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Hoists and ramps for people with disabilities — Vehicle mounted

Part 1: Product requirements



AS 3856.1:2021

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- Novita Children's Services (Australia)
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Part 1: Product requirements

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Preface

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee ME-067, Assistive Technology, to supersede AS/NZS 3856.1:1998, *Hoists and ramps for people with disabilities — Vehicle mounted, Part 1: Product requirements*.

The objective of this document is to provide persons concerned with the manufacture of hoists and ramps and their fitting onto vehicles, community transport organizers, regulatory authorities and operators with minimum design and performance specifications for hoists and ramps intended to be fitted on vehicles.

This document requires products to be tested in their fully assembled condition, both before and after fitment to a vehicle.

The document covers ramps as well as hoists because some hoisting appliances deploy a platform which forms a ramp or a set of ramps during the operating cycle.

The document covers only those appliances which are necessarily attached to a vehicle during their use. The types of appliances which are placed next to a vehicle for hoisting a person into the vehicle are covered in AS/NZS ISO 10535:2011.

While it is recognized that operators of vehicle fitted hoists and ramps may or may not be in the company of an attendant, the requirements in the document do not cover all requirements for the sole operation of an appliance by an operator, self-operated appliances usually being tailored to their specific needs.

The term 'normative' is used in Standards to define the application of the appendix to which it applies. A 'normative' appendix is an integral part of a Standard.

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NOTES

Australian Standard®

Hoists and ramps for people with disabilities — Vehicle mounted

Part 1: Product requirements

1 Scope and general

1.1 Scope

This document specifies requirements for the design, performance and installation of hoists and ramps for use by people with disabilities in accessing ADR compliant motor vehicles.

This document does not apply to devices for hoisting unoccupied mobility devices into or onto a vehicle.

Specific elements of the document are relevant to portable hoists or ramps not permanently fitted to the vehicle.

1.2 Normative references

For the purposes of this document, the following terms and definitions apply.

AS 3696.13, *Wheelchairs, Part 13: Determination of coefficient of friction of test surfaces*

AS 3856.2 *Hoists and ramps for people with disabilities — Vehicle mounted Part 2: Installation requirements*

AS ISO 14971, *Medical devices — Application of risk management to medical devices*

AS/NZS ISO 7176.14, *Wheelchairs, Part 14: Power and control systems for electrically powered wheelchairs and scooters — Requirements and test methods*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

UN R10. *United Nations Regulation No. 10: Uniform provisions concerning the approval of vehicles with regard to electromagnetic compatibility*

1.3 Terms and definitions

For the purpose of this Standard, the definitions below apply.

1.3.1

appliance

hoist, ramp or platform

1.3.2

braking

action of force being applied to slow or stop a moving mechanism

1.3.3

deploy

move an appliance from a stored position to an operating position

1.3.4

edge barrier

barrier attached to the side edges of a platform or ramp extending above the surface of the platform or ramp

**1.3.5
failure**

fault of any component, assembly or system that prevents the hoist performing additional cycles

**1.3.6
hoist**

device attached to the vehicle during use, which is used for raising or lowering people into or out of the vehicle

**1.3.7
inner roll stop**

barrier located at the interface between the platform and the vehicle

**1.3.8
isolation switch**

device which isolates an electric circuit from the source of power

**1.3.9
lifting cycle**

raising and lowering of the appliance through its complete range

**1.3.10
outer roll stop**

barrier or barriers located at any of the access/egress edges of the platform

**1.3.11
platform**

load-bearing surface which is constructed in the one plane

**1.3.12
ramp**

sloping surface joining two different levels which is either permanently or temporarily attached to the vehicle

Note 1 to entry: A ramp may be made up of two or more sections joined together.

**1.3.13
safe working load
SWL**

maximum load that an appliance is designed to lift or carry as specified by the manufacturer

**1.3.14
single fault condition**

condition for which a single means for reducing a risk is defective or a single abnormal condition is present

**1.3.15
store**

move an appliance from an operating position to a stored position on or in the vehicle

**1.3.16
vehicle**

motor vehicle as defined in the Road Vehicle Standards Act 2018 not including a vehicle exclusively used on a railway or tramway

2 Types of appliances

The following types of appliances are referred to in this Standard:

- (a) *Type A* — A platform which is required to be raised and lowered under load. The platform is deployed, stored, raised, and lowered by power or gravity, or by a combination of these means.

