Correct as at 6th June 2026. It may be superseded at any time.

Extract taken from: Heavy vehicle specialist certification > Vehicle dynamic performance

7 Vehicle dynamic performance

7-1 PSV rollover

Certifier categories: **HVEC** | **HVCD**

Reasons for rejection

1. The structural strength of a passenger service vehicle is insufficient to provide reasonable protection for the occupants in the event of roof or wall deformation resulting from the vehicle rolling over.

2. The body of a passenger service vehicle is not fit for its purpose and securely fixed to the chassis.

3. The superstructure is not of robust design, and made of materials fit for the purpose.

4. The structural strength of the vehicle has deteriorated from:

    a) corrosion, or

    b) other damage, or

    c) modifications.

5. A heavy motor vehicle which entered service as a passenger service vehicle in New Zealand on or after 1 September 1999, or whose structure was modified after that date, does not comply with the version of at least one of the following vehicle standards which was applicable at the time the vehicle entered service as a passenger service vehicle in New Zealand or at the time of the modification:

    a) one of the four options of UN/ECE Regulation No. 66, or

    b) one of the four options of Australian Design Rule 59/00, or

    c) the heavy passenger service vehicle cannot be demonstrated to withstand, without permanent deformation, the simultaneous application of forces as follows:

        i. a force, equivalent to the weight of half the gross vehicle mass, applied horizontally at right angles to the longitudinal centreline of the vehicle at the cant-rail or at the topmost corner of the body, and

        ii. a force, equivalent to the unladen weight of the vehicle, applied vertically downwards at the same cant-rail or corner, and

        iii. the distribution of these forces must be at least approximately proportional to that of the gross vehicle mass along the length of the vehicle.

6. Compliance with the PSV strength requirements, when the vehicle has not been complied to a standard, has not been established by either:

    a) a full-scale test, or

    b) calculation.

7. If compliance with the PSV strength requirements is to be established by a full-scale test on the completed frame on its chassis:

a) the heavy passenger service vehicle was not on a level surface, or

b) if the applied forces would cause the vehicle to tilt, restraint was not applied to the chassis or running gear so that the vehicle remains approximately in its normal upright position.

8. If the body structure is wholly or partly constructed of non-metallic materials, the full-scale test required for the PSV strength requirements has resulted in:

a) a permanent deformation, or

b) a local failure point, or

c) failure of the attachment to the chassis.

9. If compliance with the PSV strength requirements was established by calculation, for a heavy passenger service vehicle with a structure composed wholly or partly of non-metallic materials or metallic materials of unknown yield stress, the calculation was not based on the aggregated strength of the vehicle's ring-frames or body sections.

10. The strength of each ring-frame or body section as required for calculations if not known, was not established by physical testing.

11. The strength rating to be assigned to the ring-frame or body section from the physical testing of a ring-frame or body section is not the load at which the first point of failure occurred.

12. The ring-frame or body section was not tested until the second and third points of failure occurred.

13. The second point of failure to the ring-frame or body section is not within 65% to 85% of the rating given to the ring-frame or body section.

14. The third point of failure to the ring-frame or body section is not within 40% to 60% of the rating given to the ring-frame or body section.

15. A ring-frame or body section that is not identical in profile and construction to one previously tested uses the same rating as the tested ring-frame or body section.

16. If compliance with the PSV strength requirements is established by calculation for a heavy passenger service vehicle with a structure composed wholly of metallic material of known yield stress, the calculation was not carried out by:

a) finite element stress analysis, or

b) the simplified calculation method, or

c) other calculation methods approved by the NZTA for this purpose.

17. If compliance with the PSV strength requirements was established by finite element stress analysis for a heavy passenger service vehicle with a structure composed wholly of metallic material of known yield stress:

a) it did not include at least the whole body-frame structure (including the side-wall-to-floor-frame attachment and the body-frame-to-chassis attachment), or

b) butt-welded and mechanical joints were not separately assessed and justified, if necessary by means of mechanical tests, or

c) any assumption made on the performance of joints or other parts of the structure were not shown to be justified, if necessary, by means of tests, or

d) the calculation did not include an appropriate allowance for deterioration during the expected life of the vehicle, having regard to the material of the structure, the specific manufacturing technology, and the conditions under which the vehicle is likely to be operated.

18. If compliance with the PSV strength requirements was established by the simplified calculation method for a heavy passenger service vehicle with a structure composed wholly of metallic material of known yield stress, the following assumptions were not justified:

a) the horizontal force is equivalent to half the unladen weight, instead of half the gross vehicle mass, or

b) the roof is a rigid structure, or

c) the body is a rigid structure below the waistline, or

d) glazing makes no contribution to the structural strength, or

e) the window pillars are encased at the waistline, or

f) the roof-to-pillar attachment is of a hinged type, or

g) the load, imposed by the horizontal force, is shared by the pillars, and the distribution of load is statically indeterminate, or

h) the load, imposed by the vertical force, is shared by the pillars which are connected to the cant-rail where the force is applied, and the distribution of the load must be proportional to the area of the cross-section of the pillars.

