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LPG equipment and accessories — Automotive LPG vehicles workshops

Part 1: Working areas and procedures

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National foreword

This British Standard is the UK implementation of EN 16652-1:2016.

The UK participation in its preparation was entrusted to Technical Committee PVE/19, LPG containers and their associated fittings.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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European foreword

This document (EN 16652-1:2016) has been prepared by Technical Committee CEN/TC 286 "Liquefied petroleum gas equipment and accessories", the secretariat of which is held by NSAI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2016, and conflicting national standards shall be withdrawn at the latest by November 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

This European Standard does not purport to address all of the health and safety risks, if any, associated with its use. It is the responsibility of the user to establish appropriate health and safety practices and to ensure compliance with any national legislative and regulatory obligations.

Users should perform their own full risk assessment to address all of the health and safety risks, as required by national legislation.

Training and competency requirements for personnel involved in the activities are not included in the scope of this standard but are planned to be addressed in a second part to this European Standard.

This European Standard specifies the requirements for working areas and the procedures for the installation of LPG systems on vehicles and for the repairing and maintenance of vehicles equipped with LPG systems.

This European Standard should be used for aspects not covered by the manuals provided by the manufacturers of LPG vehicles and/or retrofit systems.

Protection of the environment is a key political issue in Europe and elsewhere, for CEN/TC 286 this is covered in CEN/TS 16765 [2] *LPG equipment and accessories - Environmental considerations for CEN/TC 286 standards*, and this Technical Specification should be read in conjunction with this standard.

It is recommended that users develop an environmental management policy. For guidance see EN ISO 14021[3], EN ISO 14024 [4] and EN ISO 14025 [5]. It has been assumed in the drafting of this European Standard that execution of its provisions is entrusted to appropriately qualified and experienced people.

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1 Scope

This European Standard sets out the requirements for automotive LPG working areas and procedures, aimed at reducing the risk of fire and explosion of LPG when the following types of work or activity are carried out:

a) equipping vehicles with an LPG system to use LPG for propulsion purposes;

b) maintenance, servicing and repairs to the LPG system;

c) any other LPG vehicle maintenance, servicing or repairs not involving the LPG system.

The operations described in items a) and b) above are undertaken in dedicated LPG working areas, whereas item c) is undertaken in general service working areas.

This Standard does not address how to equip a vehicle with an LPG retrofit system or how to repair or maintain an LPG vehicle.

NOTE Such provisions are normally provided in the instruction manuals issued by the relevant manufacturers.

2 Normative references

Not applicable.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
liquefied petroleum gas
LPG
low pressure liquefied gas composed of one or more light hydrocarbons which are assigned to UN 1011, UN 1075, UN 1965, UN 1969 or UN 1978 only and which consists mainly of propane, propene, butane, butane isomers, butene with traces of other hydrocarbon gases

Note 1 to entry: For automotive LPG specification, see EN 589 [6].

3.2
competent person
person which by combination of appropriate qualification, training, experience, and resources, is able to make objective judgments on the subject

3.3
contents gauge
device to indicate the liquid level or contents in a pressure vessel

3.4
remote-controlled service valve
device that allows or interrupts the LPG supply to the vaporizer/pressure regulator

3.5
service valve
valve for fluid off-take which is manually operated to provide a leak-tight seal

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3.6
gas-free
less than 20 % of the lower explosive limit of LPG in air

3.7
disposal
gas-freeing and discarding LPG pressure vessels either in the form of scrap metal or for use in non-pressure applications

3.8
purging
displacing LPG with a non-flammable gas, steam or water or the reverse procedure

3.9
container
pressure vessel used for the storage of automotive LPG

3.10
service container
pressure vessel used for the storage within a workshop of automotive LPG unloaded from a container

3.11
LPG system
installation for propulsion purposes consisting of an arrangement of container(s), safety device(s), pressure regulator(s), vaporiser(s), connection(s), valve(s), piping, tubing, hose, fitting(s) and devices intended to store, supply, monitor or control the flow of LPG excluding the engine

3.12
overfill protection device
OPD
device designed to automatically reduce the filling rate to a minimal flow when the fill level reaches a predetermined amount

Note 1 to entry: In automotive applications, the predetermined amount is 80 % of the water capacity.

3.13
hazardous area
area in which an explosive atmosphere is or may be present, in a quantity such as to require special precautions for the construction and installation of equipment and use of apparatus

3.14
ignition source
source of energy sufficient to ignite a flammable atmosphere

Note 1 to entry: Includes naked flames, exposed incandescent material, sparks, electric welding arcs, and electrical or mechanical equipment not approved for use in hazardous locations.

3.15
service pit
hole in the ground providing standing access to the underside of a vehicle

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3.16
electronic control unit
ECU
device that controls the electrical power supply to the remote-controlled service valves

3.17
on board diagnostic
OBD
system for emission control of the vehicle which has the capability of identifying the likely area of malfunction by means of fault codes stored in a computer memory

3.18
fixed liquid level gauge
control device, such as a dip tube in combination with a vent valve to indicate when a predetermined liquid level has been reached or surpassed

4 Working areas

4.1 General service working areas

This subclause applies to automotive working areas and servicing workshops which may be required to do work on any vehicle equipped with an LPG system but not on the LPG system itself (e.g. service station and lubrication bays, premises specializing in engine tuning, suspension, tyres or brakes and body repairs).