- (b) *Type B* — A platform which is required to be raised and lowered under load. The platform is deployed and stored manually, and raised and lowered by power or gravity, or by a combination of these means.
- (c) *Type C* — A hoist in which the sling, seat, or harness is deployed and stored either manually or by power, and is raised and lowered by power or gravity, or by a combination of these means.
- (d) *Type D* — A ramp which is deployed and stored by power or gravity, or by a combination of these means.
- (e) *Type E* — A ramp which is deployed and stored manually.

NOTE Type A and Type B appliances include appliances which, during their operation, deploy a platform which moves from an inclined plane to a horizontal plane or to a plane which is parallel with the plane of the floor of the vehicle to which the appliance is attached.

3 General requirements

All hoists and ramps shall meet the following requirements:

- (a) A risk assessment shall be completed in accordance with AS ISO 14971.
- (b) The appliance shall be tested in a fully assembled condition including all the components used to attach the appliance to a vehicle, but the tests shall be carried out with the appliance not attached to a vehicle. The same appliance and components shall undergo all tests.
- (c) Pinch points shall be identified by the following warning label no less than 12 mm high, see [Figure 3](#).

At the completion of all tests the appliance shall operate as intended.



Figure 3 — Signage for pinch points

4 Type A, Type B, Type C and Type D ramps and hoists

4.1 Material, design and construction requirements

All hoists and ramps shall be designed and constructed such that the following requirements are met:

- (a) All controls, for lowering and raising, shall be easily accessible and operable by the operator.
- (b) Those components susceptible to wear and tear, e.g. pins, shafts and connections, shall be accessible for maintenance and replacement.
- (c) All metal parts not made of corrosion-resistant material shall be protected against corrosion.
- (d) Power operated systems necessary for exit from the vehicle shall incorporate a manual override in case of power failure.
- (e) If the hoist assembly and its controls are housed within the vehicle, all housings, switches and connector housings shall conform to IEC 60529 IP code 52. Hoist components permanently mounted outside of the vehicle shall conform to IEC 60529 IP code 54.

4.2 Enclosure integrity

Exposed enclosures for electrical circuitry shall meet the requirements of [Clause G.6.3.8](#).

4.3 Hydraulic equipment

All components that contain working fluid shall have a burst pressure which is not less than three times the normal design maximum working pressure. A pressure relief valve shall be fitted to ensure that three times the maximum working pressure is not exceeded.

4.4 Manually operated folding mechanisms

Manually operated folding mechanisms shall conform to the following:

- (a) Manually deployed appliances shall have a handhold to deploy and store the appliance.
- (b) The force required for any manual folding and unfolding operations shall be not more than 60 N applied at the handhold.

4.5 Control systems

Control systems shall conform with the following:

- (a) Hoist assembly including the control system shall be tested in accordance with [Appendix F](#).
- (b) Audible noise requirements shall be assessed in accordance with AS/NZS ISO 7176.14.
- (c) Power circuits shall be —
 - (i) protected with a rated current overload device (e.g. fuse) in accordance with AS 3856.2; and
 - (ii) fitted with an operator accessible isolation switch, in accordance with [Table 4.1](#).
- (d) EMC testing for radiation immunity and general EMC shall be in accordance with UN R10.
- (e) Power-operated systems shall actuate a braking function when a control device is released.

- (f) The ramp or hoist may be lowered under power or under gravity. If the ramp or hoist is lowered under power, a safety device shall be provided to prevent jacking of the vehicle. All hoists shall have a back-up control system.
- (g) There shall be a mechanical safety device to prevent the platform from falling in an uncontrolled manner in the event of a hydraulic or power actuator failure. The safety device shall hold the platform in its stowed position unless released by means of normal operation of the appliance. The application of this device shall also be applicable to ramps that have dual purposes.
- NOTE An example of dual purpose is where the floor of the vehicle also acts as the access ramp.
- (h) The safety device shall still be effective in its operation if springs or other means are used as part of the safety device to hold it in place experience a failure.
- (i) A platform or ramp shall be capable of being manually deployed and lowered.
- (j) No control function may be overridden by another control function while the first control function is active.
- (k) The control unit shall be located so that —
- (i) the risk of damage to the control unit during operation is minimized;
 - (ii) the risk of damage to the control cable of any pendent control is minimized; and
 - (iii) it is no greater than 1 m from the isolation switch.
- (l) Switches for the control of moving parts of the appliance shall be of the momentary type so that operation requires constant pressure on the switch.
- (m) A risk assessment shall be completed in accordance with AS ISO 14971 for any alternative means for control of moving parts.
- (n) The function selection switch or integrated operating and function switches shall be labelled according to the symbols in [Table 4.1](#).

