



Vehicle Repair

Reference Manual

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1. INTRODUCTION

Over the past decade there has been a revolutionary change in vehicle design, namely the change to occupant protection features, sometimes sacrificing the structure of the vehicle itself to provide integrity to the occupant cell.

This means that the key features are those that protect the occupants if the vehicle is involved in a collision. From the repairer's point of view this means that frontal impact protection systems such as crumple/crush zones, head restraints, supplementary restraint systems, burst proof doors etc become of prime importance.

The vehicle repairer must ensure that the system remains, or is restored to within safe tolerance of its original state when manufactured, ie. provide the same degree of occupant protection.

Different vehicle designers use different safety features to achieve the level of occupant protection that will enable the vehicle to meet the type-test required by law. An example of this is the frontal impact standard (Land Transport Rule: Frontal Impact 2001).

It is a huge challenge today for the repairer to understand the types of systems and features used by manufacturers in meeting the demands of occupant protection. It is therefore even more challenging to understand the ways in which the vehicle can be safely repaired to continue to meet the requirements.

2. PURPOSE AND SCOPE

The NZ Collision Repair Association (CRA) has prepared this manual to assist light-vehicle repairers to achieve correct and consistent standards of repair.

The purpose of this document is to:

- describe the LTNZ's requirements to repairers in New Zealand
- cover the requirements for repairs.

Further copies of this manual may be obtained from:

NZ Collision Repair Association
PO Box 9208
HAMILTON

Amendments to this document will be issued from time to time as repair requirements change and improvements are made. Suggestions for improvement should be made using the form provided at the end of this introduction.

3. OVERVIEW OF THE MANUAL

This is the Vehicle Repair Reference Manual (VRRM) for in-service light vehicles. It has two main parts.

1. Introduction

The introduction explains the duties and responsibilities of the repairer. Also included are definitions and abbreviations, and an improvement suggestion form.

2. Technical

This part of the manual covers the legal requirements for the repairs to individual light vehicle components, structures and systems.

Each section of the technical part consists of up to three parts:

- Summary of legislation summarises the legislation that is relevant to that section.
- Notes are for additional guidance, where required.
- Repair guidelines specifies the repair guidelines.

To use the manual

- The repairer identifies each system, structure or component to be repaired.
- The repairer selects the corresponding section from the technical part of the Manual in relation to the damage as to determine how to meet the requirements.
- Where there is a general requirement, such as for welding, then the damaged item should be repaired according to both the general and specific sections.

4. DUTIES AND RESPONSIBILITIES

4.1 General duties and responsibilities of the repairer

The repairer's prime duty is to ensure that a repaired vehicle is within safe tolerance of the manufacturer's specifications. General duties and responsibilities are defined in the Land Transport Rule: Vehicle Repair 1998 (the Repair Rule) and Land Transport Rule: Frontal Impact 2001, and this manual. There is reference also to other rules within this manual where applicable.

4.2 Subcontracting

A repairer may approve a technician to carry out various aspects of the repair (eg. wheel alignment, air conditioning, mechanical, SRS) only after the repairer has ascertained that the person is fully capable of completing the task. Repairers are responsible for the outcomes or consequences of any delegated task.

4.3 Supporting documents

A repairer should keep all records concerned with the repair and should make them available upon request by the Owner/Insurance company/LTNZ. The records should be kept for a minimum of five years.

4.4 Non compliance review

If the CRA or LTNZ has reason to believe that a repairer has failed to comply with repair procedures and that this presents a significant risk to land transport safety, the CRA may review your membership status.

4.5 Identifying the vehicle class

The Land Transport Rule: Vehicle Repair 1998 refers to the different classes of vehicle. The repairer must be able to identify the class of the vehicle to be repaired. The following table describes vehicle classes.

Class	Description
AA (Pedal cycle)	A vehicle designed to be propelled through a mechanism solely by human power.
AB (Power-assisted pedal cycle)	A pedal cycle to which is attached one or more auxiliary propulsion motors having a combined maximum power output not exceeding 200 watts.
LA (Moped with two wheels)	A motor vehicle (other than a power-assisted pedal cycle) that has: a) two wheels, and b) either: i. an engine cylinder capacity not exceeding 50 cc and a maximum speed not exceeding 50 km/h, or ii. a power source other than a piston engine and a maximum speed not exceeding 50 km/h.
LB (Moped with three wheels)	A motor vehicle (other than a power-assisted pedal cycle) that has: a) three wheels, and b) either: i. an engine cylinder capacity not exceeding 50 cc and a maximum speed not exceeding 50 km/h, or ii. a power source other than a piston engine and a maximum speed not exceeding 50 km/h.
LB1	A class LB motor vehicle that has one wheel at the front and two wheels at the rear.
LB2	A class LB motor vehicle that has two wheels at the front and one wheel at the rear.
LC (Motor cycle)	A motor vehicle that has: a) two wheels, and b) either: i. an engine cylinder capacity exceeding 50 cc, or ii. a maximum speed exceeding 50 km/h.
LD (Motor cycle and side-car)	A motor vehicle that has: a) three wheels asymmetrically arranged in relation to the longitudinal median axis, and b) either: i. an engine cylinder capacity exceeding 50 cc, or ii. a maximum speed exceeding 50 km/h.
Side-car	A car, box, or other receptacle attached to the side of a motor cycle and supported by a wheel.

Class	Description
LE (Motor tri-cycle)	A motor vehicle that has: a) three wheels symmetrically arranged in relation to the longitudinal median axis b) a gross vehicle mass not exceeding one tonne, and c) either: i. an engine cylinder capacity exceeding 50 cc, or ii. a maximum speed exceeding 50 km/h.
LE1	A Class LE motor vehicle that has one wheel at the front and two wheels at the rear.
LE2	A Class LE motor vehicle that has two wheels at the front and one wheel at the rear.
Passenger vehicle	A motor vehicle that is constructed primarily for the carriage of passengers, and a) has either: i. at least four wheels, or ii. three wheels and a gross vehicle mass exceeding one tonne.
MA (Passenger car)	A passenger vehicle (other than a Class MB or Class MC vehicle) that has not more than nine seating positions (including the driver's seating position).
MB (Forward control passenger vehicle)	A passenger vehicle (other than a Class MC vehicle): a) that has not more than nine seating positions (including the driver's seating position) b) in which the centre of the steering wheel is in the forward quarter of the vehicle's total length.
MC (Off-road passenger vehicle)	A passenger vehicle, designed with special features for off-road operation, that has not more than nine seating positions (including the driver's seating position), and that has: a) four-wheel drive b) at least four of the following characteristics when the vehicle is unladen on a level surface and the front wheels are parallel to the vehicle's longitudinal centre-line and the tyres are inflated to the vehicle manufacturer's recommended pressure: i. an approach angle of not less than 28 degrees ii. a breakover angle of not less than 14 degrees iii. a departure angle of not less than 20 degrees iv. a running clearance of not less than 200 mm v. a front-axle clearance, rear-axle clearance, or suspension clearance of not less than 175 mm.
Omnibus	A passenger vehicle that has more than nine seating positions (including the driver's seating position).
MD1	An omnibus that has a gross vehicle mass not exceeding 3.5 tonnes and not more than 12 seats.
MD2	An omnibus that has a gross vehicle mass not exceeding 3.5 tonnes and more than 12 seats.
MD3	An omnibus that has a gross vehicle mass exceeding 3.5 tonnes but not exceeding 4.5 tonnes.
MD4	An omnibus that has a gross vehicle mass exceeding 4.5 tonnes but not exceeding 5 tonnes.
ME (Heavy omnibus)	An omnibus that has a gross vehicle mass exceeding 5 tonnes.

