Light Vehicle Inspection Manual

Section 10 Autogas Fuel and Power Systems

NORTHERN TERRITORY GOVERNMENT

Section 10 Autogas Fuel and Power System

Australian Design Rules relevant to this section	
ADR 44/...	Special purpose vehicles
ADR 79/...	Emission control for light vehicles
ADR 80/...	Emission control for heavy vehicles (greater than 3.5t GVM)
More information	*Dangerous Goods Regulations 1985* *https://legislation.nt.gov.au/*

OBJECTIVE: To ensure that fuel and power systems and associated components are fitted in accordance with regulations and operate in a safe manner.

Note:

i. *ADR 79/... applies to vehicles operating on LPG/NG with a GVM of 3500kg or less as of 1st January 2004.*

ii. *ADR 80/... applies to vehicles operating on LPG/NG with a GVM greater than 3500kg as of 1st January 2004.*

iii. *"**Autogas system** means a fuel gas system which is fitted to a vehicle, ship or machine and which is designed for use with fuel gas to be consumed by an internal combustion engine which is installed in, or forms part of, that vehicle, ship or machine" – Dangerous Goods Regulations 1985.*

10.1. Number plate labels

Reasons for rejection

a) Number plate labels are not fitted to the front and rear of the vehicle indicating its Fuel/Power system in accordance with:

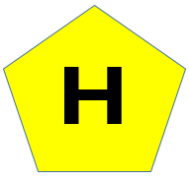
1. For vehicles fuelled with LPG:
   a. The metal plate and label size must be not less than 25mm square mounted as a diamond.
   b. The label colour must be retroreflective red, complying with AS/NZ1906.1, class 2.
   c. The label shall have only letters 'LPG' in white at least 10mm high.

Note:	*iv.*	*CNG, LNG, H and EV label requirements are not mandatory in the Northern Territory however, where fitted, label requirements are recommended.*

2. For vehicles fuelled with CNG:
    a. The metal plate and label size must be a circle not less than 35mm diameter.
    b. The label colour shall be retroreflective red, complying with AS/NZ1906.1, class 2.
    c. The label shall have only letters 'CNG' in white at least 10mm in height.

3. For vehicles fuelled with LNG:
    a. The metal plate and label size must be a circle not less than 35mm diameter.
    b. The label colour shall be retroreflective standard green, complying with AS/NZ1906.1, class 2.
    c. The label shall have only letters 'LNG' in white at least 10mm in height.

4. For vehicles fuelled with Hydrogen and built after 1 January 2019:
    a. The metal plate and label must be a pentagon with each side 20mm in length.
    b. The label colour shall be retroreflective yellow, complying with AS/NZ1906.1, class 2.
    c. The label shall have only the capital letter 'H' in black that is at least 10mm in height with the base of the 'H' to be on a side of the label.



5. For vehicles powered by electricity and built after 1 January 2019:
    a. The metal plate and label must be an equilateral triangle with all sides 30mm in length.
    b. The label colour shall be retroreflective blue, complying with AS/NZ1906.1, class 2.
    c. The label shall have only the characters 'EV' in white capital letters, a minimum of 8mm in height.

b) The metal plates for the labels must be made of 1mm thick metal.

c) If more than one autogas fuel tank is fitted, the correct number of labels are not affixed.

Note:	v.	*If more than one tank is fitted (i.e. 2 tanks), 2 labels must be affixed to the front number plate and two labels affixed to the rear number plate*

10.2. Visually inspect for the presence of an approved autogas certification plate

Installation of autogas systems must be done in accordance with state regulations and licensing requirements. In the Northern Territory, NT Worksafe regulates autogas systems under *Dangerous Goods Regulations 1985* https://legislation.nt.gov.au/

Autogas installations performed by vehicle manufacturers must be fitted with a plate validating the installation.

Autogas systems must undergo a safety inspection by an authorised gas fitter or installer every five (5) years and be issued with a certificate of compliance or compliance plate.

Reasons for rejection

a) A vehicle which has an autogas system does not have:
    1. A metal plate fitted in a prominent position near the installation, showing:
        a. A statement that the installation complies with the Standards Australia code for the fuel type ("AS or AS/NZS 1425 for LPG" and "AS or AS/NZS 2739 for LNG/CNG").
        b. The date the installation was commissioned.
        c. The state or territory where installation was made.
        d. The identification number of the authorised/licensed gas fitter/installer.