The control unit should not be operable except when located so that the operator has an unobstructed view of moving parts during operations.

Further requirements on electrical safety are specified in [Appendix G](#).

Markings identifying the control function of each switch shall be clear, durable and indicate the resulting function.

Table 4.1 — Labelling of switches

Designation	Function	Examples of Graphic Symbols
'up' or 'raise'	Raises a platform, ramp, sling, seat, or harness	
'down' or 'lower'	Lowers a platform, ramp, sling, seat, or harness	
'store' or 'fold'	Moves a platform, ramp, sling, seat or harness from an operating position to a stored position	 Store
'deploy' or 'unfold'	Moves a platform, ramp, sling, seat, or harness from a stored position to an operating position	 Deploy

Table 4.1 (continued)

Designation	Function	Examples of Graphic Symbols
Battery isolation	Isolates the battery power supply.	
Stand by switch		
ON/OFF switch	Push ON / Push OFF	
ON/OFF switch	Push and hold (Momentary switch)	

5 Type A and B appliances

5.1 Design and construction requirements

Platforms shall conform to the following:

- (a) The platform surface and outer roll stop surface when lowered shall have a slip-resistant finish. The surface shall be an acceptable surface when tested in accordance with AS 3696.13.
- (b) The platform shall have edge barriers with a height of not less than 75 mm, see [Figure 5](#) which shall be effective when in use to prevent the wheelchair wheels rolling over the barrier.
- (c) The platform shall have an outer roll stop with a height of not less than 75 mm. A locking device shall be included to prevent the roll stop inadvertently lowering while the platform is in a raised position.

NOTE 1 An inner roll stop with a height of not less than 75 mm is recommended (see [Figure 5](#)).

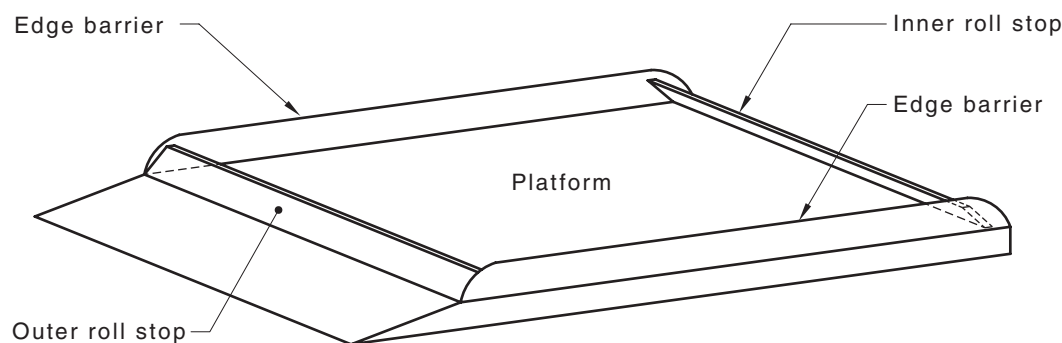


Figure 5 — Typical platform showing edge barriers and inner and outer roll stops

- (d) The platform shall have no protrusions extending from the surface greater than 6 mm, except for the edge barriers, inner roll stops, or outer roll stops.
- (e) The platform shall not have any openings greater than 40mm in width, except for a hand hold for the purpose of manual deployment and storage of the platform. Hand holds shall have an effective clear opening not exceeding 40 mm by 120 mm and be located midway between the edge barriers of the surface of the platform.
- (f) Entryways, including retracted rollstops, shall not have a vertical rise of more than 12 mm (refer to requirements for interface of a platform with the vehicle in AS 3856.2).