Australian Standard®

Earth-moving machinery—Protective structures

Part 1: General

This Australian Standard was prepared by Committee ME/63, Earthmoving Equipment. It was approved on behalf of the Council of Standards Australia on 29 August 1997 and published on 5 December 1997.

The following interests are represented on Committee ME/63:

AUSTROADS

Construction and Mining Equipment Association of Australia

Department of Defence

Department of Mineral Resources N.S.W.

Department of Mines and Energy Qld

Department of Natural Resources and Environment, Vic.

Metal Trades Industry Association of Australia

Queensland Forest Research Institute

Safety Institute of Australia

Sydney Water Corporation

Telstra Corporation

Tractor and Machinery Association of Australia

WorkCover New South Wales

Additional interests participating in preparation of Standard:

Roll-over protective structures manufacturers

Falling-object protective structures manufacturers

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PREFACE

This Standard was prepared by the Standards Australia Committee ME/63, Earthmoving Equipment, as a revision, in part, of AS 2294—1990, *Earth-moving machinery—Protective structures*.

Major changes to AS 2294 include the adoption, as separate parts, of the International Standards ISO 3471:1994, *Earth-moving machinery—Roll-over protective structures—Laboratory tests and performance requirements*; ISO 3449:1992, *Earth-moving machinery—Falling-object protective structures—Laboratory tests and performance requirements*; and ISO 3164:1995, *Earth-moving machinery—Laboratory evaluations of protective structures—Specifications for deflection-limiting volume*. This is in line with the commitment by Standards Australia to adopt International Standards where possible.

Because these International Standards are published separately and are therefore unlikely to be revised simultaneously, it was agreed that AS 2294 would follow suit to facilitate an easier adoption of any future editions of the International Standards.

The AS 2294 series now comprises the following:

AS	
2294	Earth-moving machinery—Protective structures
2294.1	Part 1: General (this Standard)
2294.2	Part 2: Laboratory tests and performance requirements for roll-over protective structures
2294.3	Part 3: Laboratory tests and performance requirements for falling-object protective structures
2294.4	Part 4: Specifications for deflection limiting volume

During its work the Committee considered the use of analytical methods for the design of roll-over protectives as an alternative to physical testing. However, the Committee agreed that such an action would be premature given that no equivalent International Standard dealing with roll-over protective structures currently permits analytical methods as the alternative to physical testing. The Committee will continue to monitor developments in the field of analytical methods and should an equivalent Standard allow such methods in the future, then further consideration to their use in Australia will be given.

The Committee agreed to include the concept of mass equivalency. This is intended to minimize testing costs for owners of agricultural tractors which are to be used for earth-moving applications. These machines have often required dual certification because of minor differences in the test methods, largely due to the different methods of specifying the mass of the machine. Work has shown that for agricultural tractors having a machine mass of up to 15 tonnes, the level of energy to be absorbed by the roll-over protective structure is almost identical to that for an earth-moving machine having a somewhat higher mass. Therefore, a series of multipliers was developed to facilitate equivalency between agricultural tractors and earth-moving machines up to 15 tonnes machine mass.

The Committee also considered the use of a single design for roll-over protective structures. However, given the number of different machine designs, masses and mounting techniques, it was agreed that such an approach would be impractical.

Statements expressed in mandatory terms in notes to tables and figures are deemed to be requirements of this Standard.

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Part 1: General

1 SCOPE This Standard specifies the requirements for roll-over protective structures and falling-object protective structures, additional to those given in AS 2294.2, AS 2294.3 and AS 2294.4.

The Standard is intended to apply to operator controlled earth-moving machinery as given in AS 2294.2 and AS 2294.3 and where the design allows for a seated operator.

While there are certain types of earth-moving machinery to which this Standard is not intended to apply, it may be used to provide guidance to the manufacturers of roll-over or falling-object protective structures should it be decided to fit such protection in a particular application.

NOTE: Roll-over protective structures and falling-object protective structures are structures whose primary purpose is to reduce the possibility of an operator who is wearing a seat belt in accordance with AS 2664, ISO 6683 or SAE J386 from being crushed or otherwise injured should the machine roll over or be struck by a falling object.

2 OBJECTIVE The objective of this Standard is to provide designers, manufacturers, suppliers, employers and users of earth-moving machinery with specifications covering technical means to minimize the risks to health and safety of persons operating earth-moving machinery.

3 APPLICATION This Standard is intended for use by designers and manufacturers of roll-over and falling-object protective structures fitted to earth-moving machinery.

4 REFERENCED DOCUMENTS The following documents are referenced in this Standard:

AS
1636 Tractors—Roll-over protective structures—Criteria and tests
1636.1 Part 1: Conventional tractors
2294 Earth-moving machinery—Protective structures
2294.2 Part 2: Laboratory tests and performance requirements for roll-over protective structures
2294.3 Part 3: Laboratory tests and performance requirements for falling-object protective structures
2294.4 Part 4: Specifications for deflection-limiting volume
2664 Earthmoving machinery—Seat belts and seat belt anchorages
2951 Earthmoving machinery—Nomenclature
2951.1 Part 1: Basic types

ISO
3449 Earth-moving machinery—Falling-object protective structures—Laboratory tests and performance requirements