Section 12

LPG, NG and Hydrogen and Electric Vehicles

Objective:

To conduct a visual inspection of vehicles fitted with an alternative fuel types or electric drives and the associated components.

Australian Design Rules relevant to this section

ADR 42	General safety requirements
ADR 44	Specific purpose vehicle requirements
ADR 80	Emission control for heavy vehicles
ADR 109	Electric Power Train Safety Requirements
ADR 110	Hydrogen-Fuelled Vehicle Safety Related Performance

➘ ADR 80 applies to vehicles operating on LPG or NG with a GVM in excess of 3500kg as of 1 January 2004. Compressed natural gas (CNG) is also known as natural gas for vehicles (NGV).

Natural gas (NG) means both CNG and liquid natural gas (LNG).

Hydrogen powered vehicle means a vehicle powered by and fitted with one or more hydrogen fuel containers Electric powered vehicle means a vehicle that is powered by one or more electric or traction motors.

12.1. Visually inspect LPG and NG vehicles for approved LPG or NG system

Visually inspect for the presence of an approved LPG or NG compliance plate and number plate labels.

A vehicle which has an LPG or NG fuel system fitted must have a metal plate (compliance plate) fitted in a prominent position near the installation, showing:

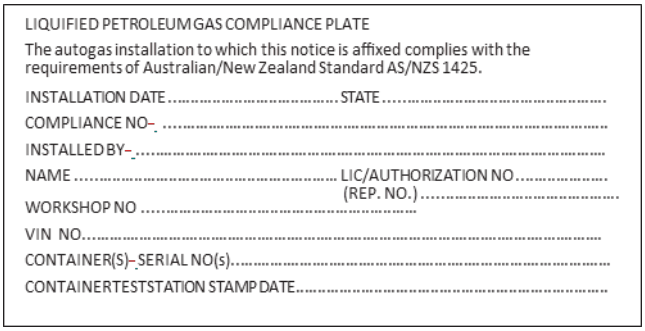
a. a statement that the installation complies with the Standards Australia code for the fuel type (Australian/ New Zealand Standard AS/NZS 1425 for LPG or Australian Standard AS 2739 for NG)
b. the date the installation was commissioned
c. the state or territory where installation was made
d. the vehicle identification number (VIN) or chassis number
e. the identification number of the suitably qualified installer.

There is no requirement for a modification plate to be fitted to a vehicle with an approved LPG or NG system unless structural modifications were undertaken to the vehicle to install the LPG or NG system.

Reason for rejection

a. Vehicle does not have an approved LPG or NG compliance plate. acceptable plates are either:
   - A plate fitted by a state or territory authorised/licensed gas fitter/installer, or
   - A plate fitted by the vehicle manufacturer, where the LPG or NG system was installed by the original vehicle manufacturer.

The following are examples of acceptable compliance plates that have been fitted by vehicle manufacturers:


LIQUIFIED PETROLEUM GAS COMPLIANCE PLATE
The autogas installation to which this notice is affixed complies with the requirements of Australian/New Zealand Standard AS/NZS 1425.
INSTALLATION DATE ..... STATE .....
COMPLIANCE NO- .....
INSTALLED BY- .....
NAME ..... LIC/AUTHORIZATION NO ..... (REP. NO.) .....
WORKSHOP NO .....
VIN NO. .....
CONTAINER(S)- SERIAL NO(s) .....
CONTAINER TEST STATION STAMP DATE .....

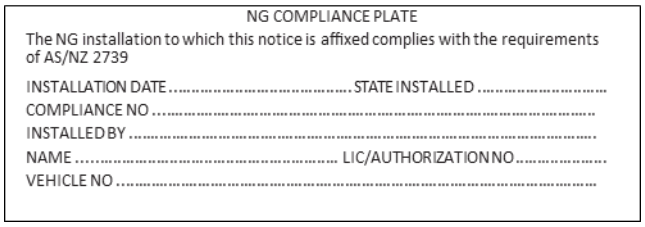
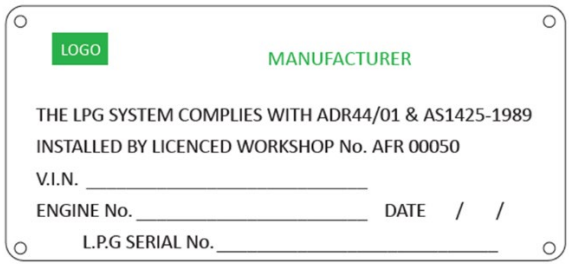

NG COMPLIANCE PLATE
The NG installation to which this notice is affixed complies with the requirements of AS/NZ 2739
INSTALLATION DATE ..... STATE INSTALLED .....
COMPLIANCE NO .....
INSTALLED BY .....
NAME ..... LIC/AUTHORIZATION NO .....
VEHICLE NO .....