Class	Description
Goods vehicle	A motor vehicle that: a) is constructed primarily for the carriage of goods, and b) has either: i. at least four wheels, or ii. three wheels and a gross vehicle mass exceeding one tonne. For the purpose of this description: a) a vehicle that is constructed for both the carriage of goods and passengers shall be considered primarily for the carriage of goods if the number of seating positions multiplied by 68 kg is less than 50% of the difference between the gross vehicle mass and the unladen mass b) the equipment and installations carried on special purpose vehicles not designed for the carriage of passengers shall be considered to be goods c) a goods vehicle that has two or more non-separable but articulated units shall be considered to be a single vehicle.
NA (Light goods vehicle)	A goods vehicle that has a gross vehicle mass not exceeding 3.5 tonnes.
NB (Medium goods vehicle)	A goods vehicle that has a gross vehicle mass exceeding 3.5 tonnes but not exceeding 12 tonnes.
NC (Heavy goods vehicle)	A goods vehicle that has a gross vehicle mass exceeding 12 tonnes.
Trailer	A vehicle without motive power that is constructed for the purpose of being drawn behind a motor vehicle.
TA (Very light trailer)	A single-axled trailer that has a gross vehicle mass not exceeding 0.75 tonnes.
TB (Light trailer)	A trailer (other than a Class TA trailer) that has a gross vehicle mass not exceeding 3.5 tonnes.
TC (Medium trailer)	A trailer that has a gross vehicle mass exceeding 3.5 tonnes but not exceeding 10 tonnes.
TD (Heavy trailer)	A trailer that has a gross vehicle mass exceeding 10 tonnes.

Figure 1. Vehicle classes.

4.6 Repair instructions

The repairer must take into account manufacturer's instructions, where available, including specifications, measurements, tolerances, materials, methods and procedures. It is the repairer's responsibility to justify any departure from the manufacturer's instructions.

If the manufacturer's instructions are not available, the repairer must take into account the instructions of a recognised research organisation such as I-CAR or any other recognised NZ industry standard.

4.7 Compliance with statutory requirements

It is the repairer's responsibility to ensure that the premises and the equipment used in the repair comply with:

- Occupational Safety and Health requirements.
- Any other relevant Acts, regulations and local bylaws as they apply to him or his business.

5. IMPROVEMENT SUGGESTION FORM

VEHICLE REPAIR REFERENCE MANUAL (VRRM)

Date: _____

Vehicle Repair Reference Manual topic: _____

Page number needing improvement: _____

Details of suggested improvement: _____

Contact details (in case we need to contact you for further clarification)

Name: _____

Company name: _____

Postal address: _____

Phone number: _____

Fax number: _____

Email: _____

Please send the completed form to:

NZ Collision Repair Association
PO Box 9208
HAMILTON

Fax number: 07-8470217

6. DEFINITIONS

Applicable	means any requirement specified in an Act, regulation or rule that applies to a specific vehicle.
Approved vehicle standard	means a vehicle standard with which a vehicle is required to comply by an applicable requirement.
Authority	means the Land Transport New Zealand continued by section 184 of the Land Transport Act 1998.
Class	in relation to vehicles, means a category of vehicle of one of the groups A, L, M, N, and T, as specified in Table 1.
CRA	means New Zealand Collision Repair Association.
De-registered	means that a vehicle's New Zealand registration has been cancelled in accordance with section 27 or 28 of the Transport (Vehicle and Driver Registration and Licensing) Act 1986.
Enter service	in relation to a vehicle means to begin to be operated in-service for the first time.
Entry level	has the same meaning as Enter service.
In-service	means a vehicle that is currently registered and operating on New Zealand roads.
Land transport document	has the same meaning as in the Land Transport Act 1998.
LTNZ	means Land Transport New Zealand.
Manufacturer's operating limits	means: a) in relation to a motor vehicle, the allowance provided by the vehicle manufacturer in terms of performance capability and dimensions, relative to deterioration, malfunction or damage beyond which the safe performance of the vehicle, as defined by the vehicle manufacturer, is compromised b) in relation to a system, component or item of equipment, incorporated in or attached to a vehicle, the allowance provided by the system, component or equipment manufacturer in terms of performance capability and dimensions, relative to the deterioration, malfunction or damage, beyond which the safe performance of the system, component or item of equipment (and consequently the vehicle) is compromised.
Modify	in relation to a vehicle, means to change the vehicle from its original state by altering, substituting, adding or removing any structure, system, component or equipment; but does not include repair.

Motor vehicle	means a vehicle drawn or propelled by mechanical power, including its structure, systems, components and equipment; and includes a trailer, but does not include: <ul style="list-style-type: none"> a) a vehicle running on rails b) a mobility device c) a trailer (other than a trailer designed solely for the carriage of goods) that is designed and used exclusively as part of the armament of the New Zealand Defence Force d) a trailer running on one wheel and designed exclusively as a speed measuring device or for testing the wear of vehicle tyres e) a vehicle designed for amusement purposes and used exclusively within a place of recreation, amusement, or entertainment to which the public does not have access with motor vehicles f) a pedestrian-controlled machine.
Re-enter service	in relation to a vehicle previously certified for entry means to begin to be operated in-service again.
Repair	in relation to a vehicle, means to restore a damaged or worn vehicle, its structure, systems, components or equipment; and includes the replacement of damaged or worn structures, systems, components and equipment with equivalent undamaged or new structures, systems, components and equipment.
Safe tolerance	means the tolerance within which the safe performance of the vehicle, its structure, systems, components or equipment is not compromised, having regard to any manufacturer's operating limits.
Specialist	means inspection and certification of a specific aspect of a vehicle.
Statement of compliance	means a statement in a format specified by the LTNZ confirming that a vehicle or component complied with one or more approved vehicle standards when manufactured or modified.
Vehicle identification number	means a group of letters and numbers consisting of 17 characters that is: <ul style="list-style-type: none"> a) affixed to a vehicle in accordance with the relevant standard prescribed under regulation 90V of the Traffic Regulations 1976 b) capable of being decoded to provide identifying information about that vehicle.
Vehicle standard	means a technical specification with which a vehicle component or system must comply, and which is adopted by: <ul style="list-style-type: none"> a) the New Zealand Standards Council, or b) any international, national or regional organisation with functions similar to the New Zealand Standards Council.

7. REFERENCE AREAS

1. VEHICLE IDENTIFICATION

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Standards Compliance 2002

Condition

1. A VIN or chassis number must not be removed, erased, altered, defaced, obscured, destroyed, obliterated or affixed unlawfully or by an unauthorised person, ie. a VIN agent must attach the VIN Number.
2. Should for any reason a VIN or chassis number require being removed, refitted or altered specific permission must be sought by the LTNZ Transport Registration Centre.

