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WHEELCHAIR OCCUPANT RESTRAINT ASSEMBLIES FOR MOTOR VEHICLES

For referenced documents see Clause 1.3



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Australian Automobile Association
Australian College of Rehabilitation Medicine
Australian Council for Rehabilitation of Disabled
Commercial Vehicle Industry Association of Australia
Confederation of Australian Industry
Department of Transport
Department of Motor Transport, N.S.W.
Department of Veterans' Affairs
Federal Chamber of Automotive Industries
Federation of Automotive Products Manufacturers
Road Traffic Authority, Vic.
University of N.S.W.

Representatives of the following interests also participated in the drafting of this Standard:

Department of Transport, S.A.
Motor Manufacturers
Rainsfords Metal Products
Regency Park Centre for Young Disabled
Spastic Society of Victoria Ltd
Traffic Authority of N.S.W.
University of Adelaide

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AUSTRALIAN STANDARD

WHEELCHAIR OCCUPANT RESTRAINT ASSEMBLIES FOR MOTOR VEHICLES

AS 2942—1987

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PREFACE

This Standard was prepared by the Association's Committee on Restraint Systems in Vehicles.

The decision to prepare the Standard was made following requests from the National Committee on Biomedical Engineering of the Institution of Engineers, Australia and the Vehicle Standards Advisory Committee. The Mechanical Standards Board of the SAA established a subcommittee of experts in the field of transportation of disabled in wheelchairs to review and guide the development of the Standard. A major contributor in the preparation of the Standard was Dr W. Fisher of the Regency Park Centre for Young Disabled, a division of the Crippled Children's Association of South Australia Incorporated, with technical support coming from Rainsfords Metal Products Pty Ltd.

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FOREWORD

Wheelchair occupant restraint assemblies complying with this Standard should give protection in most accidents if they are properly installed and worn correctly. In general, wheelchairs are not well suited to the requirements of vehicular seating, and the safety of passengers is best assured by the use of normal passenger seats and seat belts. Wheelchair occupants should transfer to passenger seats in vehicles and use the seatbelt provided whenever that is practicable and the unoccupied wheelchairs should be restrained.

Effective restraint for people occupying wheelchairs requires the wheelchair to be restrained to the transport vehicle, and the occupant to be restrained either directly to the vehicle or to parts which are themselves attached to the vehicle. The wheelchair contributes to restraint of the occupant by virtue of the support of the wheelchair seat, back rest, and arm rests. The complete restraint system includes the wheelchair itself and restraints for the occupant and for the wheelchair.

There are currently no recognized Standards covering wheelchairs suitable for vehicle seating, and, even if such Standards could be rapidly implemented, the problems of vehicular transport for people occupying non-complying wheelchairs would remain for many years. However, provided that suitable restraints are fitted, tests have shown that some types of wheelchairs can survive a severe impact without fractures of the frame.

This Standard specifies restraints for wheelchairs and their occupants and makes recommendations about the suitability of different kinds of wheelchairs for use as vehicle seating. It does not specify strength requirements for wheelchair structures or for vehicle structures used to anchor wheelchair occupant restraint assemblies. Rather, the manufacturer of wheelchair occupant restraint assemblies is required to provide details of strength requirements at the mounting points of a restraint assembly. Vehicle regulatory authorities should be consulted for advice on reinforcement of vehicle structures at mounting points.

To allow for various applications, the Standard allows for designs that do not require any wheelchair modifications, those in which parts of the restraint assembly are fixed to the wheelchair, wheelchairs that incorporate a child safety seat complying with AS 1754, and wheelchair frames manufactured with integral restraint components.

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Australian Standard

WHEELCHAIR OCCUPANT RESTRAINT ASSEMBLIES FOR MOTOR VEHICLES

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This Standard specifies requirements for restraint assemblies for wheelchairs and their occupants in motor vehicles if suitable anchorages can be installed and where sufficient space is available.

The Standard includes recommendations for headroom and access requirements.

