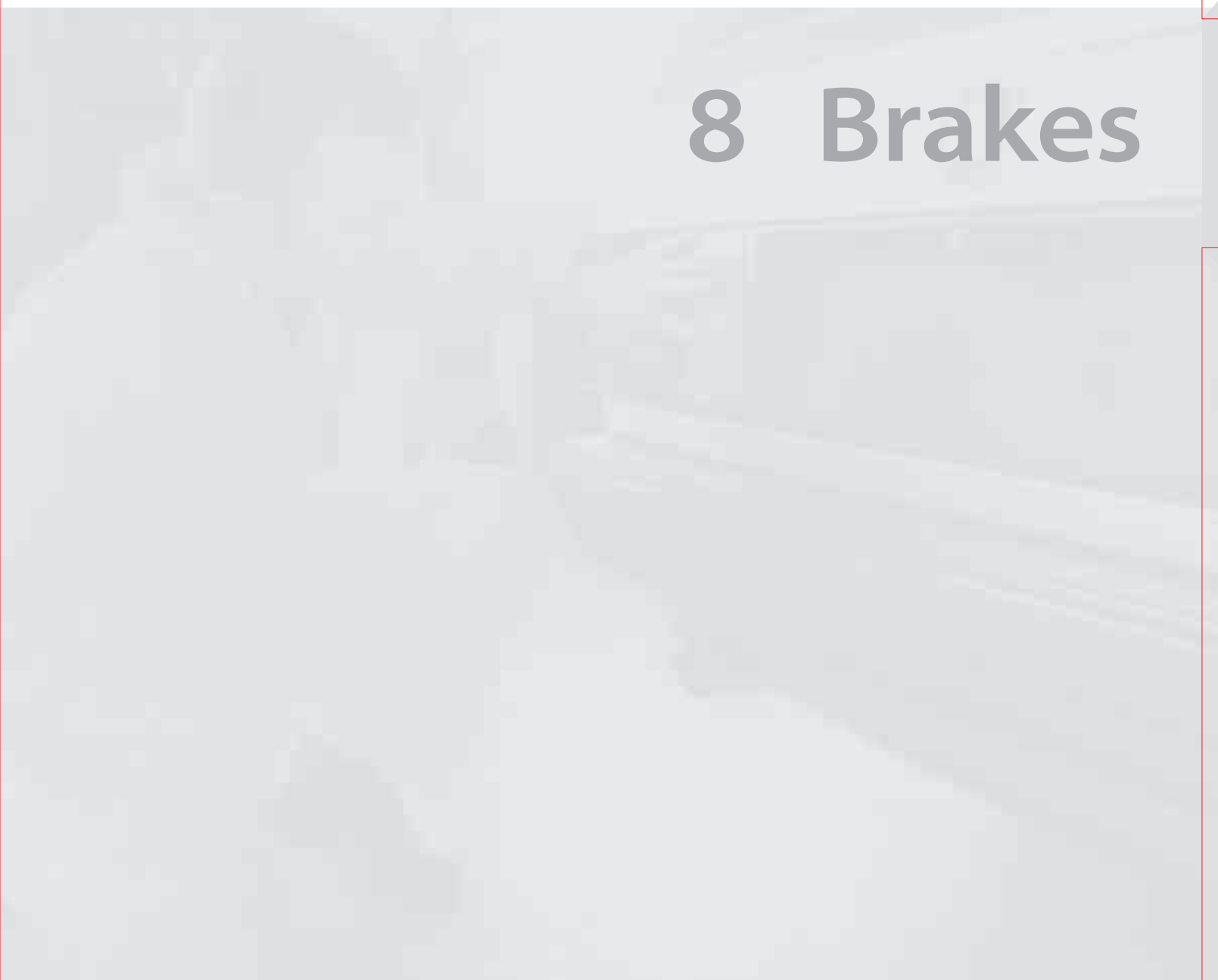


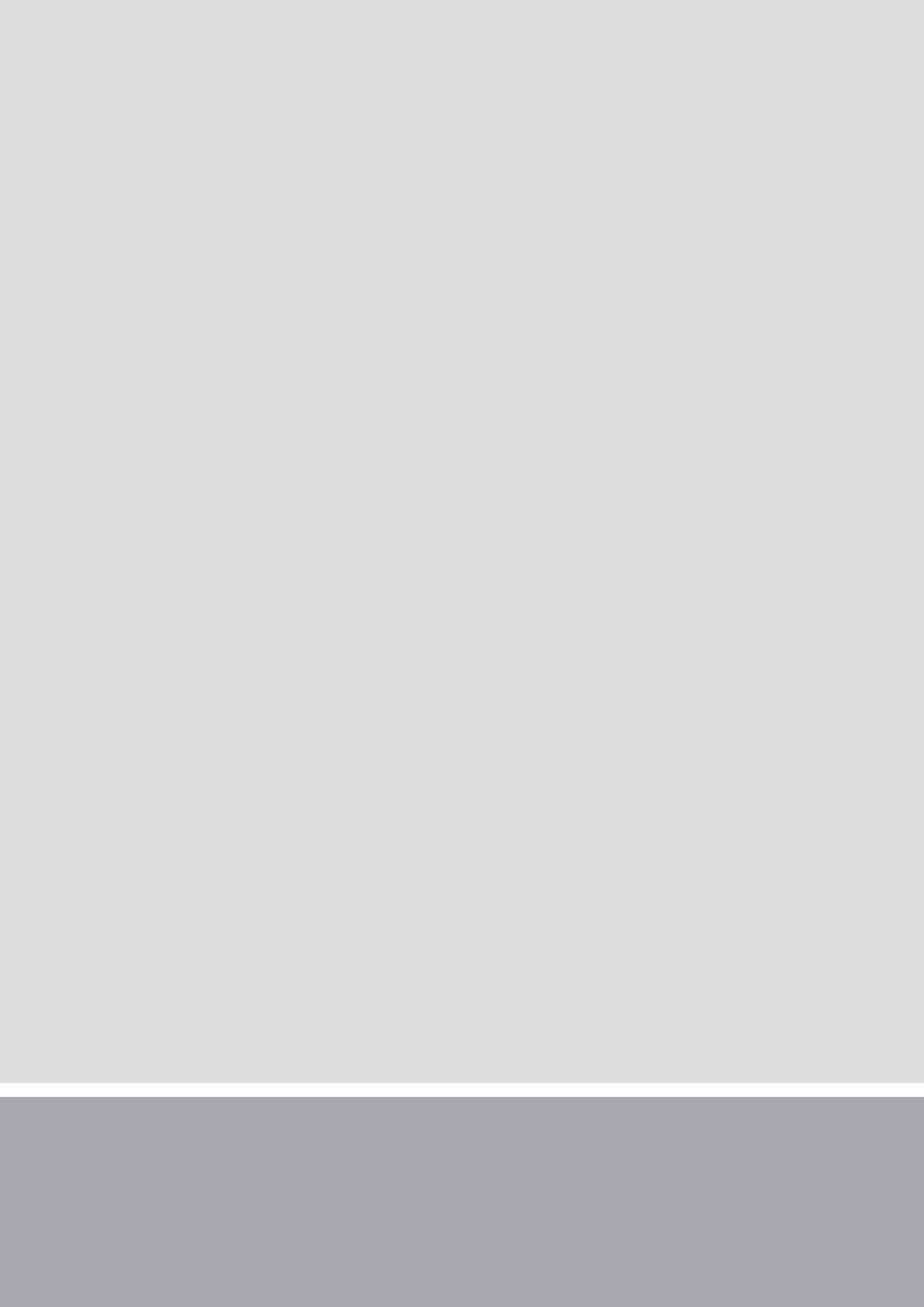
8 Brakes



Brakes

8-1 Service brake and park brake

8-2 Inspection specifications



Summary of legislation

Applicable legislation

- Land Transport Rule: Light Vehicle Brakes 2002

Mandatory equipment

1. Vehicles must comply with the requirements relating to mandatory equipment set out in the *VIRM: In-service certification*, section 8-1.