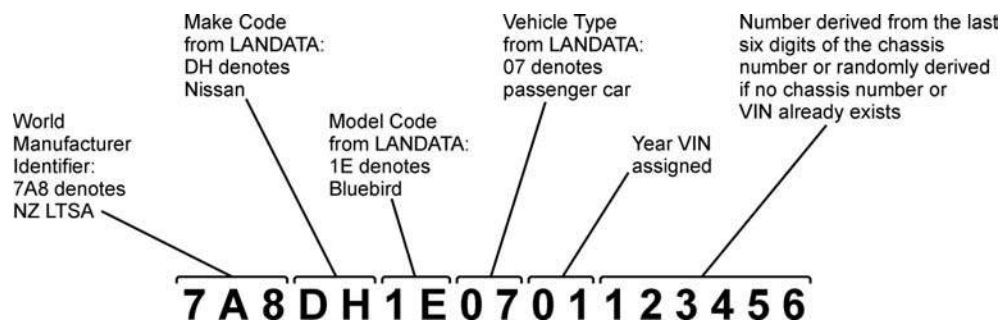


Figure 2. Structure of a VIN issued by LTNZ.

Vehicle	Permitted VIN Locations
Vehicles that are not forward controlled (passenger cars and off-road passenger vehicles)	<p>In the engine compartment on the righthand side of the firewall.</p> <p>In the engine compartment on the righthand side adjacent to the front suspension mounting point.</p> <p>In a location inside the engine compartment approved by the LTNZ for a specified vehicle or vehicle model.</p> <p>On the firewall or inner guards so it is visible from the front of the vehicle.</p>
Forward controlled vehicles (passenger vans and off-road vehicles)	<p>In the passenger compartment, on the top of the right-hand side wheel arch adjacent to the seat cushion.</p> <p>In the passenger compartment, on the inner panel of the right-hand A-pillar, adjacent to where the floor meets the A-pillar.</p> <p>In the passenger compartment on the B-pillar.</p>
Goods vehicles and light omnibuses	<p>Vehicle with a separate chassis - on the outside of the chassis adjacent to the right front wheel arch.</p> <p>Vehicle without a separate chassis - as specified for forward controlled vehicles.</p>
Motor cycles	<p>On the frame under the rider's seat, or a non removable part of the mainframe in a position where it is visible but not prone to damage.</p>

Figure 3. Location of VIN numbers.

If the vehicle is unfamiliar, and the VIN or chassis number cannot be located, the repairer should contact the manufacturer's agent or the local VIN issuing agent.

2. UNIBODY CHASSIS RAILS

Summary of legislation

Applicable legislation

- Land Transport Rule: Frontal Impact 2001
- Land Transport Rule: Vehicle Repair 1998

Condition

1. A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.
2. The performance of a frontal impact occupant protection system must not be affected by any factor, including corrosion, structural damage, material degradation, inadequate repair, the fitting of additional equipment, or the removal of equipment.

Repair guidelines

It is not permissible to:

1. repair a crush zone that is not permitted in the manufacturer's instructions.
2. apply heat to a chassis rail in a manner that is not permitted in the manufacturer's instructions.
3. section a rail when the manufacturer prohibits sectioning of rails.
4. section a rail using any procedure that is prohibited by the manufacturer.
5. section a chassis rail in or near the following locations, unless permitted by the manufacturer's instructions:
 - a) engine, suspension, steering or drive train mounting point, or
 - b) crush zone.

The chassis rail should be replaced if:

1. a vehicle has been affected by corrosion or weakening of its structure so that the vehicle is unsafe to operate.
2. the performance of a frontal impact occupant protection system has been affected by any factor, including corrosion, structural damage, material degradation, inadequate repair, the fitting of additional equipment, or the removal of equipment.
3. there is evidence that it had been deformed so that a localised kink of 90° or more has been formed over a small radius.
4. there are visible cracks, tears and or splinters before or after the chassis rail is straightened.
5. a crush zone has been repaired where this is not permitted in the manufacturer's instructions.
6. a rail has been over-stretched during repair.
7. heat has been applied to it in a manner that is not permitted in the manufacturer's instructions.

8. a rail has been sectioned when the manufacturer prohibits sectioning of rails.
9. a rail has been sectioned using any procedure that is prohibited by the manufacturer.
10. a recognised repair research organisation's procedures have not been followed with sectioning the rail when the manufacturer's instructions are not available.
11. a rail has been sectioned in or near the following locations, unless permitted by the manufacturer's instructions:
 - a) engine, suspension, steering or drive train mounting point, or
 - b) crush zone.

Note 1. *The replacement of damaged parts at factory seams should be done whenever practical and when required by the vehicle manufacturer.*

3. BODY-OVER-FRAME CHASSIS RAILS

Summary of legislation

Applicable legislation

- Land Transport Rule: Frontal Impact 2001
- Land Transport Rule: Vehicle Repair 1998

Condition

1. A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.
2. The performance of a frontal impact occupant protection system must not be affected by any factor, including corrosion, structural damage, material degradation, inadequate repair, the fitting of additional equipment, or the removal of equipment.

Repair guidelines

It is not permissible to:

1. repair a crush zone that is not permitted in the manufacturer's instructions.
2. apply heat to a chassis rail in a manner that is not permitted in the manufacturer's instructions.
3. section a rail when the manufacturer prohibits sectioning of rails.
4. section a rail using any procedure that is prohibited by the manufacturer.
5. section a chassis rail in or near the following locations, unless permitted by the manufacturer's instructions:
 - a) engine, suspension, steering or drive train mounting point, or
 - b) crush zone.

The chassis rail should be replaced if:

1. a vehicle has been affected by corrosion or weakening of its structure so that the vehicle is unsafe to operate.
2. the performance of a frontal impact occupant protection system has been affected by any factor, including corrosion, structural damage, material degradation, inadequate repair, the fitting of additional equipment, or the removal of equipment.
3. there is evidence that it had been deformed so that a localised kink of 90° or more has been formed over a small radius.
4. there are visible cracks, tears and or splinters before or after the chassis rail is straightened.
5. a crush zone has been repaired where this is not permitted in the manufacturer's instructions.
6. a rail has been over-stretched during repair.
7. heat has been applied to it in a manner that is not permitted in the manufacturer's instructions.

8. a rail has been sectioned when the manufacturer prohibits sectioning of rails.
9. a rail has been sectioned using any procedure that is prohibited by the manufacturer.
10. a recognised repair research organisation's procedures have not been followed with sectioning the rail when the manufacturer's instructions are not available.
11. a rail has been sectioned in or near the following locations, unless permitted by the manufacturer's instructions:
 - a) engine, suspension, steering or drive train mounting point, or
 - b) crush zone.

Note 1. *The replacement of damaged parts at factory seams should be done whenever practical and when required by the vehicle manufacturer.*

4. SILLS

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998
- Land Transport Rule: Frontal Impact 2001

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Repair guidelines

It is not permissible to:

1. section a sill where this is not permitted in the manufacturer's instructions.
2. section a sill without following either the manufacturer's instructions or recognised repair research organisation's procedures. eg. I-CAR, NZ recognised repair organisation.

Note 1. *Damaged parts should be replaced at factory seams whenever possible and when required by the vehicle manufacturer.*

5. A-PILLARS

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998
- Land Transport Rule: Frontal Impact 2001
- Land Transport Rule: Glazing, Windscreen Wipe and Wash, and Mirrors 1999

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Repair guidelines

It is not permissible to:

1. section a pillar when the manufacturer prohibits this repair.
2. section a pillar without following either the manufacturer's methods or a recognised repair research organisation's procedures. eg. I-CAR, NZ recognised repair organisation.
3. apply filler to the windscreen bonding face of the pillar where this is not permitted in the manufacturer's instructions.
4. apply the incorrect etch primer, primer or paint to the windscreen bonding face of the pillar.