19. If the simplified calculation method is used, the calculation did not include an appropriate allowance for deterioration during the expected life of the vehicle, having regard to the material of the structure, the specific manufacturing technology, and the conditions under which the vehicle is likely to be operated.

20. Compliance with the PSV strength requirements was not certified by a HVEC or HMCD certifier.

21. Any test equipment has not been certified by an organisation accredited by Joint Accreditation System of Australia and New Zealand.

Summary of legislation

Applicable references

- UN/ECE Regulation No. 66
- Australian Design Rule 59/00.

Applicable legislation

- **Land Transport Rule: Passenger Service Vehicles 1999**

Passenger Service Vehicles 1999 (section 7)

Structural strength

1. The structural strength of a passenger service vehicle must be sufficient to provide reasonable protection for the occupants in the event of roof or wall deformation resulting from the vehicle rolling over.

2. The body of a passenger service vehicle must be fit for its purpose and securely fixed to the chassis. The superstructure must be of robust design, and must be made of materials fit for the purpose.

3. The structural strength must be maintained throughout the service life of the passenger service vehicle.

Additional provisions for heavy passenger service vehicles

4. A heavy motor vehicle which entered service as a passenger service vehicle in New Zealand on or after 1 September 1999, or whose structure was modified after that date, must comply with the version of at least one of the following vehicle standards which was applicable at the time the vehicle entered service as a passenger service vehicle in New Zealand or at the time of the modification:

a) one of the four options of UN/ECE Regulation No. 66, or

b) one of the four options of Australian Design Rule 59/00, or

c) the structural strength specifications in requirements 9 to 20 below.

Structural Strength specifications for heavy motor vehicles

5. The heavy passenger service vehicle must be able to withstand, without permanent deformation, the simultaneous application of forces as follows:

a) a force, equivalent to:

i. the weight of half the gross vehicle mass, applied horizontally at right angles to the longitudinal centre line of the vehicle at the cant-rail or at the topmost corner of the body, and

ii. the unladen weight of the vehicle, applied vertically downwards at the same cant-rail or corner, and

b) the distribution of these forces must be at least approximately proportional to that of the gross vehicle mass along the length of the vehicle.

6. Compliance with requirement 6 must be established by either:

a) a full-scale test, or

b) calculation.

7. If compliance with requirement 6 is established by a full-scale test on the completed frame on its chassis:

a) the heavy passenger service vehicle must be on a level surface, and

b) if the applied forces would cause the vehicle to tilt, restraint must be applied to the chassis or running gear so that the vehicle remains approximately in its normal upright position.

8. If the body structure is wholly or partly constructed of non-metallic materials, the full-scale test in requirement 8 must not result in:

a) a permanent deformation, or

b) a local failure point, or

c) failure of the attachment to the chassis.

9. If compliance with requirement 6 is established by calculation, for a heavy passenger service vehicle with a structure composed wholly or partly of non-metallic materials or metallic materials of unknown yield stress, the calculation must be based on the aggregated strength of the vehicle’s ring-frames or body sections.

10. If the strength of each ring-frame or body section as required for calculations under requirement 10 is not known, this must be established by:

a) carrying out physical testing on a ring-frame or body section to establish the load at which the first point of failure occurs, and this is the strength rating to be assigned to the ring-frame or body section,

b) testing further to establish the loads at the second and third points of failure, with the result that the load at the second point of failure must be within 65% to 85% of the rating and the load at the third point of failure must be within 40% to 60% of the rating,

c) repeating the test on any ring-frame or body section that is not identical in profile and construction to one previously tested, until the strength rating of all ring-frames or body sections of the vehicle are known.

11. If compliance with requirement 6 is established by calculation for a heavy passenger service vehicle with a structure composed wholly of metallic material of known yield stress, the calculation must be carried out by:

a) finite element stress analysis, according to requirement 12, or

b) the simplified calculation method, according to requirement 13, or

c) other calculation methods approved by the NZTA for this purpose.

12. If compliance with requirement 6 is established by finite element stress analysis for a heavy passenger service vehicle with a structure composed wholly of metallic material of known yield stress:

a) it must include at least the whole body frame structure (including the side-wall-to-floor-frame attachment and the body-frame-to-chassis attachment), and

b) butt-welded and mechanical joints must be separately assessed and justified, if necessary by means of mechanical tests, and

c) any assumption made on the performance of joints or other parts of the structure must be shown to be justified, if necessary, by means of tests, and

d) the calculation must include an appropriate allowance for deterioration during the expected life of the vehicle, having regard to the material of the structure, the specific manufacturing technology, and the conditions under which the vehicle is likely to be operated.