Compliance with approved standards

2. The brakes on the following vehicles must comply with one or more of the approved brake standards in Table 8-1-1:
 - a) vehicles of group L, and class MD1 and MD2 manufactured on or after 1 October 2002
 - b) vehicles of class MA manufactured on or after 1 January 1992
 - c) vehicles of class MB, MC and NA manufactured on or after 1 January 1996.

Condition, performance and modification

3. Brakes must be easily adjustable to compensate for wear and must be maintained in good condition and efficient working order.
4. Brake friction surfaces must be within safe tolerance of their state when manufactured and must not be scored, damaged or weakened to the extent that the safety performance of the brake is adversely affected.
5. The ovality and diameter of brake drums must be within the service limits set by the vehicle or brake manufacturer.
6. The runout and thickness of brake discs must be within the service limits set by the vehicle or brake manufacturer. If the thickness limit is not known for a particular disc, the thickness must not be less than 90% of the original thickness.
7. Vehicles and brakes must also comply with the requirements relating to condition, performance and modification set out in the *VIRM: In-service certification*, section 8-1.

Reasons for rejection

Mandatory equipment

1. A vehicle does not comply with a requirement relating to mandatory equipment set out in the *VIRM: In-service certification*, section 8-1.

Note 1 Where required, a TSD agent must obtain a declaration from a recognised technician, stating that the anti-lock braking system is within safe tolerance of the manufacturer's specifications. See Technical bulletin 22 for further information on SRS/ABS declarations.

Compliance with approved standards

2. A brake that is required to comply with an approved brake standard did not comply, or cannot be demonstrated to have complied, with at least one of the standards listed in Table 8-1-1 at the time the vehicle was manufactured.
3. A brake has brake friction material that is:
 - a) not identifiable by markings of the vehicle manufacturer or a recognised brake friction material manufacturer listed in Table 8-2-2, or
 - b) not supplied by a recognised supplier and accompanied by a statement of compliance from that supplier.

Condition, performance and modification

4. Brake fluid in the master cylinder reservoir, or at remote locations, shows signs of dirt or contamination.
5. Brake friction material is:
 - a) worn below manufacturer's specifications, or
 - b) is separating from the brake pad backing plate or brake shoe, or
 - c) is cracked or otherwise damaged, or
 - d) is contaminated by brake fluid, oil or grease.
6. A brake drum:
 - a) has an ovality or a diameter that is outside the service limits set by the vehicle or brake manufacturer, or
 - b) is fractured, scored or otherwise damaged.

7. A brake disc:
 - a) has runout or a thickness that is outside the service limits set by the vehicle or brake manufacturer, or
 - b) has a thickness of less than 90% of the original thickness if the service limits for runout or thickness are not known, or
 - c) is fractured, scored or otherwise damaged.
8. A vehicle or brake does not comply with a requirement relating to condition, performance or modification set out in the *VIRM: In-service certification*, section 8-1.

Table 8-1-1. Approved brake standards*

UN-ECE Regulation no	EEC / EC Directive	FMVSS	ADR	Japan
13, 13-H 78	71/320 74/132 75/524 79/489 85/647 88/194 91/422 98/12 2002/78 93/14	105 122 135	31 33 35	Technical standard for passenger motor vehicle braking systems; or Technical standard for two-wheeled vehicle brake systems

* A brake that is required to comply with an approved brake standard must comply with at least one of the standards listed in the table.

Summary of legislation

Applicable legislation

- Land Transport Rule: Heavy-vehicle Brakes 2006

Mandatory equipment

- Vehicles must comply with the requirements relating to mandatory equipment set out in the *VIRM: In-service certification*, section 8-1.
- The brakes on class MD3, MD4, ME, NB and NC vehicles must comply with the requirements in Table 8-1-2.

Condition, performance and modification

- Brakes must be easily adjustable to compensate for wear and must be maintained in good condition and efficient working order.
- Vehicles and brakes must also comply with the requirements relating to condition, performance and modification set out in the *VIRM: In-service certification*, section 8-1.

Reasons for rejection

Mandatory equipment

- A vehicle does not comply with a requirement relating to mandatory equipment set in the *VIRM: In-service certification*, section 8-1.
- A vehicle in Table 8-1-2 does not have proof of compliance with requirements in that table.