Pillars should be replaced by following:

1. the manufacturer's repair instructions
2. a recognised repair research organisation's procedures

Note 1. *Damaged parts should be replaced at factory seams whenever possible and when required by the vehicle manufacturer.*

Note 2. *Foam filler should be reinstated as per the manufacturer's instructions.*

6. OTHER PILLARS

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998
- Land Transport Rule: Frontal Impact 2001
- Land Transport Rule: Door Retention Systems 2001
- Land Transport Rule: Seatbelts and Seatbelt Anchorages 2002

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Repair guidelines

It is not permissible to:

1. section a pillar when the manufacturer prohibits this repair.
2. section a pillar without following either the manufacturer's methods or a recognised repair research organisation's procedures. eg. I-CAR, NZ recognised repair organisation.
3. cut or patch an inner pillar in either of the following locations unless the manufacturer allows it:
 - a) above the seatbelt anchorage reinforcement, or
 - b) within 300 mm of a seatbelt retractor anchorage.
4. cut a pillar, in the absence of the manufacturer's instructions, in any of the following locations:
 - a) through sill panel reinforcements
 - b) within 150 mm of a door latch
 - c) within 150 mm of a door hinge.

Note 1. *Damaged parts should be replaced at factory seams whenever possible and when required by the vehicle manufacturer.*

Note 2. *Foam filler should be reinstated following the manufacturers instructions.*

7. BUMPERS AND ENERGY ABSORBERS

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998
- Land Transport Rule: Frontal Impact 2001

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Repair guidelines

1. In the absence of specific permission by the manufacturer's instructions, it is not permissible to repair any of the following components:
 - a) high strength steel bumper reinforcements
 - b) aluminium bumper reinforcements
 - c) structural fibre and composite bumpers
 - d) non-mechanical energy absorbers.

8. PLASTIC REPAIRS

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998
- Land Transport Rule: Frontal Impact 2001

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Repair guidelines

1. In the absence of specific permission by the manufacturer's instructions, it is not permissible to repair any of the following components:
 - a) fuel tank or line
 - b) structural composite parts and components
 - c) energy absorbing bumper
 - d) composite leaf spring.

9. WINDSCREEN

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998
- Land Transport Rule: Glazing, Windscreen Wipe and Wash, and Mirrors 1999

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Mandatory equipment

1. Windscreens fitted to the following vehicles must be made of laminated glass:
 - a) vehicles of class MA, MB, MC and NA manufactured on or after 1 July 1986
 - b) vehicles of class MD1, MD2, MD3, MD4, ME, NB and NC manufactured on or after 1 July 1997
 - c) vehicles not covered by any of the defined vehicle classes manufactured on or after 1 January 2001.
2. All glazing fitted to vehicles of class LA, LB1, LB2, LC, LD, LE1 and LE2 must be made of a transparent material that does not shatter.

Compliance with approved standards

1. Windscreens fitted to the following vehicles must comply with one or more of the approved glazing standards in Figure 4:
 - a) vehicles of group M and N manufactured on or after 1 January 1960; and
 - b) vehicles not covered by any of the defined vehicle classes manufactured on or after 1 January 2001.
2. Glazing in locations other than windscreens fitted to the following vehicles must comply with one or more of the approved glazing standards in Figure 4:
 - a) vehicles of group M (**Note 2**) and N manufactured on or after 1 February 1977 (**Note 1**)
 - b) vehicles not covered by any of the defined vehicle classes manufactured on or after 1 January 2001.

Repair guidelines

It is not permissible to:

1. fit a windscreen that is required to be made of laminated glass and is not made of laminated glass.
2. use the incorrect adhesive to bond in a piece of glazing.
3. fit a piece of glazing that is required to comply with an approved glazing standard and does not comply, or cannot be demonstrated to have complied, with at least one of the standards listed in Figure 6 at the time the glazing was fitted (**Note 3**).
4. repair a windscreen unless it has been repaired to an approved standard.
5. fit any glazing that has scratches or other defects that unreasonably impairs the vision or compromises the strength of the glazing that has been replaced (see Figure 10) or repaired.

6. fit a windscreen that shows signs of delamination or discoloration larger than 50 mm in diameter.
7. repair a windscreen bonding area of the A-Pillar if the original glazing adhesive has not been removed fully or until only a thin film is left before the new adhesive is used.
8. use an adhesive if the wrong adhesive has been used previously and the original glazing adhesive has not been removed fully before the new adhesive is used.

Note 1. For a vehicle manufactured before 1 January 1991, a glazing marking which contains one or more of the approved trade names in Figure 5 is evidence that a piece of glazing complies with an approved glazing standard.

Note 2. Curved scenic skylights above the cant rail, curved windows at the front and rear corners, skylights, louvers and interior partitions in omnibuses (vehicles of class MD1, MD2, MD3, MD4 and ME) are not required to comply with approved glazing standards if they are made of transparent material that does not shatter.

Note 3. Any repairs to a windscreen must have documentation to show that the repair was carried out to an approved standard.

UN-ECE Regulation No.	EEC/EC Directive	FMVSS	ADR	Japan	Others
43	92/22	205	8	Technical Standard for Window Glass or JIS R3211	BS 857 BS 5282 BS AU 178a ANSI/SAE Z26.1 NZS 5443 AS 2080 AS/NZS 2080 SABS 1191/1193 or ABG (behind driver only)

Figure 4. List of approved glazing standards.*

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

Armourfloat Armourplate Blindex Duolite Safety Duplate Safety Flolite Ford Indestructo Ford Safety Glass Ford Silver Arrow Glacetex Hankuk Glass Safety Heat Line HMC Glass Safety Hankuk TF5 HMC Glass Safety Hankuk TV5 Indestructo Nippon Safety NM Laminated Safety Glass FHP Peerless Plexite	Safetyflex Safety MGB (Meloplate) Safety MGB (Melite Safety Plate) Sekurit Sigla Spectrofloat Splintex Sunmat Suntex Safety Glass Temperlite Temperlite Santa Marina Thorex Connex Triplex Triplex Plate Tuflite Tyneside Veracetex
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Figure 5. Approved trade names.

The following standard markings may assist in determining compliance with approved standards.

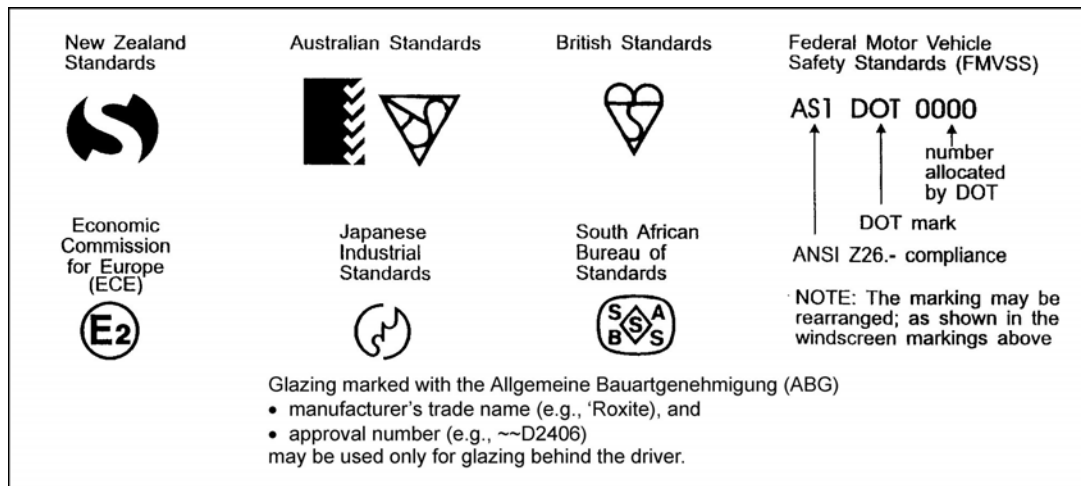


Figure 6. Approved standards markings.