13. If compliance with requirement 6 is established by the simplified calculation method for a heavy passenger service vehicle with a structure composed wholly of metallic material of known yield stress, the following assumptions must be made:

a) the horizontal force is equivalent to half the unladen weight, instead of the force defined in requirement 8(a)(i),

b) the roof is a rigid structure,

c) the body is a rigid structure below the waistline,

d) glazing makes no contribution to the structural strength,

e) the window pillars are encastre at the waistline,

f) the roof-to-pillar attachment is of a hinged type,

g) the load, imposed by the horizontal force, is shared by the pillars, and the distribution of load is statically indeterminate, it must be calculated on the basis of the flexible deflection of the pillars, and the deflection of each pillar is proportional to its L/IE factor and to the load imposed on it (where L = length of the pillar, I = moment of inertia, E = Young’s modulus),

h) the load, imposed by the vertical force, is shared by the pillars which are connected to the cant-rail where the force is applied, and the distribution of the load must be proportional to the area of the cross-section of the pillars.

14. If the simplified calculation method specified in requirement 14 above is used, the calculation must include an appropriate allowance for deterioration during the expected life of the vehicle, having regard to the material of the structure, the specific manufacturing technology, and the conditions under which the vehicle is likely to be operated.

15. Compliance with the requirement 6 above must be certified by a HVEC or HMCD certifier.

16. Any test equipment must be certified by an organisation accredited by Joint Accreditation System of Australia and New Zealand.

7-2 PSV static rollover

Certifier categories: **HVEC** | **HMCD**

Reasons for rejection

1. A motor vehicle that entered service as a passenger service vehicle in NZ on or after 1 July 2000 with a floor not more than 2m above the ground cannot achieve a sideways tilt of 35 degrees when tested.

2. A motor vehicle that entered service as a passenger service vehicle in NZ on or after 1 July 2000 with a floor not more than 2m above the ground cannot achieve a sideways tilt of 28 degrees when tested (Note 3). During testing the passenger service vehicle:

a) was not loaded with weights representing the occupants mass in accordance with the deemed mass in all seating positions on the upper deck of a double-decked vehicle and in all seating positions on a single decked vehicle, or

b) roof rack, if fitted, was not loaded with the maximum permitted load, or

c) suspension system was not in the uppermost position on a vehicle with a variable suspension system, or

d) tilt platform stop to prevent the lower wheels of the passenger service vehicle from slipping sideways exceeds the height from the tilt platform to the bottom edge of the wheel rim, or

e) lightweight strop fitted between the higher side of the passenger service vehicle and the platform to prevent the vehicle from rolling over has an influence on the test, or

f) stability test and the checking of the accuracy of the test equipment was not carried out under the guidance of a HVEC certifier.

4. The proof of the vehicle meeting the stability angle is not:

a) written documentation from the vehicle manufacturer, or

b) type approval, or

c) calculations, if the CoG can be established within 50mm of the longtitudinal centreline, or

d) practical testing.

5. The documentation for certification is incomplete.

Note 1

The deemed mass of each occupant is:

a) 80kg for adult occupants, and

b) 65kg for secondary school pupils, and

c) 55kg for intermediate school pupils, and

d) 42kg for primary school pupils.

Note 2

The CoG in the chassis rating is valid for the unladen vehicle in the configuration as approved in Japan.

This itself is not sufficient to establish the that the vehicle, which may be modified in NZ prior to registration, would comply with the stability requirements in the PSV Rule.

However, this data can be used, as one of the input data, when the position of the CoG of the modified and laden vehicle is determined, which can the be directly used to establish compliance.

Other input data to such a calculation could and should also include the number and position of passengers, mass and position of any toilet and kitchen facilities and equipment including water sontainment, mass & position of any air conditioning equipment, roof rack capacity and the position of the load on it, and other item that may be relevant.

Note 3

Fitting a roof rack to a PSV is a modification requiring certification by a HVEC and may require recalculation or testing of the vehicle's stability.

Summary of legislation

Applicable references

- UN/ECE Regulation No. 66
- Australian Design Rule 59/00.

Applicable legislation

- **Land Transport Rule: Passenger Service Vehicles 1999**

Passenger Service Vehicles 1999 (section 7)

Stability requirements

1. A motor vehicle which entered service as a passenger service vehicle in New Zealand on or after 1 July 2000 must be stable under the following conditions of static tilt:

a) a vehicle with a floor not more than 2m above the ground, and loaded with the deemed passenger weight (Note 1) in all positions on the upper deck of a double-decked vehicle and in all seating positions on a single-decked vehicle and the maximum weight for the roof rack, must be stable on a surface which is subjected to a sideways tilt of 35 degrees, as demonstrated by one of the following methods:

i. written documentation from the vehicle manufacturer, or

ii. type approval, or

iii. calculations, if the centre of gravity can be established within 50mm of the longitudinal centreline, or

iv. practical testing carried out in accordance with requirement with the following conditions:

b) the passenger service vehicle must be loaded with weights, representing the occupants' mass in accordance with the deemed mass (Note 1) in all seating positions on the upper deck of a double-decked vehicle and in all seating positions on a single-decked vehicle,

c) the roof-rack, if fitted, must also be loaded with the maximum permitted load,

d) a passenger service vehicle with a variable suspension system must be tested with the suspension system in the uppermost position,

e) the tilt platform may be fitted with a stop to prevent the lower wheels of the passenger service vehicle from slipping sideways, however, this stop must not exceed the height of the tyres, from the tilt platform to the bottom edge of the wheel rim,