Figure 12.1 acceptable LPG or NG compliance plate examples for in-service fitments


LOGO
MANUFACTURER
THE LPG SYSTEM COMPLIES WITH ADR44/01 & AS1425-1989
INSTALLED BY LICENCED WORKSHOP No. AFR 00050
V.I.N. _____
ENGINE No. _____ DATE / /
L.P.G SERIAL No. _____

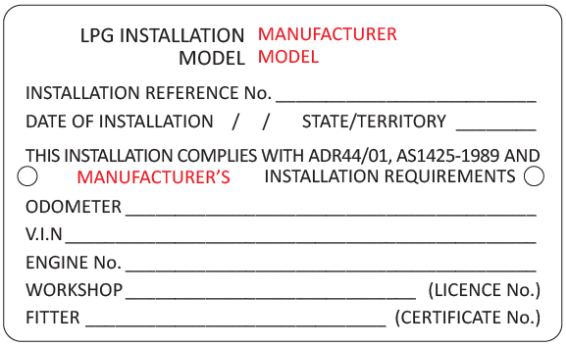

LPG INSTALLATION MANUFACTURER
MODEL MODEL
INSTALLATION REFERENCE No. _____
DATE OF INSTALLATION / / STATE/TERRITORY _____
THIS INSTALLATION COMPLIES WITH ADR44/01, AS1425-1989 AND
MANUFACTURER'S INSTALLATION REQUIREMENTS
ODOMETER _____
V.I.N _____
ENGINE No. _____
WORKSHOP _____ (LICENCE No.)
FITTER _____ (CERTIFICATE No.)

Figure 12.2 acceptable LPG or NG compliance plate examples for OEM fitments

b. For installations after 1999, a vehicle does not have acceptable, durable and reflective number plate labels fitted to the front and rear of the vehicle indicating it is LPG or NG fuelled.

Acceptable number plate labels are shown in Figure 12.3.

12.2. Visually inspect the LPG or NG system

Reasons for rejection

a. The container has:
   - advanced corrosion or fire damage
   - cuts or dents which penetrate the surface of the container
   - 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
   - any sharp impression or crease on the container which is longer than 75mm or is deeper than 25% of the wall thickness.

b. The statutory life of the container has expired:
   - LPG every 10 years
   - NG steel containers every 5 years
   - Fibreglass reinforced plastic (FRP) containers every 3 years.

➘ It is a statutory requirement for an LPG or NG container to be checked for continued service life.

c. Any metal parts contact the container (excluding clamping bands)

d. The container:
   - is not securely restrained
   - is only restrained by a single strap
   - is restrained by straps that are damaged or have deteriorated
   - is not attached to the vehicle structure at least at 4 points.

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

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

g. If fitted the sleeving of any fuel line routed under the vehicle is damaged such that the fuel line is exposed

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

i. Any provision has been made to allow use of the gasfuel for purposes other than as automotive fuel

j. Any fuel lines, joints, connections or gas carrying components leak

➘ Extreme caution should be taken if a gas leak is identified. If possible shut/close-off the manual gas isolation valve and contact local emergency services.

k. Any other component of the fuel system is cracked, broken, distorted, missing or corroded to the point where it is weakened or failure is likely to occur

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

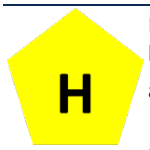
Figure 12.3 Acceptable LPG, NG, Hydrogen or Electric number plate label examples

Number plate label for vehicles fuelled with LPG:
a. The metal plate and label size shall be not less than 25mm square mounted as a diamond
b. The label colour shall be retroreflective red, complying with AS/NZS 1906.1, Class 2
c. The label shall have only the letters 'LPG' in white at least 10mm in height.

Number plate label for vehicles fuelled with CNG:
a. The metal plate and label size shall be a circle not less than 35mm diameter
b. The label colour shall be retroreflective red, complying with AS/NZS 1906.1, Class 2
c. The label shall have only the letters 'CNG' in white at least 10mm in height.

Number plate label for vehicles fuelled with LNG:

a. The metal plate and label size shall be a circle not less than 35mm diameter
b. The label colour shall be retroreflective standard green, complying with AS/ NZS 1906.1, Class 2
c. The label shall have only letters 'LNG' in white at least 10mm in height.



Number plate label for vehicles fuelled with hydrogen:

a. The metal plate and label size shall be a regular pentagon shape each side of which is 20mm long
b. The label colour shall be retroreflective yellow, complying with AS/ NZS 1906.1, Class 2
c. It is marked 'H' in a black capital letter that is at least 10mm in height

Number plate label for vehicles using electricity as a means of propulsion:

a. The metal plate and label size shall be an equilateral triangle shape each side of which is 30mm in length
b. The label colour shall be retroreflective blue, complying with AS/ NZS 1906.1, Class 2
c. It is marked 'EV' in a white capital letter that is at least 10mm in height

Figure 12.4 Hydrogen or Electric label examples

For vehicles using high voltage electricity:
The label colour shall have a yellow background with black arrow and border