L =	laminated glass
LF =	laminated float
LP =	laminated plate
// or ///	laminated when near the E2 mark
L.76WHP =	laminated, 0.76 mm interlayer, suitable for all locations
AS1 =	laminated for use anywhere in the vehicle
A S or A S =	the glass in the direction of the arrow complies with the 70% light transmission requirement

Figure 7. Glossary of codes for safety glass.

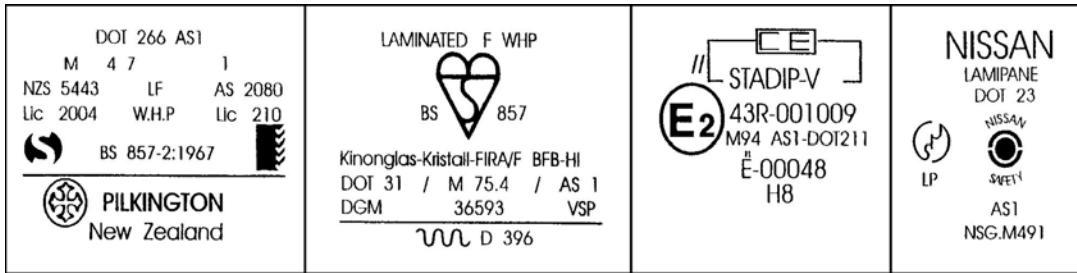


Figure 8. Typical laminated glazing markings.

L = laminated glass
F = float glass
P = plate glass
LF = laminated float
LP = laminated plate
/ = toughened, when near the mark
// or /// = laminated, when near the mark
TS = toughened glass
TP = toughened plate
T = toughened or tempered
Z = zone tempered
WHP = complies with impact test
DOT = Department of Transport (USA)
A S or A S = the glass, in the direction of the arrow, complies with the 70% light transmission requirement
ANSI = American National Standards Institute
FVMSS codes
AS1 = for use anywhere in the vehicle
AS2 = for use anywhere in the vehicle other than windscreen
AS3 = for rear and rear side windows only
AS4 and AS5 = plastic glazing not suitable for driver's vision
Glazing cut from mother sheet
L.76WHP = laminated, 0.76 mm interlayer, suitable for all locations
L.38 = laminated, 0.38 mm interlayer, must not be used for windscreens
PCZ26.1 = polycarbonate, meets requirements of ANSI Z26, must not be used for windscreens

Figure 9. Glossary of codes for laminated glass.

<p>CRATER</p> <p>Maximum diameter 5 mm</p>	<p>HORSESHOE</p> <p>Maximum diameter 25 mm</p>	<p>STAR</p> <p>Maximum diameter 30 mm</p>	<p>BULLSEYE</p> <p>Maximum diameter 20 mm</p>	<p>CRACK</p> <p>Maximum diameter 100 mm</p>
<p>COMBINATION SAME TYPE</p> <p>Diameter of the smallest circle around all incidences is measured and max. dia. applied.</p>	<p>COMBINATION DIFFERENT TYPES</p> <p>Each type measured and max. dia. applied separately.</p>	<p>COMBINATION SAME + DIFFERENT</p> <p>Diameters of the smallest circles around all incidences of same types are measured and max. dia. applied.</p>		

Figure 10. Types and maximum sizes of windscreen damage.

10. DOOR AND HINGED PANEL RETENTION SYSTEMS

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998
- Land Transport Rule: Door Retention Systems 2001
- Land Transport Rule: Vehicle Standards Compliance 2002, 7.4

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Mandatory equipment

1. A motor vehicle fitted with doors used by the driver or passengers for entrance and exit of the motor vehicle must have a door retention system.

Permitted equipment

1. The door retention system on doors to the rear of the driver's seat may incorporate safety devices installed during the manufacture of the vehicle to prevent the doors from being opened from the inside of the vehicle (eg. kiddi-locks).
2. A vehicle designed or adapted to transport prisoners is not required to be fitted with a mechanism for opening a door from the inside if the prison compartment has an alternative exit that can be operated by an authorised person in an emergency.

Performance

1. A door retention system and its mountings must be safe and structurally sound.
2. A door used for the entrance and exit of the driver or passengers must be operable by any occupant seated by the door from inside the motor vehicle.
3. The vehicle must be repaired using components and materials that are fit for their purpose, and return the vehicle within safe tolerance of its state when manufactured or modified.

Repair guidelines

1. A motor vehicle fitted with doors used by the driver or passengers for entrance and exit of the motor vehicle must have a door retention system.
2. A hinge for a door or other hinged panel must be securely attached to both the vehicle body and to the door or other hinged panel and not affected by loose connections, corrosion or other damage.
3. A door used for entrance and exit must be able to be opened from the inside.
4. A door used for entrance and exit must open or close easily.
5. A door or other hinged panel must remain secure in a closed or locked position.
6. A side intrusion beam must not be repaired without specific permission in the manufacturer's instructions.
7. A door retention system must be in good working order.
8. A door used for entrance and exit must remain secure in a closed position during the operation of the motor vehicle.

11. SEATS AND SEAT ANCHORAGES

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998
- Land Transport Rule: Seats and Seat Anchorages 2002

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Mandatory equipment

1. A motor vehicle must be fitted with a driver's seat.
2. A seat in a motor vehicle must be fitted to the vehicle structure by means of seat anchorages.

Performance

1. Seats and seat anchorages must be safe, strong and in sound condition.
2. Seats and seat anchorages must be securely attached to the vehicle structure.
3. A replacement seat that is similar to the OE seat may be used provided that:
 - a) the seat is fitted to unmodified OE seat anchorages
 - b) the relationship between the seat, seat occupant and location of the seatbelt anchorages has not been affected.

Repair guidelines

1. A vehicle must be fitted with a driver's seat.
2. A seat must be attached to the vehicle structure by seat anchorages.
3. A seat frame must not be weakened by damage or corrosion.
4. The attachment of the seat to the seat anchorage must not be loose or weakened by damage.
5. The attachment of the seat anchorage to the vehicle structure must not be loose or weakened by damage.
6. If a replacement seat has been used instead of an OE seat:
 - a) the seat must be fitted to unmodified OE seat anchorages, or
 - b) the relationship between the seat, seat occupant and location of the seatbelt anchorages must not be affected, or
 - c) the replacement seat must be similar to the OE seat, ie. bench seat/bucket seats.