Condition, performance and modification

- A vehicle or brake does not comply with a requirement relating to condition, performance or modification set out in the *VIRM: In-service certification*, section 8-1.

Note 1 Where required, a TSD agent must obtain a declaration from a recognised technician, stating that the anti-lock braking system is within safe tolerance of the manufacturer's specifications. See Technical bulletin 22 for further information on SRS/ABS declarations.

Table 8-1-2. Heavy vehicle brakes: compliance requirements for class MD3, MD4, ME, NB and NC vehicles²

Conditions applying	Requirements
Imported, and <ul style="list-style-type: none"> first registered in NZ 1/3/2007–30/6/2008, and operated in a combination with a GM³ >39≤44 t 	<ul style="list-style-type: none"> HVBS(2) Heavy vehicle braking specification of 6 December 1998, or HVBC(2) Heavy vehicle brake code, second edition or HVBNZ New Zealand heavy vehicle brake specification, or At least one approved standard in Table 8-1-3
Manufactured in NZ, and <ul style="list-style-type: none"> first registered in NZ 1/3/2007–30/6/2008, and operated in a combination with a GM³ >39≤44 t 	<ul style="list-style-type: none"> HVBS(2) Heavy vehicle braking specification of 6 December 1998, or HVBC(2) Heavy vehicle brake code, second edition or HVBNZ New Zealand heavy vehicle brake specification
Imported ⁴ first registered in NZ on or after 1/7/2008	<ul style="list-style-type: none"> At least one approved standard in Table 8-1-3
Manufactured in NZ, and <ul style="list-style-type: none"> first registered on or after 1/7/2008, and with a towing connection for towing a heavy trailer 	<ul style="list-style-type: none"> HVBNZ, New Zealand heavy vehicle brake specification
Manufactured in NZ and <ul style="list-style-type: none"> first registered on or after 1/7/2008, and with no towing connection for towing a heavy trailer. 	<ul style="list-style-type: none"> HVBNZ New Zealand heavy vehicle brake specification, or stopping tests in 6.1(2)(b) of HV Brake Rule

Note 2 Not applicable to mobile cranes except those constructed using a commercial truck chassis.

Note 3 GM means gross mass.

Note 4 **Imported** in this case includes heavy PSVs that are manufactured in New Zealand from imported transport frame/chassis which comply with an approved brake standard in **Table 8-1-3**.

Table 8-1-3. Approved brake standards for class MD3, MD4, ME, NB and NC vehicles*

UN-ECE Regulation no	EEC / EC Directive	FMVSS	ADR	Japan
13	71/320	105 (Hydraulic and electric brake systems); or 121 (Air brake systems)	35	Technical Standard for Brake Systems of Trucks and Buses (Japan); or Technical Standard for Anti-Lock Brake System (Japan)

* A brake that is required to comply with an approved brake standard must comply with at least one of the standards listed in the table.

Note 5 Technical bulletin 31 clarifies brake standards requirements for class MD3, MD4, ME, NB and NC vehicles.

Summary of legislation

Applicable legislation

- Land Transport Rule: Heavy-vehicle Brakes 2006

Mandatory equipment

- Vehicles must comply with the requirements relating to mandatory equipment set out in the *VIRM: In-service certification*, section 8-1.
- The brakes on class TC and TD vehicles must comply with requirements in Table 8-1-4.

Condition, performance and modification

- Brakes must be easily adjustable to compensate for wear and must be maintained in good condition and efficient working order.
- Vehicles and brakes must also comply with the requirements relating to condition, performance and modification set out in the *VIRM: In-service certification*, section 8-1.

Reasons for rejection

Mandatory equipment

- A vehicle does not comply with a requirement relating to mandatory equipment set out in the *VIRM: In-service certification*, section 8-1.
- A vehicle in Table 8-1-4 has not been certified as required by that table.

Condition, performance and modification

- A vehicle or brake does not comply with a requirement relating to condition, performance or modification set out in the *VIRM: In-service certification*, section 8-1.