f) a lightweight strop of sufficient strength may be fitted between the higher side of the passenger service vehicle and the platform to prevent the vehicle from rolling over, and the strop must be fitted in a suitable way while keeping its influence on the test to a minimum,

g) if the centre of gravity of the passenger service vehicle, loaded according to requirement 2, as determined by a certifier, is not within 50mm of the longitudinal centreline, the vehicle must be tested by being tilted to the side of the centre of gravity,

h) the stability test and the checking of the accuracy of the test equipment must be carried out under the guidance of a person authorised by the NZTA, and that person must certify that this specification has been complied with,

i) a vehicle with a floor 2m or more above the ground, and loaded with the deemed passenger weight in all positions on the upper deck of a double-decked vehicle and in all seating positions on a single-decked vehicle and the maximum weight for the roof rack, must be stable on a surface which is subjected to a sideways tilt of 28 degrees, as demonstrated by one of the following methods:

i. written documentation from the vehicle manufacturer, or

ii. type approval, or

iii. calculations, if the centre of gravity can be proven within 50mm, or

iv. practical testing carried out in accordance with the following conditions:

j) the passenger service vehicle must be loaded with weights, representing the occupants' mass in accordance with the deemed mass (Note 1) in all seating positions on the upper deck of a double-decked vehicle and in all seating positions on a single-decked vehicle,

k) the roof-rack, if fitted, must also be loaded with the maximum permitted load,

l) a passenger service vehicle with a variable suspension system must be tested with the suspension system in the uppermost position,

m) the tilt platform may be fitted with a stop to prevent the lower wheels of the passenger service vehicle from slipping sideways, however, this stop must not exceed the height of the tyres, from the tilt platform to the bottom edge of the wheel rim,

n) a lightweight strop of sufficient strength may be fitted between the higher side of the passenger service vehicle and the platform to prevent the vehicle from rolling over, and the strop must be fitted in a suitable way while keeping its influence on the test to a minimum,

o) if the centre of gravity of the passenger service vehicle, loaded according to this requirement, as determined by a certifier, is not within 50mm of the longitudinal centreline, the vehicle must be tested by being tilted to the side of the centre of gravity,

p) the stability test and the checking of the accuracy of the test equipment must be carried out under the guidance of a person authorised by the NZTA, and that person must certify that this specification has been complied with.

7-3 Static roll threshold (SRT)

Certifier categories: **HVS1** | **HVS2** | **HVS3**

Reasons for rejection

1. A class TD vehicle that must comply with SRT and be certified has an assessment below 0.35g (Note 1).

2. The method of calculating the SRT was not:

a) a physical test of the vehicle on a tilt table according to the procedure in SAE J2180 – Dec 1998 or by a procedure approved by International Accreditation New Zealand (IANZ), or

b) a method approved by the Transport Agency and published on the Transport Agency's website.

3. The load height has been incorrectly determined.

4. The load mass has been incorrectly determined.

5. Incorrect information has been input into the SRT calculator.

6. The load configuration used to calculate the centre of gravity of the load was not based on:

a) mixed freight, or

b) uniform density,

c) other loads.

7. For mixed freight 70% of the load mass was not used for the bottom half and 30% of the load mass for the top half of the load space.

8. For uniform density freight the centre of gravity has not been placed midway between the load bed and the load height.

9. The combination of load height and mass is inappropriate for the particular type of deck or body fitted to the vehicle.

10. A motor vehicle with retractable axles has not had the SRT calculated with the retractable axle in the non-retracted position.

11. The deck or body fitted to the vehicle has been changed and the SRT has not been recertified.

12. A semi trailer carrying import/export containers on an overweight permit has not had its SRT calculated in accordance with **Technical bulletin 8** and its amendments.

Note 1

The following vehicles of class NC and class TD do not have to comply with the minimum SRT requirements:

a) a vehicle of class NC that does not have a deck or body on which to carry a load and is fitted with a turntable coupling to tow a semi-trailer

b) a vehicle operating under *section 6*, or with a vehicle axle index above 1.1 and operating under an overweight permit, or both, provided that the operator of the vehicle complies with the conditions of the permit and the applicable requirements in section 6

c) a vehicle that is being used on a road or portion of a road that is designated as a road construction zone under *regulation 12* of the *Heavy Motor Vehicle Regulations 1974*

d) a vehicle that is being used on a road or portion of a road that is a roadworks zone approved by the road controlling authority

e) a vehicle that is not normally used on a road and that a road controlling authority has authorised to cross a road

f) a vehicle that is designed exclusively for transporting earth or other bulk material and that may only be used unladen on a road

g) a vehicle with a tipping body, but only when the tipping body is raised for the purpose of discharging a load at low speed

h) a vehicle recovery service vehicle that is principally designed to tow or transport a heavy motor vehicle;

i) a vehicle first registered before 1 January 1940

k)For the avoidance of doubt, a high-productivity motor vehicle must comply with the minimum SRT requirements, except if the vehicle is a vehicle described in *(g).*

Note 2

X1/Y1 represents the maximum allowable load height (X1) of the vehicle that is used to calculate the maximum safe gross mass (Y1) of the vehicle to meet an SRT of 0.35g.