OR

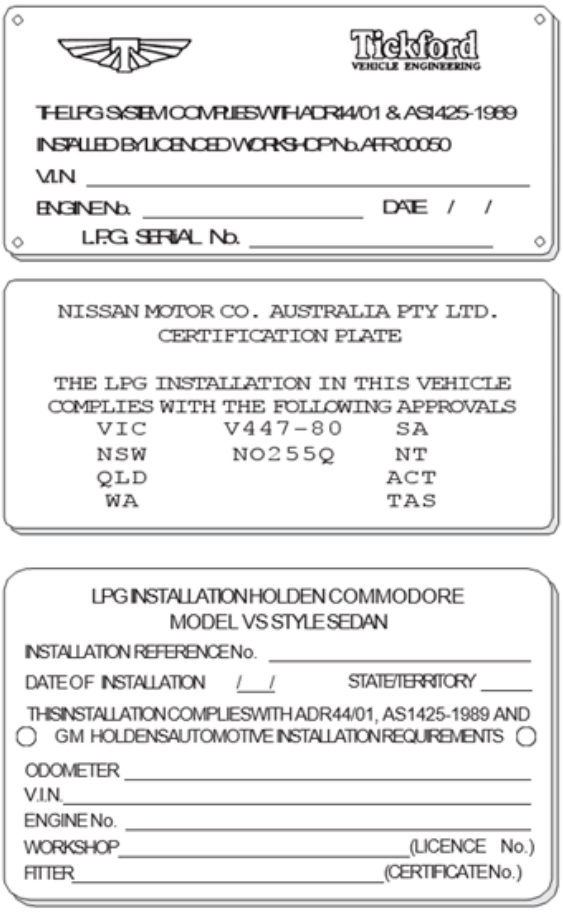
2. A plate fitted by the vehicle manufacturer, where the autogas system was installed by the original vehicle manufacturer.

b) Within the last five years:

1. the autogas system has not passed a safety inspection conducted by an authorised gas fitter or installer and
2. a certificate of compliance has not been issued.

Note:	*vi.*	*The age of the vehicle is determined by the month and year displayed on the vehicle compliance plate or as recorded on the Register of Approved Vehicles or as determined by a Transport Inspector/vehicle examiner.*
	vii.	*If any obvious or dangerous defects are observed with the fuel/power system installations, the vehicle is to be rejected and the reason recorded on the inspection report.*
	viii.	*Any autogas installation or modification in a vehicle must be certified by a licensed gas installer – refer to NT Worksafe.*

Examples of manufacturer's autogas certification plates



10.3. Visually inspect the autogas container

Reasons for rejection

a) The container is mounted externally.

b) The container is not installed within a protective compartment.

c) The container is located less than 75mm from the side panels of the vehicle.

d) The container is not marked '***This vessel shall be installed within a compartment inside the vehicle***'.

e) The container is removable without the use of tools from any vehicle other than those specified below:

   3. Fork lift trucks.
   4. Vehicles which do not use autogas as a means of propulsion.
   5. Diesel engine enhancement systems.

f) The container has:

   1. Advanced corrosion.
   2. Cuts or dents which penetrate the surface of the container.
   3. Any dent on the container which is deeper than 10% of the width of the dent, or which is located on a weld and exceeds 6.5mm in depth.
   4. Any dent or crease on the container which is longer than 75mm.
   5. The tank filler valve is not fitted with a cap sealed with an O-ring.
   6. The statutory life of the container has expired.

> **Note:** *ix. It is a statutory requirement for an autogas container to be checked for continued service life:*
>
> - *LPG - every ten years*
> - *LNG steel containers - every five years*
> - *Fibreglass reinforced plastic containers - every three years*
> - *CNG steel containers - every five years*
> - *As otherwise required by law – see NT Worksafe.*

g) The boot lid torsion bars, coil springs or hinges contact the container.

h) The container and its surface mounted fittings are not protected from damage by vehicle component (e.g. tail shaft) failure.

i) Where mounted within a cargo space the container is not protected from cargo or other objects carried in that area (i.e. it is not installed within an enclosed protective compartment).

j) The container or its gas carrying components are located within 150mm of a heat source and there is no heat shield.