Table 8-1-4. Heavy vehicle brakes: compliance requirements for class TC and TD vehicles

Conditions applying	Requirements
<ul style="list-style-type: none"> Operated in a combination with a GM¹ >39≤44 t, and first registered in NZ 1/3/2007–30/6/2008, and 	<ul style="list-style-type: none"> Breakaway brake, and HVBS(2) Heavy vehicle braking specification of 6 December 1998, or HVBC(2) Heavy vehicle brake code, second edition or HVBNZ New Zealand heavy vehicle brake specification
<ul style="list-style-type: none"> First registered on or after 1/7/2008 	<ul style="list-style-type: none"> Breakaway brake, and HVBNZ New Zealand heavy vehicle brake specification

Note 1 GM means gross mass.

Note 2 The appropriate brakes standard code must be entered into the standards code field in the ILOAD screen on LANDATA (refer to page 3-1-1 of the LATIS agent's manual).

IMPORTANT: Any parts that require removal or disassembly in order to carry out the inspection of brakes and brake components must be removed or disassembled.

Exceptions to this requirement are:

- a) Vehicles presented for re-registration that were manufactured before 1991 and previously registered in New Zealand before 1 January 1991.
- b) For new vehicles and scratch-built low volume vehicles, it is not necessary to disassemble any brake components.
- c) For vehicles with rear drum brakes that are less than two years old and that have travelled less than 40,000 km, only the front brakes must be disassembled initially. If the front brakes are up to standard, and there are no signs of problems with the rear brakes, disassembly of the rear brakes is not required.

Entry-level brake inspection process for group L vehicles, and group M or N light vehicles

The vehicle inspector must personally carry out the brake inspection of all vehicles according to the following specifications. The alternate method for motorcycles may be used if the vehicle inspector is unfamiliar with the disassembly or reassembly of the braking system.

Master cylinder

1. Check the condition of the brake fluid in the master cylinder reservoir, and calliper or wheel cylinder for contaminants. If there are visible signs of dirt in the fluid, the fluid must be replaced.
2. Check the master cylinder for leaks.

Underbody brake components

1. Brake components underneath the vehicle must be inspected using a hoist, pit or ramp that allows the vehicle inspector to comfortably walk under the vehicle.
2. Check the park brake cable by examining exposed cable for signs of knotting, corrosion or fraying or the use of auxiliary tensioning devices.
3. Examine any brake rods for excessive corrosion or wear.

Wheels, brake drums and disc pads

1. Remove all wheels, brake drums and disc pads.
 - a) Only the front brakes need to be disassembled initially, if the vehicle:
 - is less than two years old, and
 - has travelled less than 40,000 km, and
 - is fitted with drum brakes at the rear.Provided there are no problems detected with the front brakes and the rear brakes exhibit no external sign of a problem (eg, uneven braking, leaks, noises), no further disassembly is required.
 - b) Brake components do not need to be disassembled during the entry certification inspection if the vehicle is new (Note 1) or a scratch-built low volume vehicle.

Note 1 New means a vehicle that has not been registered and operated in any country, and has not been operated on a road in any country as a demonstration or courtesy vehicle or used for training or test purposes. It must not be a scratch-built vehicle that contains components which have been fitted to a vehicle operated on a road in any country.

- c) Any brake discs or drums and their friction materials, which are used for park brakes only, do not have to be inspected in detail, or have compliance verified. No further disassembly is required provided the brakes do not show any external signs of a problem and meet performance and condition requirements set out in the *VIRM: In-service certification* section 8-1.

2. Check the run out of the disc rotors, the minimum thickness of the discs and any variation in disc thickness using calibrated measuring equipment (Note 2).
3. Check the drums for ovality using calibrated measuring equipment.
Measurements must be checked against the manufacturer's specifications. If the manufacturer's specifications are not available, the following maximum runout and ovality are permitted:
 - runout on a disc brake rotor with a single acting hydraulic piston 0.1 mm
 - runout on a disc brake rotor with opposing hydraulic pistons 0.2 mm
 - ovality on a brake drum for light vehicles 1.0 mm

Note 2 If a TSD agent wishes to use a roller brake machine to detect disc/rotor runout, they must be able to demonstrate this ability to a Land Transport NZ reviewer.