Y2/X2 represents the maximum allowable gross mass (Y2) of the vehicle when loaded that is used to calculate the maximum safe load height (X2) of the vehicle to meet an SRT of 0.35g.

The procedure is fully explained in Summary of legislation 6 to 10.

Note 3

Level 1 assessment (HVS1):

Level 1 assessment is the most basic and requires minimal data, the computer programme relies on a number of generic default values for assessing the vehicle's performance. It also makes assumptions about the centre of gravity of the load, by offering two typical load scenarios, mixed freight or uniform density load. The use of Level 1 is not permitted when calculating SRT for overweight permits

Level 1 assessment caters for the following type situations:

a) full trailers (including pole trailers) with stanchions or relatively flat decks, or

b) semi-trailers: (flat decks, step-decks such as in low loaders or B-trains), or

c) simple trailers with relatively flat decks when:

i. carrying a load of uniform density (the centre of gravity is halfway up the load), or

ii. carrying a load of mixed freight (the centre of gravity is equivalent to 40% of the load height taken from the base of the load).

Note 4

Level 2 assessment (HVS2):

Level 2 assessment requires more detailed data about the vehicle's mechanical characteristics such as the actual stiffness values of the suspension and load characteristics.

This level also caters for scenarios where the load's centre of gravity cannot easily be assumed. Typical examples include irregular or complex shaped hoppers, body shapes of irregular cross section, non-uniform loads such as construction machinery and equipment.***** With these cases a Level 2 SRT Certifying Engineer must assess the vehicle.

A Level 2 assessment must be the basis for SRT certification when an operator is applying for an overweight permit to carry import/export containers as explained in **Technical bulletin 8** and its amendments.

***** Alternatively, the SRT mass and height limits for construction machinery and equipment carried on one of the level 1 trailers (as above) may be considered by level 1 assessment and taken to be the same as for a uniform density load, however this alternative is conservative with regard to mass and height limits.

Note 5

Level 3 assessment (HVS3):

Level 3 assessment is a practical assessment of the static roll performance and requires the test to be carried out to the requirements of SAE J2180 – Dec 1998 of the American Society of Automotive Engineers using a full size tilt table.

This level of certification is valid for all SRT requirements.

Note 6

The Transport Agency-approved SRT Certifier or SRT Vehicle Inspector will assess the vehicle's rollover performance at the maximum legal mass limits and maximum allowable load heights. The mass limits will be assessed at maximum potential axle set limits or a lower limit controlled by trailer/truck mass ratio if applicable.

If the operator carries overweight loads under the overweight permits, they may elect to increase the mass limit to a vehicle axle index (VAI) of 1.1. Unless the vehicle has a body that restricts the load height, the assessment will be undertaken at 4.3m. If the trailer at maximum potential load mass and height meets or exceeds the 0.35g SRT requirement, then an SRT certificate can be issued. The Certificate of Loading will be endorsed with these values. Alternative certification scenarios are covered in **Technical bulletin 8** and its amendments.

Note 7

If the trailer at maximum potential load mass and height meets or exceeds the 0.35g SRT requirement, then an SRT certificate can be issued. The Certificate of Loading will be endorsed with the maximum load and height values.

Note 8

SRT requirements for HPMV vehicles and vehicles operating on 'O' permits and carrying import and export containers are covered in **Technical bulletin 7**, **Technical bulletin 8**, **Technical bulletin 10**

Summary of legislation

Applicable references

- SAE J2180 – Dec 1998 of the American Society of Automotive Engineers.

Applicable legislation

- **Land Transport Rule: Vehicle Dimensions and Mass 2016**

Vehicle Dimension and Mass (section 3)

Section 3

Static Roll Threshold (SRT) performance requirements

Scope of this section

This section sets out Static Roll Threshold (SRT) performance requirements for heavy motor vehicles. These requirements are intended to ensure the stability of heavy motor vehicles when negotiating corners within posted advisory speeds, and when undertaking evasive manoeuvres to avoid a collision .

Minimum SRT values

1. Unless exempt (Note 1) a vehicle of class NC or class TD, whether laden or unladen, must comply with an SRT of at least 0.35g.

3.3 Compliance with SRT

2. A vehicle of class TD, other than an exempt vehicle (Note 1), that is first registered on or after 1 July 2002 and is required to comply with the SRT specified in *1*, must be certified for SRT in accordance with 7 to 9 if it has a body height or load height above the ground that exceeds 2.8m.

3. A vehicle of class NC, other than an exempt vehicle, must:

a) comply with the SRT specified in *1*, and

b) if checked for compliance with SRT, have the SRT determined by one of the methods specified in *7*.

Methods for determining SRT

4. SRT must be determined by one of the following methods:

a) a physical test of the vehicle on a tilt table according to the procedure in the *SAEJ2180-DEC 1998 of The American Societyof Automotive Engineers* and carried out using a procedure approved by International Accreditation New Zealand, or

b) a calculation using the "SRT Calculator" computer program approved by the Transport Agency, or

c) a method approved by the Transport Agency and published on the Transport Agency's website .