12. SEATBELTS AND SEATBELT ANCHORAGES

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998
- Land Transport Rule: Seatbelts and Seatbelt Anchorages 2002

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Repair guidelines

1. A seatbelt of the type specified for the class of vehicle must be fitted for a seating position where one is required to be fitted.
2. The seatbelt assembly must be securely fixed to a seatbelt anchorage.
3. A seatbelt component (eg. protective plastic cover on buckle, tongue or retractor system) must not be damaged so that foreign objects may enter the interior components, or so that they may cause damage to the interior components, mechanisms or webbing.
4. The seatbelt webbing (including webbing attached to the buckle) must not have:
 - a) a cut, including a cut on the surface, or
 - b) a rip or tear, or
 - c) fraying, or
 - d) stretching (eg. the belt has unusual web patterns or the webbing is deformed, will not lie flat, or is curled or rippled), or
 - e) fading so that most of the colour has been bleached
 - f) signs of chalking, or a powdery residue is evident on the webbing, or
 - g) become stiff
 - h) been dyed to conceal fading, or
 - i) contamination from grease, paint, solvents or similar products.
5. The seatbelt stitching:
 - a) must not be damaged or insecure, or
 - b) must not show signs of home repairs eg. gluing, stitching by hand or home sewing machine, staples, bolts, or rivets, or
 - c) must not indicate that the 'rip stitch' system has been activated, ie. the stitching is broken and a 'REPLACE BELT' label has been exposed near the lower seatbelt anchorage, or this label has been cut off.
6. A buckle and tongue:
 - a) must not be mismatched, or
 - b) must lock, or
 - c) must remain locked, or
 - d) must release easily, or
 - e) must be secure when coupled.

7. A seatbelt stalk:
 - a) (wire-cable type) wires must not appear to be broken, or
 - b) (plastic covered webbing type) the webbing must not be deteriorated, frayed, cut or faded, or
 - c) (solid metal type) must not be corroded, cracked or buckled, or
 - d) must be the correct type for the vehicle or the seating position.
8. A seatbelt that was worn during a crash should be carefully inspected for damage and replaced under the requirements of the repair rule if found to be damaged. Refer to clause 4 and 5 above.
9. A seatbelt pre-tensioning system must be replaced after activation.
WARNING: Special care is required with these explosive devices. Refer to the manufacturer's instructions and warnings.

13. AIRBAGS

WARNING: Airbags are an explosive device.

Special care must be taken when working with or around these systems. Only suitably trained staff should undertake any repairs involving the removal or replacement of any airbag component. Always refer to the manufacturer's instructions and warnings before commencing work.

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998
- Land Transport Rule: Frontal Impact 2001

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Mandatory equipment

1. A frontal impact airbag, its operating system and its warning light system must remain operational if the vehicle was originally manufactured with a frontal impact airbag.
2. A motor vehicle must not have a sign, light, or other device that indicates the vehicle is fitted with an airbag if it is not fitted with an airbag.
3. A motor vehicle must not have a light or other device indicating an airbag operating system is operable if it is inoperable.
4. Airbags may be removed or made inoperable in a vehicle that is more than 14 years old from the date of first registration; however the vehicle must then be low volume vehicle certified.

Permitted equipment

1. A switch may be installed as OE to render an airbag temporarily inoperable.

Performance

1. An airbag and its operating system must be safe and in good condition.
2. An airbag warning light fitted by the manufacturer must remain operational.

Repair guidelines

1. An OE airbag warning light system must not be removed from a vehicle fitted with airbags.
2. An airbag must not be permanently removed from a vehicle unless the vehicle is 14 years or older and low volume certification has been obtained.
3. An airbag component, ie. impact sensor, clock spring, wire harness, etc must not be repaired unless this is permitted in the manufacturer's instructions.
4. An airbag cover must not:
 - a) be damaged, or
 - b) be deteriorated, or
 - c) show signs of tampering.
5. The airbag warning-light must:
 - a) operate, and
 - b) indicate a fault in the system as per the manufacturer's recommendations.
6. An airbag that failed to deploy when involved in a crash above the vehicle's deployment threshold (as determined by the manufacturer's agent) should be referred back to the owner or the manufacturer's agent for further inspection.
7. An airbag component must be replaced with the same specifications as the original component.
8. If a salvaged/recycled replacement airbag and its associated components have been fitted, evidence of their fitness for purpose, including their source and the storage conditions of the donor vehicle and the airbag and its components should be recorded by the supplier and supplied with the parts. Refer to Figures 11, 12, 13, and 14.
9. A diagnostic report should be completed by the manufacturer's agent, approved representative or specialist when salvaged/recycled airbag components have been used.

Recycled Airbags

The following is not an endorsement for the use of recycled airbags.

If one is contemplating the use of recycled components, it is recommended the following procedures and flowchart is followed and adhered to. The CRA consider this to be a minimum standard.

It should be noted that the procurement of recycled SRS components should be from an industry recognised supplier who has processes and controls in place to ensure wherever possible the highest standards of supply are maintained.

NOTE: *The use of manually activated recycled airbags is not recommended.*

Manufacturers' recommendations

Check with the manufacturer's agent what the requirements are for the reinstatement of the SRS system after deployment. What parts must be replaced and what parts can be reused after a deployment eg. ECU, clock spring, sensors etc.

Sourcing recycled SRS components from an approved distributor

Ensure as much as possible of the following information is supplied. Make, model, year, chassis number, explanation of damage and images of donor vehicle where possible.

NOTE: Approved suppliers must follow a strict supply protocol.

Ensuring compatibility

Contact the relevant manufacturer's agent and have part number of SRS components from donor vehicle cross referenced with part numbers of SRS components for recipient vehicle. This can be done by supplying the chassis number for each vehicle and the new part supplier to check part number for each individual part eg. driver's airbag vs driver's airbag, passenger's airbag vs passenger's airbag etc.

Installation and testing

Ensure that the person fitting SRS components has received the appropriate training to do so.

Fit all components as per the manufacturers' recommendations.

Once installation has been completed the self-diagnostics capabilities of the SRS system will test the electronic circuitry when the ignition is turned on. If the warning light fails to go out after the prescribed time (usually a few seconds) then a fault has been detected. In this situation the vehicle should be sent to the manufacturer's agent or a specialist repairer for diagnosis and repair.