If machining is required, both of the drums or discs on a common axis must be machined. If it is found that a disc brake rotor requires machining or replacing, the brake friction material that was originally fitted to the vehicle may be re-used, provided it is within safe tolerance of the vehicle manufacturer's specifications. The TSD agent must consider the thickness and condition of the remaining brake friction material, and whether or not the vehicle manufacturer permits the re-fitting of brake friction material to new or re-surfaced brake rotors.

Wheel cylinders and callipers

1. Check wheel cylinders and callipers for fluid leaks.
2. Check that the calliper or cylinder pistons have not seized, and are able to slide or swing on their mountings as appropriate.

Brake pipes

1. Ensure that brake pipes are secure and supported.

Hoses and connections

1. Inspect all hoses and connections (under pressure) for condition. Flexible brake hoses must be rejected if:
 - they leak brake fluid, or
 - they are insecure, or
 - they bulge under pressure, or
 - they are twisted, or
 - they have been stretched, or
 - the outer covering is chafed or cracked, particularly in the area of the crimp.

Brake friction material

1. Visually inspect the brake friction material to verify that the material was supplied by the vehicle manufacturer. The name or logo of the vehicle manufacturer or a brake friction material manufacturer (listed in Table 8-2-2) will be marked on the backing plate or the edge of the friction material.

If the material cannot be identified as being supplied by the vehicle manufacturer, the vehicle must not be certified until replacement brake friction material has been fitted, which:

- has been supplied by a recognised supplier (Note 3), or
- is accompanied by a statement completed by the supplier (see 'Reference material 47'), or

- is accompanied by a 'Brake repair declaration' (see 'Reference material 47') completed by a recognised brake repairer.

A correctly completed 'Brake repair declaration' is acceptable evidence for replaced brake friction material.

If the brake friction material fitted to a vehicle is not known to be original equipment (OE), it may be accepted if it was made by a manufacturer that is known to produce OEM or OES brake parts.

If brake friction material does not meet these criteria, it must be removed and replaced with parts that return the vehicle's brakes to within safe tolerance of the manufacturer's specifications. When disc pads or linings are replaced, the material on both the left and right side of an axle must be replaced using identical material with the same co-efficient of friction.

Table 8-2-1. Limits for wear on brake friction material

Material	Minimum thickness
Disc pads	3.0 mm
Shoe linings (bonded)	2.0 mm
Shoe linings (riveted)	2.0 mm above the head of the rivet minimum thickness

Note 3 A recognised supplier is a supplier recognised by the TSD agent as being reputable and competent to supply material that ensures the braking system will be returned to within safe tolerance of its state when manufactured.

Note 4 These limits for wear do not apply if the manufacturer has specified a greater minimum thickness for specific vehicle makes and models.

Note 5 For further information, please refer to 'Technical bulletin 1 - Replacement parts'

Important: TSD agents are required to include a regular audit of brake repairers in their procedures to ensure that information contained in declarations is correct.

Markings not found in published data

Where brake friction material is found with markings that cannot be found in published data, but the TSD agent believes the material to be OEM and otherwise fit for further service, the vehicle inspector must:

- take a photocopy of the brake pad backing plate or brake shoe edge, and
- note the vehicle make, model, chassis number and odometer reading on the copy, and
- fax this to the TSD agent technical manager, who will forward it to the Vehicle Certification Unit (attention Colin Hainsworth) on (04) 9108179. Alternatively, it may be emailed to colin.hainsworth@landtransport.govt.nz.

Where an answer can be provided without further research, Land Transport NZ will supply a fax or email to confirm or decline the information.

Where further investigation is required Land Transport NZ will publish the results in a newsletter and re-issue Table 8-2-2 with the updated information.

Re-assembly

Where components are removed as part of the inspection process, a TSD agent must have procedures in place to ensure that those components are re-assembled correctly.

Brake performance

1. Once components have been accepted, carry out a service brake system performance test using a Land Transport NZ approved roller brake machine.
2. Record the braking effort achieved.
3. Check that the performance meets the requirements specified in the *VIRM: In-service certification*, section 8-1.

Re-checking brakes that fail inspection

If a vehicle is failed due to brake imbalance on one or more axles, each axle in question must be re-checked, as the failure may have occurred on either side, not just the side where brake force was lower.

