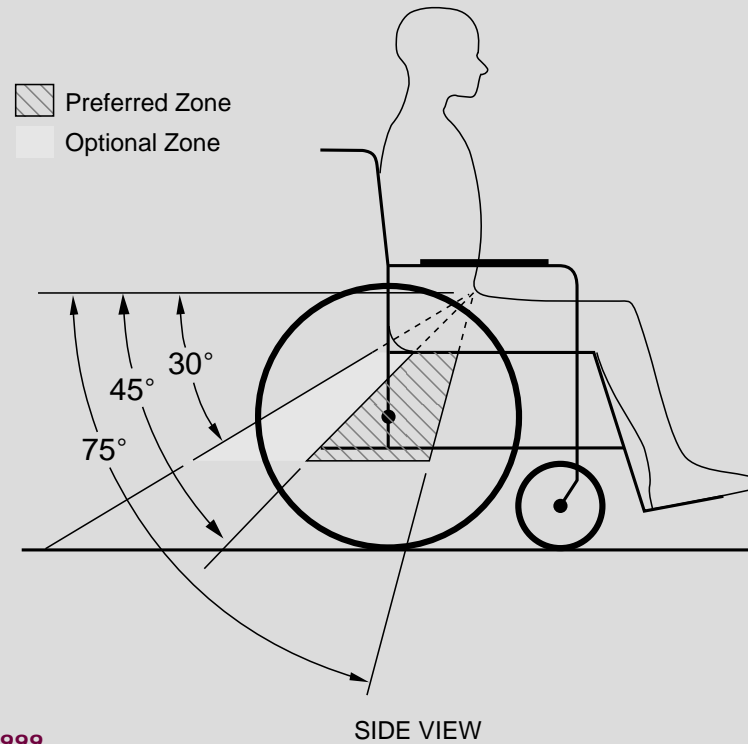
In contrast, the ANSI/RESNA WC-19 mandates an integrated pelvic restraint within two years of issuing of the WC-19 standard, expected in Fall, 1999.

ISO DIS7176/19: Requirements:

- Pelvic Restraint:
 - Provide a clear path for anchorage of pelvic restraint to vehicle (independent restraint)
 - Two year grace period for ANSI/RESNA WC-19



Pelvic Restraint Angles



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ISO DIS7176/19: Requirements:

- Postural Supports:
- Postural supports intended for use as occupant restraints shall comply with ISO 10542-WTORS
- Postural supports not intended for use as occupant restraints shall break away at a force of 1000N, or less

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This requirement attempts to differentiate between postural supports and occupant restraints, the former only being suitable for occupant restraint if it meets the requirements of ISO 10542.

If a postural support is not intended to serve as an occupant restraint, it should not interfere with performance of the occupant restraints.

ISO DIS7176/19: Requirements:

- Dynamic Strength:
 - Sled impact test specified
 - 48kph (30 mph) / 20 g deceleration pulse
- To pass the test:
 - ATD must remain seated in the test W/c
 - no obvious component failure
 - WC and dummy excursions do not exceed specified limits
 - no WC loading of occupant
 - detachable seat inserts remain attached
 - no part over 100gm flies off the W/c
 - batteries restrained with no leakage

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The crash pulse is simulated using a impact sled onto which is mounted the wheelchair containing an anthropometric test dummy (ATD). The test arrangement is very similar to the pulses used in auto tests.

ISO DIS7176/19: Requirements:

- Identification, labeling, user instructions and warnings:
 - identification that WC meets standard.
 - each securement point is clearly identified with required symbol.
 - user manual with written instructions and warnings.
 - labeling of postural supports unsuitable for use as occupant restraints.



ISO DIS7176/19: Requirements:

- Pre-sale literature disclosure:
 - WC size and turning radius
 - forward facing use only
 - total mass of WC
 - test results for movement stability
 - description of WTORS suitable for use with WC.

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This information is intended for use in purchasing decisions.

ISO-DIS 7176/19

- Guidelines Document (ANSI/RESNA)
 - information on how to use and interpret the standard.
 - information on the meaning and relevance of the disclosed test results.
 - overview of principles of safe vehicular transport for WC riders.
 - designer recommendations for optimal placement of securement points, pelvic-belt anchor locations, etc.
 - draft release due fall 1999.



Procurement Guidance for WCs intended for use as seats in motor vehicles

- Purchase WCs that comply with ISO 7176/19, or equivalent national standards.
- Request test reports along with pre-sale literature.
- Verify appropriate labeling on WC.
- Awareness of instructions and warnings in user manual.
- Take time to understand the warnings and installation/usage recommendations.



Current Status

- CSA-Z604, Transportable Mobility Aids: issued February 1997.
- USA-ANSI/RESNA WC-19: Fall 1999.
- ISO 7176/19: Fall 2000.



New Standards Work-ISO & ANSI/RESNA

- WC Seating Standards:
 - Part 1: Terms and definitions
 - Part 2: Pressure management devices
 - Part 3: Postural support devices
 - Part 4: Seating devices for use as seats in motor vehicles



New Standards Work-ISO & ANSI/RESNA (cont'd)

- Working group met at RESNA-98-99 conferences.
- Similar initiative taking place in ISO (organization meeting- October 1998, second meeting- March 1999).



For More Information....

- Visit the Standards Development WWW page:
 - <http://www.erc.upmc.edu/STDsDev/stdsindex.html>
 - See: ISO-WG-6: ISO CD7176/19
 - See: ANSI/RESNA SOWHAT-WC-19