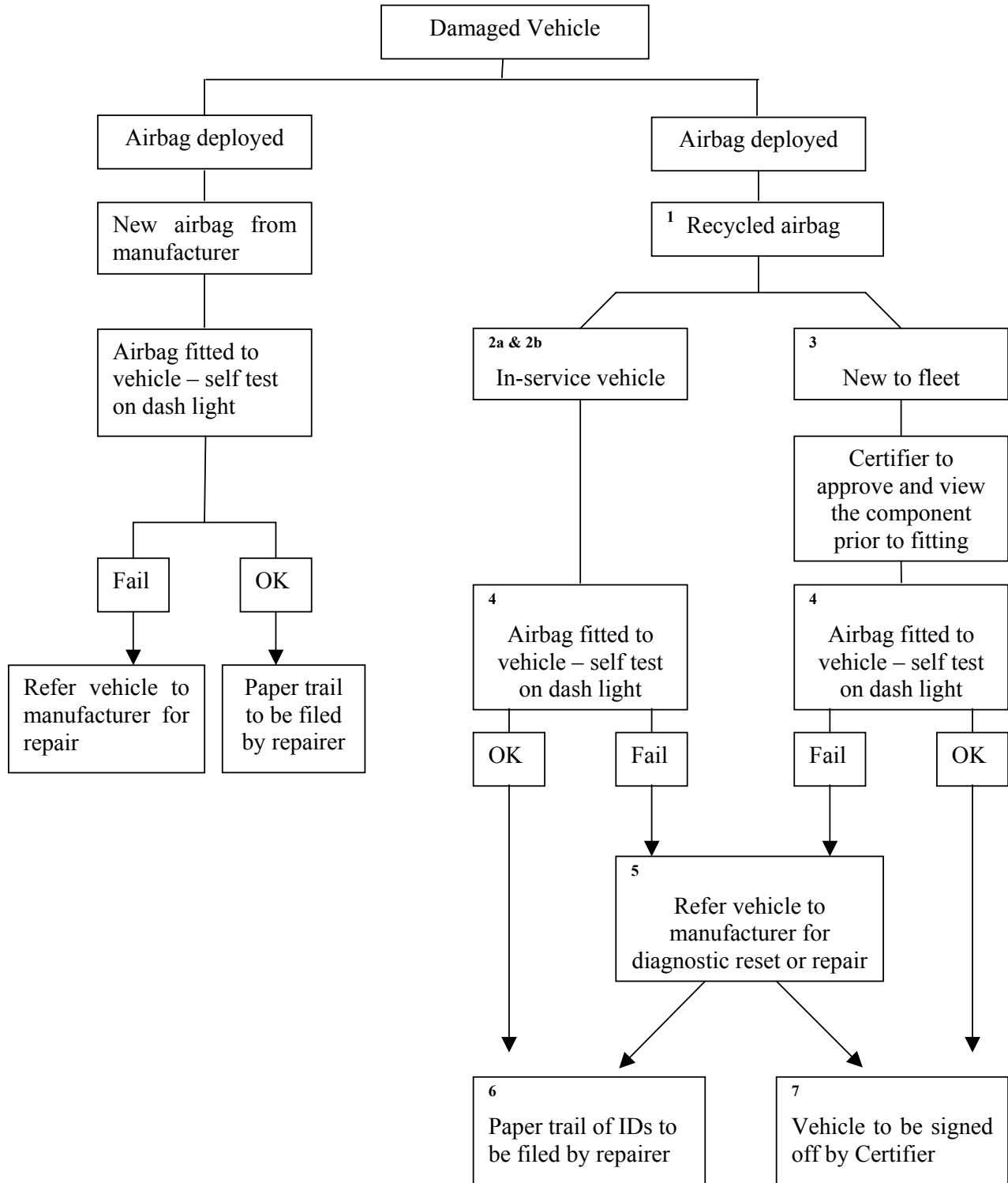


Figure 11. Fitment of Airbags – Airbag replacement.
Please read this above flowchart in conjunction with Figure 12.

Flowchart Reference

1. Currently the A.P.I.A. (Automotive Parts Industry Association) has an industry 'Code of Practice' for the sale of recycled airbags and components. We urge our members to use only companies with a written code of practice when purchasing any of the above components.
- 2a. An in-service vehicle post 1999 must be repaired in accordance with the Land Transport Rule: Frontal Impact 2001 (Rule 32006). Please refer to this rule when repairing these vehicles. All other vehicles must be repaired in accordance with the Land Transport Rule: Vehicle Repair 1998 (Rule 34001). Copies of these rules can be obtained through LTNZ.
- 2b. Vehicles fitted with airbags must be replaced if deployed in an accident unless the vehicle is over 14 years of age. Contact LTNZ for further information regarding Low Volume Certification.
3. New to fleet damaged or repaired vehicles require the services of LTNZ approved Light Vehicle Repair Certifier. Before any work is undertaken please contact the Certifier.
4. Each manufacturer has a prescribed system for the SRS on-board warning light to extinguish. Please ensure you contact the manufacturer for instructions.
5. If the light does not extinguish as per instructions, refer the vehicle to the manufacturer or a specialist repairer for rectification.
6. It is the responsibility of the repairer to keep all relevant reports regarding the replacement of recycled SRS components. A full paper trail from procurement to fitting is a must.
7. For new to fleet vehicles, the Repair Certifier must sign off the repairs and SRS systems. Please keep Certifier fully informed.

Figure 12. Flowchart Reference.

Supply declaration for use of recycled SRS components

Date: Repairer Ref. No.:

Recipient Vehicle Details

Make: Model: Year:

Model/Chassis No.: Reg. No.:

Owner: Insurance Co.:

Donor Vehicle Details

Make: Model: Year:

Model/Chassis No.: Reg. No.:

Supplier declaration attached

SRS Parts Used – Tick appropriate boxes

- | | | | |
|-----------------------|--------------------------|--------------------------------|--------------------------|
| Driver's airbag | <input type="checkbox"/> | Passenger airbags | <input type="checkbox"/> |
| Driver's pretensioner | <input type="checkbox"/> | Passenger pretensioners | <input type="checkbox"/> |
| ECU | <input type="checkbox"/> | Clock spring (rotary coupling) | <input type="checkbox"/> |
| Sensor | <input type="checkbox"/> | Side airbag | <input type="checkbox"/> |
| Seat with airbag | <input type="checkbox"/> | Other | <input type="checkbox"/> |

.....
.....
.....

Manufacturer's Procedure (copied from service manual) Attached

System check – self diagnosis Pass Fail Refer to specialist

Specialist repairer details

Name: Declaration attached

Figure 13. For use of recycled SRS components form.

**Declaration form – Supplementary restraint systems and/or anti-lock
braking systems**

Repairer details:

Company: _____

Manager's name: _____

Vehicle details:

Make: _____ Model: _____

Model code: _____ Vehicle year: _____

V.I.N.:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Reason for inspection: _____

Details of company performing the inspection:

Company name: _____

Technician's name: _____

Address: _____

Phone number: _____ Mobile number: _____

Scanner used: _____ Date programme last updated: _____

Fault codes introduced: _____

Details of visual inspection: _____

- | | |
|--|--|
| <input type="checkbox"/> Driver's
<input type="checkbox"/> Electronic
<input type="checkbox"/> Mechanical | <input type="checkbox"/> Side impact (seats, doors, pillars)
<input type="checkbox"/> Front
<input type="checkbox"/> Rear |
| <input type="checkbox"/> Passenger's | <input type="checkbox"/> Knee airbags (dash) |
| <input type="checkbox"/> Booster cushion in seats | <input type="checkbox"/> Front crash sensors |
| <input type="checkbox"/> ABS | <input type="checkbox"/> Brake pedal bags |
| <input type="checkbox"/> Side curtains | <input type="checkbox"/> Window curtains |
| <input type="checkbox"/> Other: _____ | |

Declaration:

I, _____ being a competent technician, have performed the above inspections and can confirm that at the time of the inspection, no apparent faults were found in the above systems and components.

As inspected on: / / (date)

Signature: _____

Figure 14. Supplementary restraint systems and/or anti-lock braking systems form.

In-service vehicles procedure for recycled airbags

Part 1 – Establishing a salvaged airbag’s suitability for use in a repair

The following steps are to be carried out by the **supplier** to establish that a salvaged airbag is suitable to be used in a repair.

Step 1: Inspect donor vehicle and airbag

Wherever possible the supplier or the supplier’s agent should oversee the removal of the airbags from the vehicle. Inspect the donor vehicle and the airbags for evidence of damage that may have affected the performance of the airbag system or that would cast any doubt as to the serviceability of the airbags. If in doubt reject the airbags.

For airbags sourced from an overseas supplier, photographic evidence of the donor vehicle should be supplied with the airbags.

Step 2: Prepare signed statement

Prepare a signed statement to the effect that, to the best of your knowledge, the airbag is suitable for use in a repair. The statement must also record the identity of the donor vehicle and should include the chassis number.

