Under Revision. See DR 91161 Dup

Superseded by AS 2942-1994

AS 2942—1987
UDC 614.895.1:629.111.32:629.113

see also Seminar Papers (1987) AS 2942

Australian Standard®
2942—1987

WHEELCHAIR OCCUPANT RESTRAINT ASSEMBLIES FOR MOTOR VEHICLES

For referenced documents see Clause 1.3

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

F

This Australian Standard was prepared by Committee ME/48, Restraint Systems in Vehicles. It was approved on behalf of the Council of the Standards Association of Australia on 3 March 1987 and published on 4 May 1987.

The following interests are represented on Committee ME/48:

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

...iew of Australian Standards. *To keep abreast of progress in industry, Australian Standards are subject to p...odic review and are kept up-to-date by the issue of amendments or new editions as necessary. It ... important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.*

Full details of all SAA publications will be found in the Catalogue of SAA Publications; this information is supplemented each month by SAA's journal 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of the Association, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

This Standard was issued in draft form for comment as DR 86099.

AUSTRALIAN STANDARD

WHEELCHAIR OCCUPANT RESTRAINT ASSEMBLIES FOR MOTOR VEHICLES

AS 2942—1987

First published 1987

PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA
STANDARDS HOUSE, 80 ARTHUR ST, NORTH SYDNEY, N.S.W.

ISBN 0 7262 4622 0

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.

CONTENTS

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 fracture 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.

STANDARDS ASSOCIATION OF AUSTRALIA

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. ✓ 29.23/2

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.