For vehicles fuelled with hydrogen:

a. The label colour shall have a light blue background with white retroreflective border, letters, and symbols
b. The label should be ≥ 110 mm wide and ≥ 80 mm heigh.
c. The label shall be weather resistant.
d. The centre zone indicates the first energy source
e. The upper zone indicates the second energy source
f. The left zone indicates the gas behaviour due to density
g. The right zone indicates the state of aggregation of stored gaseous fuel

12.3. Visually inspect hydrogen vehicles for approved hydrogen number plate label

Reasons for rejection

a. A vehicle manufactured/modified to operate on hydrogen from 1 January 2019 does not have acceptable, durable and reflective number plate labels fitted to the front and rear of the vehicle indicating it is hydrogen fuelled.
b. The number of labels on the front and rear number plates number do not correspond with:
   – 1 acceptable label on each number plate if the vehicle is fitted with 1 hydrogen fuel container; or
   – 2 acceptable labels on each number plate if the vehicle is fitted with 2 or more hydrogen fuel containers.

12.4. Visually inspect hydrogen system

💣**High pressure and high voltage electrical system risk**. Undertaking any more than a visual inspection requires a person holding relevant qualifications.

Reasons for rejection

a. The container has:
   – advanced corrosion or fire damage
   – cuts or dents which penetrate the surface of the container
   – any significant dents on the container
   – any sharp impression or crease on the container
b. Any metal parts contact the container (excluding clamping bands)
c. The container:
   – is not securely restrained
   – is only restrained by a single strap
   – is restrained by straps that are damaged or have deteriorated
   – is not attached to the vehicle structure at least at 4 points.
d. If fitted the sleeving of any fuel line routed under the vehicle is damaged such that the fuel line is exposed
e. Any supporting clips are missing or do not provide effective support to the fuel line
f. Any provision has been made to allow use of the gasfuel for purposes other than as automotive fuel
g. Any fuel lines, joints, connections or gas carrying components leak

↘ Extreme caution should be taken if a gas leak is identified. If possible shut/close-off the manual gas isolation valve and contact local emergency services.

h. Any other component of the fuel system is cracked, broken, distorted, missing or corroded to the point where it is weakened or failure is likely to occur
i. The container or gas carrying components are located within 150mm of a heat source and there is no heat shield.
j. HV wiring is not adequately secured
k. Batteries and not secured
l. Batteries show signs of leaking or expansion
m. Battery box ventilation system is blocked or not operating
n. Any HV electrical components show signs of shorting, over current draw or deterioration
o. An electric motor does not operate as intended
p. A generator/re-generation unit does not operate as intended
q. Hydrogen system warning light not cycling when ignition is switched "on".
r. High voltage warning label not fitted. (figure 12.4)
s. Hydrogen label at the front left or right side of the vehicle is not fitted. (figure 12.4)
t. Visual or audible signal not displayed when vehicle first placed into active drive mode (not for vehicles fitted with an ICE).
u. Vehicle has electrolyte leaking from HV system.
v. Energised HV components are exposed (except for roof mounted charging components)
w. Hydrogen cylinders are not labelled (name, serial number, date of manufacturer, type of fuel)

x. Label not fitted at refuelling location stating fuel type

💣**Fuel cell electric vehicles (FCEV)**.
FCEV produce water as part of the fuel cell conversions process. This water is design to drain beneath the vehicle and as such should not be considered as a reason for rejection.

12.5. Visually inspect hybrid and electric vehicles for approved electric vehicle number plate label

Visually inspect for the presence of an approved electric vehicle number plate labels.

Acceptable electric vehicle number plate labels are shown in Figure 12.3.

Reasons for rejection

a. A vehicle manufactured/modified to operate on electric/hybrid drive from 1 January 2019 does not have an acceptable, durable and reflective number plate labels fitted to the front and rear of the vehicle indicating its means of propulsion is electric powered/assisted.

12.6. Visually inspect hybrid and electric vehicle system

➘ When inspecting the high voltage wiring of an electric or hybrid vehicle extra care needs to be taken. For identification purposes high voltage (HV) wires are generally colour coded orange.

Should a person inspecting a high voltage system have concerns or require more information, please contact a person certified to work on high voltage systems in your state or territory.

Reasons for rejection

a. HV wiring (including insulation) is chafing, damaged or deteriorated
b. HV wiring is not adequately secured
c. Batteries and not secured
d. Batteries show signs of leaking or expansion
e. Battery box ventilation system is blocked or not operating
f. Any HV electrical components show signs of shorting, over current draw or deterioration
g. An electric motor does not operate as intended
h. A generator/re-generation unit does not operate as intended
i. Rechargeable electrical energy storage system (REESS) warning light not cycling when ignition is switched “on”.
j. High voltage warning label (figure 12.4) not fitted.
k. Visual or audible signal not displayed when vehicle first placed into active drive mode (not for vehicles fitted with an ICE).
l. Vehicle has electrolyte leaking from HV system.
m. Energised HV components are exposed (except for roof mounted pantograph style charging components)