Step 3: Oversee packaging of airbag

If the airbag is not to be installed immediately, ensure that it is packaged appropriately and that the signed statement is included with the airbag. Packaging must be appropriate (eg. robust, shock absorbing, offers suitable protection for transportation and has regard to the potential build-up of static electrical charges).

Part 2 – Completing a repair that involves a salvaged airbag

The following steps are to be carried out by a repairer when repairing a light vehicle that involves the use of a salvaged airbag.

Step 1: Check that the airbag is suitable for use in the repair

Check that there is a signed statement from the supplier stating that the airbag is suitable for use in a repair (see ‘Establishing a salvaged airbag’s suitability for use in a repair’ above). This statement must be retained for audit purposes. If there is no signed statement, reject the airbag.

Check that the donor vehicle chassis number is recorded on the statement and that the part number for that airbag cross references with the part number for the recipient vehicle. If the airbag does not have the correct part number for the vehicle, reject the airbag. (NOTE: This is assuming that the airbags from the donor vehicle are those originally fitted when manufactured).

Undertake a visual inspection of the airbag’s packaging prior to the airbag’s removal and of the airbag once removed from its packaging. If there is anything in the condition of the packaging or the airbag that would cast any doubt as to the serviceability of the airbag, reject the airbag.

Step 2: Confirm integrity of vehicle’s SRS system

Verify that the remaining airbag system components (eg. the ‘clocks spring’ connector, steering column, control module and sensors) are fit for further service and have not been damaged by the deployment of the original airbag. (Refer to manufacturer’s recommendations). If there is any evidence that they are not fit for further service, contact your service agent.

Step 3: Operational checks

Once all components are fitted, check that the 'dash light' test indicates that the electronic aspects of the airbag system are functioning correctly. If not, send the vehicle to the service agent for repair.

NOTE: It is the suppliers'/repairers' responsibility to have a thorough knowledge of the Land Transport Rule: Frontal Impact 2001 (Rule 32006) and the Land Transport Rule: Vehicle Repair 1998 (Rule 34001), these procedures are to be read in conjunction with the above rules.

14. STEERING AND SUSPENSION SYSTEMS

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998
- Land Transport Rule: Steering Systems 2001

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Repair guidelines

1. In the absence of specific permission in the manufacturer's instructions:
 - a) a steering or suspension component must not be welded as part of the repair,
 - or
 - b) a steering or suspension component must not be heated as part of the repair.
2. A steering or suspension component, that has been damaged, should be replaced.
3. An original steering or suspension component that has been retained during the repair, and may have been damaged, should be dis-assembled and subjected to a careful visual inspection and replaced in accordance with the Repair Rule if found to be damaged. In some situations this may involve non-destructive crack testing.
4. New bolts of the same grade and size as the original bolts must be used for any replacement of used or new suspension or steering components where instructed by the manufacturer.
5. The steering column should be checked for damage and replaced if it was a collapsible type column and sustained damage.

Note 1. *Where a component has been subjected to non destructive testing evidence must be retained by the repairer with the vehicle file.*

15. THREE DIMENSIONAL CHASSIS MEASUREMENT

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Repair guidelines

1. A three dimensional chassis measurement should be completed at the discretion of the repairer, assessor or owner, or when:
 - a) a chassis rail has been damaged or displaced, or
 - b) there is corrosion damage and the vehicle structure has deformed or collapsed.
2. Where no measurement tolerances are available, the chassis measurement should not exceed a measurement tolerance of $\pm 3\text{mm}$ for a unibody or $\pm 5\text{mm}$ for a body-over-frame vehicle.
3. The measurements of the vehicle should always be within the vehicle manufacturer or measurement sheets specified measurement tolerance.
4. The measurement system should be calibrated regularly in accordance with the maker's recommendations.

Note 1. *The measurement sheet where applicable, should be retained by the repairer with the vehicle file.*

16. FOUR-WHEEL ALIGNMENT MEASUREMENT

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Repair guidelines

1. A wheel alignment should be completed at the discretion of the repairer, assessor or owner or when:
 - a) the severity of the damage may have caused misalignment, or
 - b) any suspension components have been damaged or replaced.

Note 1. *A copy of the wheel alignment report should be retained by the repairer with the vehicle file.*

Note 2. *The repairer is ultimately responsible for the work performed by sub-contractors including wheel alignments. It is therefore the responsibility of the repairer to ensure the equipment, training and quality of work performed by any sub-contractor meets any applicable standards.*

17. WATER DAMAGE

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Note 1. *Anyone contemplating the repair of a water damaged vehicle and is in doubt of the repair procedure, should seek the advice and guidance of a Light Vehicle Repair Certifier. In some cases the vehicle may require major component replacement to ensure its continued safe operation.*

Note 2. *It is not a legal requirement to have a vehicle certified by a Light Vehicle Repair Certifier if the vehicle is still currently registered (in-service).*

Note 3. *If a vehicle has been de-registered or is unregistered (entry level), it is a requirement by LTNZ that a Light Vehicle Repair Certifier inspects and certifies that the vehicle meets all the requirements of the applicable standards and legislation.*

18. WELDING

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Repair guidelines

1. All 'Structural Repair Centres' must meet the minimum requirement for I-CAR certificated or other certified welders to be employed in the business.
2. All welding should be done taking into account the vehicle manufacturers instructions.
3. All welding should be performed by a suitably trained person for the particular application.

19. REPLACEMENT COMPONENTS

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Repair guidelines

1. All replacement parts, systems or components must comply with an approved vehicle standard.
2. All replacement parts, systems or components must be fit for the purpose in which they are to be used, ie. still within safe tolerance of the manufacturers original specification.
3. All replacement parts, systems or components should be of equal or better quality than those parts, systems or components they are to replace.

20. CORROSION PROTECTION

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Repair 1998

Condition

A repair to a vehicle, its structure, systems, components or equipment, must restore the damage or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle when manufactured.

Repair guidelines

1. Weld-through primers should always be used when welding replacement panels.
2. A suitable corrosion protection system should always be used after the repair has been completed and prior to re-assembly. eg. the application of cavity wax or underseal.

Note 1. *The vehicle manufacturers corrosion protection instructions should always be followed where available or a recognised repair research organisation procedure. eg. I-CAR.*

21. CORROSION REPAIRS

Corrosion damage repairs on a vehicles structure should be repaired in the same manner as collision damage.

Modern cars are manufactured using a variety of steels, and replacement with mild steel, is today, not an option. Care should also be taken around safety zones, ie. crush zones, seatbelt mounts etc. These areas must be repaired to manufacturer's specifications.

On pre 1999 vehicles, rust repair should be undertaken taking into account 'best industry practice' including the use of 'I-CAR techniques and manufacturer's specifications'.

On vehicles between 1999-2001, the repairer must be mindful of the Land Transport Rule: Vehicle Repair 1998, 2.1(1) A repair to a vehicle, its structure, systems, components or equipment must restore the damaged or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle, structure, system, component or equipment when manufactured.

For vehicles 2002 onwards, use a variety of high strength steels and indeed different forms of welding etc. The use of the Land Transport Rule: Frontal Impact 2001 (Rule 32006) and the Land Transport Rule: Vehicle Repair 1998 (Rule 34001) must always be taken into account when repairs are undertaken.

If in doubt always refer to the manufacturer's repair manual.

Weld through primers should always be used on a repair. Thorough rustproofing should always be undertaken on corrosion damaged areas.

Some specific vehicles have specialised repair methods approved by LTNZ, ie. Nissan Terrano. It is the repairer's responsibility to obtain all the relevant information.