The Standard does not apply to the restraint of wheelchair occupants who are driving the vehicles.

NOTES:

1. Guidelines for reinforcement of the vehicle at the anchor points are given in Appendix C.
2. Guidelines for vehicle access are given in Appendix D.
3. Guidelines for wheelchairs for use in vehicles are given in Appendix E.

1.2 RESTRAINT TYPES. Wheelchair occupant restraint assemblies shall be classified according to their design principles as follows:

- (a) *Type A*—wheelchair occupant restraint assembly designed for use with wheelchairs which have not been modified by the attachment of parts for the purpose of restraint.
- (b) *Type B*—wheelchair occupant restraint assembly designed with parts for fixing to a wheelchair for the purpose of restraint, these parts being attached to the wheelchair subsequent to its manufacture.
- (c) *Type C*—wheelchair occupant restraint assembly designed with parts permanently incorporated into the frame of a wheelchair during manufacture of the frame.

1.3 REFERENCED DOCUMENTS. The following documents are referred to in this standard:

- | | |
|-----------|---|
| AS 1753 | Webbing for Restraining Devices for Occupants of Motor Vehicles |
| AS 1754 | Child Restraints for Passenger Vehicles and Derivatives |
| AS 2596 | Seat Belt Assemblies for Motor Vehicles |
| AS 2597.1 | Methods of Testing Seat Belts—Determination of Webbing Durability in Adjustment Duty |
| AS 2597.2 | Methods of Testing Seat Belts—Determination of Webbing Durability in Withdrawing and Retracting Duty Through a Sash Guide |
| AS 2597.3 | Methods of Testing Seat Belts—Determination of Fatigue Resistance of a Flexible Member |
| AS 2597.6 | Methods of Testing Seat Belts—Determination of Adjustment Device Forces |
| AS 2597.7 | Methods of Testing Seat Belts—Determination of Locking Angle of Tilt-lock Adjustment Device |

AS 2597.8 Methods of Testing Seat Belts—Determination of Free-end Device Strength

√ADR 4D Australian Design Rule for Seat Belts. $\frac{2629.23}{2}$

1.4 DEFINITIONS. For the purpose of this standard, the following definitions apply:

1.4.1 Restraints.

1.4.1.1 Pelvic restraint—a device which transmits restraint forces to the body through the bones of the front of the pelvis to prevent compression of the abdominal contents between the restraint and the lumbar spine.

1.4.1.2 Upper torso restraint—a device which transmits restraint forces to the front of the ribcage and shoulders so that crash forces are applied to these structures symmetrically about the midline or are applied across the midline to the ribcage and one shoulder.

1.4.1.3 Head and back restraint—a device which transmits restraint forces to the back of the head and to the back of the torso so as to limit rearward movement of the head or torso.

1.4.2 Belt.

1.4.2.1 Seat belt assembly—an arrangement of straps, anchors or mountings, securing buckle and adjusting devices, designed to restrain a motor vehicle occupant in the event of an impact. (See Figs 1.1 to 1.3.)

NOTES:

1. Belt end fittings are not shown in Figs 1.1 to 1.3.
2. Figs 1.1 to 1.3 are indicative only. Chair configurations and wheel sizes may vary from those shown.

1.4.2.2 Harness belt—a seat belt assembly consisting of at least one strap designed to provide pelvic restraint, and two or more torso straps. (See Fig. 1.1.)

1.4.2.3 Lap belt—a seat belt assembly designed to provide pelvic restraint only. (See Fig. 1.2.)

1.4.2.4 Lap-sash belt—a seat belt assembly combining a lap strap and torso strap. (See Fig. 1.3.)

1.4.3 Strap.

1.4.3.1 Strap—a length of webbing material.

1.4.3.2 Lap strap—a strap which provides pelvic restraint.

1.4.3.3 Torso strap—a strap which provides or contributes to upper torso restraint.

1.4.3.4 Sash strap—the torso strap of a lap-sash belt.

1.4.3.5 Harness straps—the shoulder straps only of a harness belt.