If a vehicle is failed due to poor performance, the whole brake system must be re-checked to ensure that the repair has not affected other brakes and impaired the vehicle's braking performance.

Vehicles returning for recheck following brake repair are not expected to be dismantled again for invasive inspection if a declaration from a recognised brake repairer is supplied. A sample 'Brake repair declaration' is shown in 'Reference material 47'.

Note 6 Brake parts that meet UN/ECE Regulation No. 90R are acceptable for vehicles undergoing entry certification. The vehicle inspector must retain documented evidence that the brake parts meet UN/ECE 90R and are suitable for the particular vehicle (in the location where they are fitted) on the vehicle file.

Alternate method for motorcycle brake inspections

In cases where a vehicle inspector is not familiar with the disassembly or reassembly of the motorcycle's braking system, a relevant person or company, recognised by the TSD agent as being reputable and competent to carry out this work, may be employed to strip, inspect and reassemble motorcycle brake systems in accordance with the above inspection specifications.

This recognised person or company must supply the TSD agent with documentation confirming that the brake system and components are within safe tolerance of their state when manufactured.

If the motorcycle is required to comply with an approved brake standard, the documentation must also confirm that the brakes still comply with the original equipment brake standard that the motorcycle was manufactured to.

The recognised person or company must issue a declaration confirming that:

1. the motorcycle brake system has been dismantled, and
2. all brake components have been inspected, and
3. measurements have been taken and recorded, and
4. the brake system has been reassembled with no repairs required,

OR

any component(s) not within safe tolerance of the manufacturer's specifications is repaired or replaced, and the brake system has been reassembled.

If the motorcycle brake components are dismantled away from the inspection site, then the brake component measurements must be recorded by the recognised person or company, or the vehicle inspector must be present during the dismantling process to record details.

The motorcycle owner/importer may take the vehicle to the recognised person or company.

Table 8-2-2. Recognised brake friction material manufacturers

MANUFACTURER	LOGO 1	LOGO 2	MANUFACTURER	LOGO 1	LOGO 2
AISIN			MANDO		
AKEBONO			MINTEX		
AMBRAKE		AMBRAKE CORPORATION	MK KASHIYAMA		
ASKTECHNICA		Ask Corporation	NBK		
ATE			NIPPONDENSO		
BENDIX			NISSHINBO		
BOSCH			NISSIN KOGYO		
BREMBO			PAGID		
DELCO			PBR		
FERODO			SANGSIN		
GIRLING		[Logo Not Known]	SANYO		
HITACHI			SUMITOMO		
HOSEI			TAKARA/VESSRAH		
JAPAN BRAKE INDUSTRIAL CO			TEVES		
JURID			TEXTAR		
KIA PRECISION WORKS		Similar to 	TOKICO		
LOCKHEED		[Logo Not Known]	VALEO		
LUCAS					