> **Note:** *x. This may be reduced to 40mm if the shield is more than 15mm from a gas carrying component.*

k) The container is incorrectly aligned so that it impedes access to the container service valve.

l) The container is incorrectly aligned so that it impairs the operation of the ullage valve or the automatic fill limiter (AFL).

m) Where containers installed on or after 1 July 1988 have a wall thickness marked to be less than 2.2mm:

10.4. Visually inspect the container anchorages and straps

Reasons for rejection

a) Any anchorage straps allow the container to move.

b) There is only one anchorage strap used to secure the container.

c) The anchorage straps are cut, have advanced rust or are otherwise deteriorated.

d) The anchorage straps are smaller than the sizes shown in **Table 10.1 Dimension of container attachment devices**

Table 10.1 Dimension of container attachment devices

Autogas container size (litres)		Minimum anchorage strap dimensions (mm)	Bolt or stud diameter for anchorage strap mountings (mm)
	Up to 100	30 x 3	10
>100	Up to 150	50 x 6	12
>150	Approval limit	Approval required from state licensing department	

e) The anchorage bolts or studs are smaller than the sizes shown in **Table 10.1 Dimension of container attachment devices**.

f) The anchorage bolts or studs do not have locking devices (such as spring washers, split pins or lock nuts) fitted.

g) Reinforcement plates are missing or not shaped to the contours of the panel on which the container is mounted.

> **Note:**
> xi. *Reinforcement plates attached to sheet metal panels must be at least 75mm square and 3mm thick.*
> xii. *Where a compliance plate is fitted, the vehicle should not be rejected if reinforcement plates of mounting points are smaller than typical dimensions in the Standards Australia code, as compliance covers the whole installation.*

h) There are less than four (4) points of attachment to the vehicle structure.

10.5. Visually inspect remote filled internally mounted containers

Reasons for rejection

a) The compartment housing the container and its fittings, or the sub-compartment has electrical equipment other than the wiring connecting the contents gauge.

b) Wiring is not insulated or secured at interval of not more than 600mm.

c) Any conduit containing the piping and hoses which pass through an enclosed area of the vehicle is missing or damaged so that it allows venting to the inside of the vehicle.

d) The clamps for the conduit connections are missing or loose.

> **Note:** *xiii. Adhesives or sealing compounds are not acceptable as alternatives to mechanical clamps.*

e) The container service valve is inoperable.

f) The seals for any sub-compartment do not provide a gas-tight seal.

10.6. Visually inspect direct filled internally mounted containers

Reasons for rejection

a) The passenger compartment of the vehicle is not sealed from the container space.

b) The container space vent(s) is obstructed.

c) The container space vent outlet is less than 250mm from the exhaust system.

d) Wiring is not insulated or secured at intervals of not more than 600mm.

10.7. Visually inspect externally mounted containers

On vehicles less than 5 tonnes tare mass or where the chassis has 610mm ground clearance or less.

Reasons for rejection

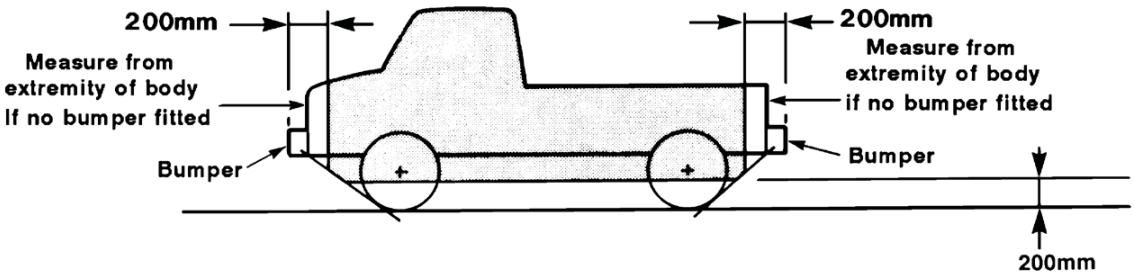
a) The tank, or any tank component, has less than 200mm ground clearance.

b) The tank, or any tank component, is not a minimum 200mm inboard of the original equipment bumper bars (measured on the centreline of the vehicle).

> **Note:** *xiv. If a bumper bar is not fitted, the measurement should be taken from the extremity of the permanent body work.*

c) The tank, or any tank component, is not above a line which is tangent to the front or rear wheels and slopes upward and outward to the extremities of the vehicle's permanent body work.

