

AS/NZS 4968.1:2023



Australian/New Zealand Standard™

Heavy road vehicles — Mechanical coupling between articulated vehicle combinations

Part 1: Design criteria and selection requirements for fifth wheel, kingpin and associated equipment



AS/NZS 4968.1:2023

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- Municipal Works Operations Association
- National Heavy Vehicle Regulator
- New Zealand Heavy Haulage Association
- Queensland University of Technology
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Preface

This Standard was prepared by the joint Standards Australia/Standards New Zealand Committee ME-053, Heavy Road Vehicles, to supersede AS/NZS 4698.1:2003.

The objective of this document is to provide design criteria and dimensions, loads that the installed components have to withstand, and equations to determine the required *D*-value rating of components for various combinations for fifth wheel, kingpin and associated equipment.

This document forms part of the AS/NZS 4968 series on heavy road vehicles. A list of all parts in this series can be found in the Standards Australia online catalogue.

The major changes in this edition are as follows:

- (a) New formula-based requirements for design forces.
- (b) Simplified formula and methods for determining *D*-values.
- (c) Updated and simplified equations.
- (d) Updated and additional worked examples and configurations.

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Introduction

This document correlates the dimensional requirements in International Standards for 50 mm kingpins (ISO 337), 90 mm kingpins (ISO 4086). The rating and selection of kingpins is principally based on the *D*-value method used in Regulation 55 of the Economic Commission for Europe of the United Nations. The process of determining the required *D*-value ratings is outlined in this document.

In applying the *D*-value method, which is specified in kilonewtons to avoid confusion with the towed-load capability of the coupling, a series of equations are used to determine the required rated strength of the fifth wheel assembly. The equations used in this document were obtained from original experimental research conducted by the ARRB National Transport Research Organization. These equations differ from those used in the ISO standards in order to reflect Australian conditions. Whereas the equation for semi-trailers, i.e. for articulated vehicles with one trailer, is the same as in the ISO standards, additional equations have been developed for multiple trailer combinations in accordance with Australian practice.

Australian/New Zealand Standard

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Part 1: Design criteria and selection requirements for fifth wheel, kingpin and associated equipment

1 Scope

This document sets out the attachment design forces for fifth wheel assembly and equations to determine the required *D*-value of components for various combinations.

This document applies to fifth wheel assemblies used with 50 mm, 75 mm and 90 mm kingpins and associated equipment for articulated vehicle combination used in heavy road vehicles, B-doubles and road trains in normal use on both sealed and unsealed roads.

2 Normative references

The following document is referred to in the text in such a way that some or all of its content constitutes requirements of this document.

NOTE Documents referenced for informative purposes are listed in the Bibliography.

AS 2706, *Numerical values—Rounding and interpretation of limiting values*

AS/NZS 4968.3, *Heavy road vehicles—Mechanical coupling between articulated vehicle combinations, Part 3: Kingpins and associated equipment*

3 Terms and definitions

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

3.1 axle

one or more shafts, positioned in a line across a vehicle, on which one or more wheels are intended to support the vehicle to move

3.2

axle group

multiple *axles* ([3.1](#)) grouped together

3.3

B-double

combination consisting of a *prime mover* ([3.16](#)) towing two *semi-trailers* ([3.18](#))

3.4

combination

group of vehicles consisting of a motor vehicle towing one or more other vehicle units

Note 1 to entry: A motor vehicle may include a prime mover or rigid truck.

Note 2 to entry: Other vehicle units may include a semitrailer or trailer.

3.5

converter dolly

trailer with an *axle* ([3.1](#) or *axle group* ([3.2](#))) and a *fifth wheel* ([3.11](#)) coupling that is designed to convert a *semi-trailer* ([3.18](#)) into a *dog trailer* ([3.10](#))

3.6

coupler plate

part of the *fifth wheel* (3.11) which houses the closing jaw system that engages the *kingpin* (3.14) of the vehicle and which provides a turning base or support for the *skid plate* (3.22) of the vehicle

Note 1 to entry: The coupler plate is mounted on feet which permit limited pivoting about the transverse axis, see AS/NZS 4968.2.

3.7

coupling

mechanical device used to couple a towing vehicle in a *combination* (3.5) to a towed vehicle

3.8

critical coupling

maximum D-value (3.17) *coupling* (3.7) for a vehicle *combination* (3.5) with more than one *fifth wheel* (3.11) and *kingpin* (3.14) *coupling* (3.8)

3.9

D-value

value based upon the dynamic longitudinal force experienced by a *coupling* (3.8) for each vehicle combination and load

3.10

dog trailer

full trailer

trailer with an *axle* (3.1) or *axle group* (3.2) at the front that is steered by connection to the towing vehicle by a *drawbar* (3.12) and with an axle or axle group at the rear

Note 1 to entry: For the purposes of this document, a dog trailer also includes a trailer consisting of a semi-trailer and a converter dolly.

3.11

fifth wheel

device fitted to a towing vehicle to permit quick *coupling* (3.7) and uncoupling of a *semi-trailer* (3.18) and to provide articulation for the combination (3.4) and stability and support to the semi-trailer

3.12

fifth wheel assembly

coupling (3.8) including any turntable, mounting plate, sliding assembly, load cell and other equipment mounted between the towing vehicle chassis and the trailer *skid plate* (3.21)

Note 1 to entry: The fifth wheel assembly includes any mechanism that allows adjustment of its longitudinal location but does not include any attachment brackets.

Note 2 to entry: Where a fifth wheel is designed to have a turntable base as an integral part, the term fifth wheel includes that turntable base. It does not include the skid plate and kingpin, which are parts of the semi-trailer, see [Figure 5.1](#).

3.13

gross combination mass

GCM

maximum loaded mass of a vehicle *combination* (3.4)

Note 1 to entry: Gross combination mass is either specified by the manufacturer or by the vehicle registration authority if there is either no specification by the manufacturer or the specification is not appropriate due to vehicle modification.