Table 8-2-3. Approved brake parts suppliers

Legal name of business	Trading name used on invoice
Allparts International Ltd	Allparts International Ltd
Apex Brake and Clutch Ltd	Apex Brake and Clutch Ltd
Auto Brake and Clutch Ltd	Auto Brake and Clutch Specialists
Auto Brake and Clutch Supplies Ltd	Auto Brake and Clutch Supplies Ltd
Auto Brakes Ltd	Auto Brakes Ltd
Auto Replacements 1994 Ltd	Auto Replacement 1994 Ltd
Auto Trail Ltd	Auto Trail Ltd
Autolines N.P Ltd	Autolines Auto One
Automotive Brake and Clutch Ltd	Automotive Brake and Clutch Ltd
Automotive Driveline 1992 Ltd	Automotive Driveline 1992 Ltd
Automotive Partzio Ltd	Partzio (East Tamaki Ltd)
Automotive Partzio Ltd	Partzio (Otahuhu Ltd),
Automotive Supplies NZ Ltd (including AutoStop and AutoStar)	Automotive Supplies NZ Ltd
Bay City Motor Co Ltd	Bay City Motor Co Ltd
Belfor Automotive Centre Ltd	Belfor Automotive Centre Ltd
Brake and Clutch Rebuilders Ltd	Brake and Clutch Rebuilders Ltd
Brake and Transmission Ltd	Brake and Transmission NZ Ltd
Brakes and Spares Ltd	Brakes and Spares Ltd
Challenge Auto Parts	Challenge Auto Parts
Cockram Motors (ChCh) Ltd	Cockram Nissan
Collins Motors Ltd	Collins Auto Parts and Accessories
Cycle and Carriage (North Shore) Ltd	Kia Motors New Zealand
Daihatsu New Zealand Limited	Daihatsu New Zealand Limited
Direct Auto One	Direct Auto One
Extreme Distributors Ltd	Extreme Automotive Distributors
Forward Specs (2000) Ltd	Forward Specs (2000) Ltd
Garland Motors	Whakatane Auto One
Holdaways Limited	Holdaways Ltd
Holden New Zealand Ltd	Holden New Zealand Ltd
Honda New Zealand Ltd	Honda New Zealand Ltd
Import Part Specialists Ltd	Import Part Specialists Ltd
Independent Brake Supplies NZ Ltd	Independent Brake Supplies NZ Ltd
Interpart Ltd	Interpart Ltd
Jaycon Engineering Ltd	M.P Auto Parts
John Patton Ltd	Thames Auto One
Johnson Piston Rings Ltd	Johnson Piston Rings
Lambert Brake and Clutch Ltd	Lambert Brake and Clutch Ltd
Le Freins Ltd	Autosafe Taupo
MacDonald Halligan Motors Ltd	MacDonald Halligan Motors Ltd
Master Part Automotive Products (1997) Ltd	0800 Brakes
Master Part Automotive Products Ltd	Master Part Brake and Clutch
Mintoft and Heenan Ltd	Freemans Auto One
Muffler and Brake Ltd	Muffler and Brake Ltd
Murray McLean Motorcycles Services Ltd	Murray McLean Motorcycles Services Ltd

Legal name of business	Trading used on invoice
Napier Auto Supplies (1980) Ltd	Napier Auto Supplies
Nelson Brake Services Ltd	Nelson Brake Services Ltd
New Zealand Brake Company Ltd	Brake Co
Orton Motor 1990 Ltd	Ruts Auto Brake, Clutch
Owens Suspension and Brake Specialist Ltd	Owens Suspension and Brake Specialist Ltd
Partmaster Ltd	Partmaster
Pembroke Fram Ltd	Union Yamaha
Precision Brake and Clutch Services Ltd	Precision Brake and Clutch Services Ltd
R and J E Hull Ltd	Brake Specialists
Rawson Parts Ltd	Partnership Auto One
Red Baron (NZ) Ltd	
Redwood Investments Ltd	Bikes'n' Bits
Repco Auto Parts Ltd (incorporating Appco Auto Parts and DAS Car Parts)	Repco New Zealand
River City Auto World	Wanganui Toyota
Robbie's Speedy Exhaust and Brakes Shop Ltd	Robbie's Speedy Exhaust and Brake Shop Ltd
RTJ Industries	Brake Service Centre
Safe R Brakes Ltd	Safe R Brakes Ltd
Segedins Auto Parts Ltd	Segedins Auto parts Ltd
Sims Brake Services Ltd	Sims Brake Services Ltd
Southern Brakes and Driveline Ltd	Southern Brake and Driveline Ltd
Speedy Parts (NZ) Ltd	Speedy Parts (NZ) Ltd
Sterling Brake and Clutch Specialists	Sterling Brake and Clutch Specialist
Styles Autoparts Ltd	Hawera Autospares
Suvic Engineering Ltd	Suvic Engineering Ltd
T B and J F Bell Partnership	Redhills Benz
Taupo Auto One Ltd	Taupo Auto One
Transport Brake and Clutch Ltd	Transport Brake and Clutch
Triumph Promotions Ltd	Jim Wright Nissan
Vehicle Testing and Compliance Ltd	Vehicle Testing and Compliance Ltd
Waikato Bonding Services Ltd	
Waikato Clutch and Brake Specialists Ltd	Waikato Clutch and Brake Specialists Ltd
Whakatane Brake and Clutch Centre Ltd	Whakatane Brake and Clutch Centre Ltd