Determining the appropriate loading of a vehicle

5. The following procedures must be applied to determine the appropriate vehicle loading:

a) for mixed freight loads and uniform density loads:

i. if the vehicle is loaded to the maximum internal body height or to the maximum height specified in *schedule 4* of the **Vehicle Dimension and Mass Rule**, the maximum allowable gross mass must be determined

ii. if the vehicle is loaded to the maximum allowable gross mass specified in *schedule 4* of the **Vehicle Dimension and Mass Rule**, the maximum allowable load height must be determined

b) for all other loads, for a particular height above ground level of the centre of gravity of the load, the maximum allowable gross mass of the vehicle and its load must be determined.

6. The combination of load height and load mass in *6* applies for a particular standard type of loading that must be appropriate for the particular type of deck or body with which a heavy motor vehicle is fitted, and must be one of the following types of load:

a) mixed freight, where 70% of the load mass is in the bottom half of the load space and 30% of the load mass is in the top half of the load space

b) uniform density, where the load is uniformly distributed between the load bed and the top of the load so that the centre of gravity of the load lies midway between the load bed and the load height

c) "other loads", where the height above ground of the centre of gravity of the load is entered in the calculation.

7. If the deck or body fitted on a heavy motor vehicle is changed to allow a different type of load to be carried, the SRT must be determined, and the vehicle recertified, for the new loading.

8. A motor vehicle with a retractable axle or axles must be assessed under the procedures in *3.16(4)* of the **Vehicle Dimension and Mass Rule** with its axles in a non retracted position.

9. For a load of logs, the maximum allowable load height shall be determined by the following method:

a) measuring the height above ground of the highest point of the load, and

b) if the height in *(a)* does not comply with the SRT, then measuring the height above ground of the highest point at each end of the highest packet and calculating an average of the two measurements, and

c) if the height in *(a)* or *(b)* does not comply with the SRT, and the load comprises multiple packets and the highest points of all of the packets differ in height by no more than 1m, measuring the average height of each packet by the method described in *(b)* and calculating an average height of all packets.

Certifying results of SRT test

10. SRT test results must be:

a) verified for compliance with loading and mass specifications by a vehicle inspector or an inspecting organisation, and

b) specified in a document of compliance that complies with a form approved by the Transport Agency.

11. SRT test results must be displayed on a vehicle's certificate of loading with the options for load height and gross mass specified on the certificate as follows:

'SRT 0.35g X1/Y1, Y2/X2

where:

X1 = maximum allowable load height above ground in metres to two decimal places

Y1 = maximum safe gross mass to nearest tonne to meet SRT of 0.35 g

Y2 = maximum allowable gross mass to nearest tonne

X2 = maximum safe load height above ground in metres to two decimal places to meet SRT of 0.35g' (Note 2)

Page amended **1 February 2017** (see **amendment details**).

7-4 Swept path

Certifier categories: **HVP1** | **HVP2**

Background

The Land Transport Rule Vehicle Dimensions and Mass 2016 (the Rule) specifies requirements for dimensions and mass limits for vehicles operating on New Zealand roads. The Rule sets in place a regulatory regime so that vehicles are operated safely.

The Rule includes requirements for overdimension vehicles including travel restrictions and piloting to manage the risk to public safety. The Rule also recognises that with appropriate design an overdimension vehicle can be configured to perform cornering manoeuvres and use no greater road space than a maximum size standard vehicle. Therefore the Rule provides for the road space requirements (swept path) of overdimension vehicles to be assessed and if appropriate be exempt from certain specific requirements in the Rule.

While not generally overdimension vehicles, the Rule also contains an exemption for certain classes of buses in respect of determining over-length or forward distance limits based on swept path performance measures.

The assessments for swept path compliance are to be carried out by a heavy vehicle specialist certifier by using a method approved by NZTA published on the NZTA website.

The following lists the provisions of the Rule which provide swept-path based exceptions and the performance measures applying to each provision.