Figure 10.1 Tank mounting dimension limits



10.8. Visually inspect ullage and safety valves

Reasons for rejection

a) Where a container is fitted with an automatic fill limiter (AFL), there is no label at the filling point warning the driver '***AFL fitted - bleeding during filling not required***'.

Note:	*xv. An ullage valve is not required if the vehicle is fitted with an AFL*

b) Where an ullage valve is fitted, the outlet does not have a cap or plug.

c) Where a container is not fitted with an AFL, there is no label warning the driver to '***Stop filling when liquid appears***'.

d) The safety valve has any damage in the system or blockage to the discharge pipe, if fitted, or allows the discharge to strike the exhaust system, container or a bystander, or the protective cap is not functioning or is missing.

10.9. Visually inspect hydrostatic relief valves

Reason for rejection

a) The hydrostatic relief valve on multiple containers is damaged, or is not fitted with a self-closing device which prevents the entry of dirt or water into the outlet.

10.10. Visually inspect fuel lines, joints and connections

Reasons for rejection

a) Where chassis members do not provide protection for fuel lines under the vehicle, the piping is not shielded or encased in a protective sleeve.

b) The sleeving of any fuel line routed under the vehicle is damaged such that the fuel line is exposed.

c) Any supporting clips (required to be spaced at intervals of 600mm) are missing or do not provide effective support to the fuel line.

d) Any provision has been made to allow use of the gas fuel for purposes other than as automotive fuel.

e) Any fuel line that is less than 150mm (or 50mm when protected by a heat shield) from any exhaust component.

10.11. Visually inspect shut off devices, converters (vaporiser regulators), fuel selectors and air/gas mixers

Reasons for rejection

a) The fuel shut off device is not securely mounted.

b) The fuel shut off device allows the fuel to flow to the converter while the ignition and the engine are off;

c) The converter is not securely mounted.

d) Where the converter uses water circulation to assist in vaporisation, the water hoses leak or are deteriorated.

e) Air/gas mixers are not securely mounted or vapour lines and connections have leaks.

> **Note:** *xvi. Where there are any signs of leakage from any component, the system must be thoroughly leak tested under normal Autogas operating pressure using an approved gas detecting device or foaming agent solution. The solution must be applied to the component having the suspected leak.*

f) The filling connection does not have a captive cap.

g) The high tension ignition wiring or electrical contacts in the engine compartment are exposed.

h) A vehicle operating on liquid petroleum gas (LPG) or compressed natural gas (CNG) and petrol does not have the emission control equipment fitted to enable compliance with emission levels when operating on petrol.

i) Any gas leaks.

10.12. Visually inspect the LPG electrical wiring

Reasons for rejection

a) Electrical wiring is not securely mounted and insulated, is exposed to excessive heat or chafing or located in such a way that would cause danger to the operation of the vehicle.

b) Electrical wiring hinders driver or passenger movement.

c) Electrical wiring does not have sufficient insulation.

d) Wiring is not secured at interval of not more than 600mm.

10.13. Test the operation of the fuel containment system

Test as described below depending on the type of system fitted at the container.

Excess flow valve

Close the service valve and run the engine until the fuel line is empty. With the ignition turned OFF, quickly open the service valve.

Reason for rejection

a) The excess flow valve does not produce a click or thud sound, or the owner is not able to produce a letter from State or Territory authorised/licensed gas fitter/installer certifying that the excess flow valve is operating satisfactorily.

Note:	*xvii. The certificate number and licence number of the State or Territory authorised/licensed gas fitter/installer are to be recorded in the inspection report.*
	xviii. This test can only be conducted by State or Territory authorised examiner, accredited for this purpose.
	xix. If an automatic fuel shut off device is fitted at the container, there is no requirement to test the excess flow valve.

Automatic fuel shut off device (AFSOD)

Deactivate the AFSOD and run the engine until the service line is empty and the engine stalls.

Reasons for rejection

a) The engine fails to stall or the engine stalls but then re-starts after a short period.

Note:	*xx. Alternatively, the owner is to produce a certificate from an Autogas Installer certifying that the excess flow valve is operating satisfactorily.*
	xxi. The certificate number and licence number of the State or Territory authorised/licensed gas fitter/installer are to be recorded in the inspection report.
	xxii. Any autogas fitment or repair(s) must comply with Australian Standard AS/NZS 1425:2013 LP Gas fuel systems for vehicle engines.
	xxiii. This test can only be conducted by State or Territory authorised examiner, accredited for this purpose.