WITHDRAWN BY
JANUARY 1996
SK BY
AS 1636.1-1996

DR 94382
1636.1 - 1995
FWD 950921

AS 1636—1984
UDC 631.372-78:620.1

1636.2 - 1995
1636.3 - 1995

Australian Standard 1636—1984

AGRICULTURAL WHEELED TRACTORS—ROLL-OVER PROTECTIVE STRUCTURES—CRITERIA AND TESTS

AS 1636
Tractors—Roll-over protective structures—Criteria and tests

AS 1636.1—1996
Conventional tractors
(In Professional Package 47A)
34pp F

Specifies the test procedures and minimum performance criteria for evaluating roll-over protective structures fitted to tractors having a rear track width generally greater than 1150 mm. It applies to driver-controlled tractors, but does not cover earthmoving equipment. It includes test procedures for both static and dynamic testing. A theoretical analysis of roll-over protective structures, which would provide equivalent performance to physical testing, is included.

(ME/65): ***Supersedes AS 1636—1984 which is to be withdrawn: DR 94382: Publication date 1996-01-05.***

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

This Australian standard was prepared by Committee AG/4, Agricultural Tractors and Machinery. It was approved on behalf of the Council of the Standards Association of Australia on 28 February 1984 and published on 11 May 1984.

The following interests are represented on Committee AG/4:

CSIRO, Agricultural Engineering Group

Department of Agriculture, New South Wales

Department of Agriculture, Victoria

Department of Employment and Labour Relations, Queensland

Department of Industrial Relations, New South Wales

Department of Labour and Industry, Victoria

Department of Primary Industries, Queensland

National Farmers Federation

National Safety Council of Australia (Victorian Division)

Queensland Agricultural College

Queensland Cane Growers Council

Safety Institute of Australia (Incorporated)

Tractor and Machinery Association of Australia

This standard was issued in draft form for comment as DR 83103.

AUSTRALIAN STANDARD

AGRICULTURAL WHEELED TRACTORS—ROLL-OVER PROTECTIVE STRUCTURES—CRITERIA AND TESTS

AS 1636—1984

First published 1974
Second edition 1984

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

ISBN 0 7262 3354 4

PREFACE

This edition of this standard was prepared by the Association's Committee of Agricultural Tractors and Machinery to supersede AS 1636—1974, Protective Cabs and Frames for Agricultural Wheeled Tractors. It lays down the performance requirements under specified test methods for roll-over protective structures (ROPS) intended to protect drivers in the event of a tractor overturning.

This edition includes a static test method which complements the dynamic method previously specified. Overseas experience and some testing in Australia has lead the committee to accept that ROPS that comply with the criteria for either method of test will give a similar degree of protection, and that the two different methods can be used interchangeably.

The standard closely follows the requirements of ISO 3463, Agricultural and Forestry Wheeled Tractors—Protective Structures—Dynamic Test Methods and Acceptance Conditions, and ISO 5700, Agricultural and Forestry Wheeled Tractors—Protective Structures—Static Test Method and Acceptance Conditions, but differs in a number of points, most notably in not accepting moment of inertia as a basis for calculations of energy input for the dynamic test.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
AGRICULTURAL WHEELED TRACTORS—ROLL-OVER PROTECTIVE STRUCTURES—CRITERIA AND TESTS

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard sets out test criteria for roll-over protective structures (ROPS) fitted to agricultural wheeled tractors.

It lays down procedures for testing in order to establish—

(a) compliance with the performance requirements of this standard;

(b) whether the ROPS may be expected to protect the driver adequately from being crushed during an overturning accident of a type likely to be encountered during practical work.

1.2 APPLICATION. The standard describes two alternative methods of test, viz a dynamic method and a static method. While there are significant differences in the test procedures, the ROPS which comply with the requirements of either method of test may be expected to give an equal degree of protection to the driver.

The dynamic test may be applied to tractors whose mass exceeds 800 kg but does not exceed 6000 kg. The static test may be applied to tractors whose mass exceeds 800 kg but does not exceed 15 000 kg.

NOTE: Further research is required to obtain the basic data to be used for developing a standard which will include tractors whose mass is outside the specified ranges.

1.3 REFERENCED DOCUMENT. The following standard is referred to in this standard:

AS 1426 Steel Wire Ropes for Winding and Haulage Purposes in Mines.

1.4 GENERAL REQUIREMENTS.

NOTE: Tests made using special rigs are intended to simulate such loads as are imposed on the cab or frame when the tractor overturns rearwards or sideways. These tests, described in Clauses 2.4 and 3.4, enable observations to be made on the strength of the cab or frame and the attaching brackets to the tractor, and are made with the tractor stationary.

1.4.1 ROPS previously tested on different tractor models. For a cab or frame which has fulfilled the conditions required for acceptance as a protective cab or frame designed to be used on other models of tractor, the tests as specified in Clauses 2.4 and 3.4 need not be carried out on each model of tractor provided that the cab or frame and tractor comply with the following:

(a) The combined effect of unballasted mass as defined in Clause 1.4.3 and the wheelbase is such that the energy, height of lift and crushing loads as calculated under Clauses 2.4 and 3.4 do not exceed by more than 5 percent the values calculated for the original test.

(b) The method of attachment and the tractor's components to which the attachment is made are to all practical intents and purposes identical.

(c) Any components such as mudguards and bonnet cowls which may provide support for the cab or frame are to all practical intents and purposes identical.

(d) The positions and initial dimensions of the seat in the protective frame or cab and the position of the protective frame or cab relative to the tractor shall be such that the clearance zone would have remained within the protection of the deflected structure throughout all tests.

(e) The test report or approval document contains a reference to the previous tests.

1.4.2 Measurement tolerances. Measurements shall be made during the tests to the following tolerances:

(a) Linear dimensions measured during test (except (b) below), cab or frame and tractor dimensions, zone of clearance and tyre deflections when lashed for impact tests: ± 3 mm.

(b) Height of pendulum weight set for impact tests: ± 6 mm.

(c) Basic tractor mass: ± 20 kg.

(d) Force applied in horizontal and crushing tests: ± 2 percent.

(e) Deviation from the direction of the applied force during static tests:

(i) At start of test (under zero load): ± 2 degrees.

(ii) During test (under load): + 10 degrees above and − 20 degrees below the horizontal.

NOTE: The test rig should be designed to keep these deviations to the minimum possible.

(f) Angle of mass supporting chains at the point of impact: ± 2 degrees.

1.4.3 Tractor mass.

1.4.3.1 *Basic tractor mass.* The basic tractor mass, m, shall be the mass in kilograms of the tractor with full fuel tanks, coolant and lubricating oil quantities, and complete with cab or frame fitted with cladding but without driver. Not included are optional front or rear weights, tyre ballast, mounted implements, mounted equipment or any specialized components. For a tandem tractor, the mass of the standard version of that part to which the cab or frame is fitted shall be used.

1.4.3.2 *Reference tractor mass.* The reference tractor mass, m_t, is a mass, not less than the basic tractor mass as defined in (a) above, selected by the manufacturer for calculation of the energy inputs to be used in the tests.