Exception	Performance measure
Section 3.5(1) A bicycle rack fitted to the front of a bus of Class MD3, MD4 or ME is not included in determining the overall length or forward-distance. Specialist certification is not required when a vehicle of class MD3, MD4, or ME is fitted with a bicycle rack which has dimensions within the criteria specified in **Land Transport Rule: Vehicle Dimensions and Mass 2016 (Bicycle Racks on Urban Buses) Class Exemption Notice 2022**	1. Swept width must not exceed 7.0m 2. Frontal swing must not exceed 1.5m 3. Steady state low speed swept width must not exceed 5.25m
Section 6.9(1) A Category 2 overdimension motor vehicle may be operated in accordance with the operating requirements for a Category 1 overdimension motor vehicle, provided any load or equipment carried by or attached to the vehicle does not exceed the maximum dimensions specified by the vehicle inspector or inspecting organisation.	Not exceed 4.7m through a 90-degree turn inside a 50m radius wall at up to 5km/h
Section 6.28(1) A Category 1 or Category 2 overdimension vehicle does not have to comply with travel time requirements in sections 6.21(2), 6.22(2), or 6.22(3) of the Rule provided that the vehicle or any load or equipment it carries does not project outside the land in which it is traveling. Note: Ground spreader trucks operated without a trailer or towing a trailer not exceeding 2.55m in width and agricultural vehicles are also exempt the time travel requirements.	1. Swept width must not exceed 7.0m 2. Tail swing must not exceed 0.3m 3. Frontal swing must not exceed 0.75m 4. Steady state low speed swept width must not exceed 5.25m
Section 6.33(3) A motor vehicle whose dimensions are within Category 1 and whose width does not exceed 3.1m does not have to be escorted by a class 2 pilot vehicle. Note there are limitations to this exemptions set out in section 6.33(2) of the Rule.	1. Swept width must not exceed 7.0m 2. Tail swing must not exceed 0.3m 3. Frontal swing must not exceed 0.75m 4. Steady state low speed swept width must not exceed 5.25m

Exception	Performance measure
Section 6.34(4) An overdimension vehicle within Category 2 may be escorted by at least one class 2 pilot vehicle. (By contrast if the performance requirement is not met, at least one class 1 pilot vehicle and one class 2 pilot vehicle are required).	Not exceed 4.7m through a 90-degree turn inside a 50m radius wall at up to 5km/h

Certificates of compliance for swept path performance

- **Bicycle rack fitted to the front of a bus of class MD3, MD4 or ME is not included in determining the overall length or forward distance**
- **Giving a Category 2 overdimension vehicle the right to operate in accordance with Category 1 overdimension operating requirements**
- **Providing exemption from the travel time restrictions for an overdimension vehicle**
- **Providing exemption for an overdimension vehicle within category 2 from the requirement to have at least one Class 1 pilot vehicle and one Class 2 pilot vehicle**
- **Providing exemption from class 2 pilot vehicle escort**

Page amended **7 October 2022** (see **amendment details**).

7-5 Dynamic performance

Certifier category: **HVP2**

Reasons for rejection

1. A high productivity vehicle that is not a pro forma vehicle is not certified to the requirements of the Rule.

2. A pro forma vehicle has not been approved as a high productivity vehicle.

3. A high productivity vehicle has been certified by a HVS certifier with the incorrect category.

4. A high productivity vehicle has not been certified using the appropriate methodology (PBS or approved alternative) (Note 1).

5. A vehicle certified as a pro forma high productivity heavy vehicle does not have general access to the road network over 44 tonne.

6. A vehicle certified as a high productivity heavy vehicle but is not a pro forma or PBS vehicle has general access to the road network.

7. A vehicle certified as a high productivity does not have the equivalent safety performance as a standard motor vehicle for the proposed roads to be used under the permit.

8. A vehicle certified as a high productivity vehicle does not meet the applicable axle and axle set requirements and the gross mass limits in parts 3 and 4 of *Schedule 3*.

9. the towing vehicle in a combination certified as a high productivity vehicle does not have at least two motor driven axles in a tandem or tri axle set when operating above 39 tonne.

10. A semi-trailer certified as a high productivity vehicle that is not in a B-train does not have a tri-axle or quad-axle set with no more than one steering axle when operating above 44 tonne.

11. A semi-trailer certified as a high productivity vehicle that is in a B-train and does not have either a tandem or tri-axle set when operating above 44 tonne when operating above 44 tonne.

12. A full trailer that is certified as part of a high productivity combination does not have either two tandem axle sets or one tandem axle set and one tri-axle set.

13. A vehicle operating as a high-productivity motor vehicle has a gross mass which exceeds the gross vehicle mass, gross combination mass, maximum towed mass, or brake code mass if any of these limits apply to the vehicle.

14. A vehicle certified as a high productivity vehicle has been certified with a gross mass, axle mass, or dimension requirements less than that specified in the permit or the applicable requirements in the Rule.

15. A vehicle being operated as part of a combination vehicle on a 50Max permit does not have sufficient axles to ensure the dedicated combination it operates in has a minimum of 9 axles.

16. A vehicle operating as a high productivity vehicle operates outside the width or height dimension limits and does not have an exemption.

17. A vehicle operating as a high-productivity motor vehicle does not comply with the requirements of the Rule.

Note 1

For further information:

- **Vehicle dimension and mass permitting manual** (NZTA website)
- **HPMV permit questions and answers** (NZTA website)

Table 7-5-1. Dimension requirements[1] for vehicles and vehicle combinations

Dimension	Distance (metres except where indicated otherwise)
Width[2]	
Two-wheeled vehicles of classes AA, AB, LA, and LC	1.1
All other vehicles	2.55, or 1.275 from each side of the longitudinal centre-line of the vehicle
Overall length (excluding collapsible mirrors)	
Towing vehicle, full trailer, pole trailer (excluding load)	11.5
Simple trailer	12.5
Rigid vehicle (not towing)	12.6
Rigid bus with three axles where the rearmost axle is a single-tyred steering axle that is: (a) either positively and continuously linked to the front steer axle (except may be locked for reverse or high-speed operations), or (b) automatically locked at a speed of 30km/h in the straight-ahead position or for reverse operations	13.5
Articulated bus	18
Towing vehicle and semi-trailer with: • a quad-axle set with two steering axles (and first registered before 1/2/17) • any other axle set	 18 19
Towing vehicle and full trailer: • excluding load • including load if load overhanging the rear of the trailer does not exceed 2.3m in width, or 1.15m from the longitudinal centre-line of the vehicle	 20 22