The presence of a vehicle equipped with a normally operating LPG system within the workshop shall not require any special extension of the normal ventilation, working space, and access to open space outside.

4.2 Dedicated LPG working areas

4.2.1 General

4.2.1.1 The requirements of this subclause apply to working areas where the equipping of vehicles with LPG systems, or the repairing and the maintenance of LPG systems are carried out.

The atmosphere within the working area shall be maintained within occupational exposure limits during and after the operations are completed.

4.2.1.2 Subclauses 4.2.1.3 to 4.2.1.8 apply when:

— the components of the LPG system involved in any of the following operations contain gas at a pressure above atmospheric pressure; or

— the components of the LPG system involved in any of the following operations contain gas at a pressure less than or equal to atmospheric pressure and are not isolated from other parts of the system; or

— an increased hazard, as defined in 5.1.1, exists.

4.2.1.3 Where the equipping of vehicles to operate on LPG, or the repairing and the maintenance of LPG system are carried out, a working area shall be identified through a risk assessment. The risk assessment will include hazardous zone classification in accordance with ATEX requirements and any necessary ventilation requirements.

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NOTE For ATEX requirements see the relevant EU Directives (e.g. Directive 1999/92/EC [7] and 2014/34/EU [9]) and their transposition in national legislation.

4.2.1.4 If the working area does not encompass the entire workshop, it is advisable to clearly mark the designated working area(s) on the workshop floor.

4.2.1.5 In the working area, appropriate signage addressing the risks shall be displayed in accordance with national rules.

4.2.1.6 The floor level of the working area shall not constitute a depression in relation to the surrounding ground contours and levels unless appropriate extraction arrangements and gas detection systems are in place.

4.2.1.7 The working area shall not include or provide access to lower areas such as depressions, sumps, basements, unventilated pits, descending stairs, ramps or openings into drainage systems unless effectively sealed to prevent the ingress of LPG liquid or vapour.

4.2.1.8 The working area shall not be above any work space other than a properly ventilated service pit in accordance with provisions set out in 4.2.2.

4.2.2 Service pits

In dedicated LPG working areas where service pits are used, the following requirements shall also apply:

a) the pit shall be provided with a mechanical dilution ventilation system with the air flow sourced from the pit bottom and with the whole of the pit bottom being evenly air swept and without significant dead spots;

b) the location and direction of entry and discharge of airstreams for fans and duct systems shall be selected to minimize contamination and hazard;

c) the power supply to the service pit shall be configured in such a way that power is only available when the ventilation system is operational;

d) electric equipment and lights used in pits shall be suitable for use in explosive atmospheres with LPG;

e) the ventilation shall be suitable for use in explosive atmospheres with LPG; and

f) the atmosphere at the pit bottom shall be monitored for explosive conditions and breathable air with an acoustic and visual alarm system.

4.2.3 Equipment

The dedicated LPG working area should be provided with appropriate equipment, to ensure that the operators will be safe and the vehicle will be safe. A list of recommended equipment is provided in Annex A.

5 Procedures

5.1 Procedures in case of an increased hazard

5.1.1 An increased hazard exists if the LPG system contains gas and any of the following circumstances applies:

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a) the LPG system fittings have been disturbed and are not confirmed to be leak free, e.g. by one of the methods described in Annex F;

b) a gas leak is suspected or known (e.g. smell, noise, pressure drop); or

c) the vehicle has suspected damage to the LPG system (e.g. after accidents, after filling station drive-off).

5.1.2 In case of an increased hazard, the remote-controlled service valve and the service valve, if present, shall be closed and the hazard eliminated in a dedicated LPG working areas before any further work is done.

5.1.3 In case of an increased hazard, the following requirements apply:

a) air compressor intakes shall be kept out of the working area;

b) the explosive atmosphere monitoring system and the ventilation system of the service pits shall be active;

c) the remote-controlled service valve and the service valve, if present, shall be turned off;

d) under no circumstances shall heating, welding, or flame cutting be carried out;

e) no ignition source shall be activated (e.g. the engine shall not be started, no electric switch shall be operated, either to switch it on or off); and

f) every possible source of ignition shall be identified before any attempt is made to open up the vehicle as sparks may be caused by courtesy light switches, boot lights, by the action of disconnecting the battery, or may be introduced by the towing vehicle.

5.2 Prevention of overheating

5.2.1 General

When vehicles are undergoing repairs involving welding or the application of heat to any part within 1 m of a LPG system component, the component shall be shielded from the source of heat.

The shielding shall prevent heat transfer to the LPG system component and prevent welding arcs or weld splatter coming into contact with the component.

When arc welding, a non-conducting shield shall be used to prevent welding currents passing through the LPG system components.

5.2.2 Treatment of an LPG vehicle in the paint booth

5.2.2.1 In case of paint booths with ambient temperatures equal to or higher than 50 °C, the LPG container shall be removed from the vehicle and stored outdoors in a fenced and well-ventilated space, with the remote-controlled service valve and the service valve, if present, closed and caps shall be applied to seal the inlet and outlet valves. This procedure shall also be followed if a drying treatment such as infrared light is applied near the container and/or components containing LPG,

5.2.2.2 In case of paint booths with ambient temperatures lower than 50 °C, no specific provisions shall apply and the LPG container may be left in the vehicle during the treatment.

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