Dimension	Distance (metres except where indicated otherwise)
Towing vehicle and simple trailer	22
Any other combination of vehicles	20
Height[3]	
All vehicles	4.3
Forward distance (excluding collapsible mirrors)	
Rigid vehicle	8.5 if fitted with tow coupling; 9.5 otherwise
Full trailer, simple trailer, pole trailer with drawbar at full extension, articulated bus (both front and rear sections)	8.5
Semi-trailer	9.2
Rear overhang	
Heavy rigid vehicle whose rearmost axle is a non-steering axle	4.0 or 70% of wheelbase (whichever is less)
Heavy rigid vehicle whose rearmost axle is a steering axle	4.25 or 70% of wheelbase (whichever is less)
Rigid bus that exceeds 12.6m in overall length	4.5 or 72% of wheelbase (whichever is less)
Articulated bus, heavy simple trailer, heavy pole trailer with one axle set	4.0 or 50% of forward distance (whichever is less)
Heavy semi-trailer other than a Class TC caravan trailer	4.3 or 50% of forward distance (whichever is less)
Heavy full trailer, heavy pole trailer with two axle sets	4.0 or 50% of wheelbase (whichever is less)
Class TC caravan trailer that is a semi-trailer	4.0 or 65% of forward distance (whichever is less)
All other vehicles	4.0
Minimum ground clearance[4]	

Dimension	Distance (metres except where indicated otherwise)
Heavy motor vehicle	The greater of 100mm or 6% of the distance from the nearest axle to the point where the ground clearance is measured (except when vehicle is loading or unloading)
Light motor vehicle	No requirement
Front overhang	
Semi-trailer	2.04 radius arc ahead of kingpin centre
Simple trailer	2.04 radius arc ahead of tow coupling centre
Full trailer	2.04 radius arc ahead of turntable centre
Pole trailer	2.04 radius arc ahead of turntable centre on towing vehicle
Agricultural motor vehicle	4.0
All other vehicles	3.0
Rear trailing unit distance	
A-train, B-train, towing vehicle and two trailers	14.5
Articulated vehicle point of attachment (excluding articulated buses)	No further rearward than the rearmost axle of the towing vehicle or rearmost axle of the leading trailer, and if the towing vehicle is a rigid vehicle and has more than one axle in its rear set, not more than 300 mm rearward of the rear axis of the towing vehicle
Tow coupling position[5] (for towing heavy trailer)	
Full trailer	45% of wheelbase of towing vehicle
Simple trailer	At least 700 mm rearward of the rear axis of the towing vehicle and not more than a distance equal to 50% of wheelbase

Dimension	Distance (metres except where indicated otherwise)
Articulated bus	45% of wheelbase of the leading unit
Coupling point distance[6]	
A-train	30% of forward distance of semi-trailer
Inter-vehicle spacing (between any two consecutive vehicles in a combination, except for a laden pole trailer)[7]	4.0
Outside turning circle in either direction for 360-degree turn[8]	25.0 diameter (kerb to kerb, excluding collapsible mirrors)

Notes:

1 Unless otherwise stated, the dimensions in Table 7-5-1 are maximum dimensions.

2 For items not included in determining whether a vehicle complies with width restriction, see section 3.4 *(***Land Transport Rule: Vehicle Dimensions and Mass 2016**).

3 For items not included in determining whether a vehicle complies with height restrictions, see section 3.6 *(***Land Transport Rule: Vehicle Dimensions and Mass 2016**).

4 Ground clearance for a heavy motor vehicle does not include flexible mudflaps, wheels, tyres or devices designed to discharge static electricity.

5 The tow coupling position is the distance rearward from the motor vehicle's rear axis to the centre of the tow coupling.

6 The coupling point distance (for an A-train) is the distance between the rear axis of the semi-trailer and the tow coupling centre of the full trailer.

7 For other requirements relating to the inter-vehicle spacing between a towing vehicle and a full trailer, see section 3.14(1) *(***Land Transport Rule: Vehicle Dimensions and Mass 2016**).

8 Includes all attachments to vehicles except collapsible mirrors. For requirements relating to turning circle, see section 3.7(1) and 3.7(2) *(***Land Transport Rule: Vehicle Dimensions and Mass 2016**).

Summary of legislation

High productivity vehicles (PBS or Pro-forma) may only be certified by a certifier with this category or by application to the Transport Agency. The Transport Agency reserves the right to set conditions.

Applicable legislation

- **Land Transport Rule: Vehicle Dimensions and Mass 2016**

Page amended **1 February 2017** (see **amendment details**).