
Oprema in pribor za utekočinjeni naftni plin (UNP) - Delavnice za motorna vozila na UNP - 1. del: Delovna območja in postopki

LPG equipment and accessories - Automotive LPG vehicles workshops - Part 1: Working areas and procedures

Flüssiggas-Geräte und Ausrüstungsteile - Autogasfahrzeug-Werkstätten - Teil 1: Arbeitsbereiche und Verfahren

Équipements GPL et leurs accessoires - Ateliers pour véhicules automobiles fonctionnant au GPL - Partie 1: Zones de travail et modes opératoires

<https://standards.iteh.ai/catalog/standards/sist/6c7c6ba6-076f-4553-8aad-d52bd1d49770/sist-en-16652-1-2016>

Ta slovenski standard je istoveten z: EN 16652-1:2016

ICS:

| | | |
|-----------|--|--|
| 23.020.20 | Posode in vsebniki, montirani na vozila | Vessels and containers mounted on vehicles |
| 43.180 | Diagnostična, vdrževalna in preskusna oprema | Diagnostic, maintenance and test equipment |

SIST EN 16652-1:2016**en,fr,de**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 16652-1:2016

<https://standards.iteh.ai/catalog/standards/sist/6c7c6ba6-076f-4553-8aad-d52bd1d49770/sist-en-16652-1-2016>

EUROPEAN STANDARD

EN 16652-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2016

ICS 43.060.40; 43.180

English Version

LPG equipment and accessories - Automotive LPG vehicles workshops - Part 1: Working areas and procedures

Équipements GPL et leurs accessoires - Ateliers pour véhicules automobiles fonctionnant au GPL - Partie 1: Zones de travail et modes opératoires

Flüssiggas-Geräte und Ausrüstungsteile - Werkstätten für Autogas-Nachrüstsysteme - Teil 1: Arbeitsbereiche und Verfahren

This European Standard was approved by CEN on 13 February 2016.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

| Contents | Page |
|---|-------------|
| European foreword..... | 3 |
| Introduction | 4 |
| 1 Scope | 5 |
| 2 Normative references | 5 |
| 3 Terms and definitions | 5 |
| 4 Working areas | 7 |
| 4.1 General service working areas | 7 |
| 4.2 Dedicated LPG working areas | 7 |
| 4.2.1 General | 7 |
| 4.2.2 Service pits | 8 |
| 4.2.3 Equipment | 8 |
| 5 Procedures | 8 |
| 5.1 Procedures in case of an increased hazard | 8 |
| 5.2 Prevention of overheating | 9 |
| 5.2.1 General | 9 |
| 5.2.2 Treatment of an LPG vehicle in the paint booth | 9 |
| 5.3 Fuel unloading | 10 |
| 5.4 Gas-freeing | 11 |
| 5.5 Work on the LPG system | 11 |
| 5.6 Storage of unpurged containers | 11 |
| 5.7 LPG system decommissioning | 12 |
| 5.8 Scrapping | 12 |
| 5.9 Emergency measures | 12 |
| Annex A (informative) Dedicated LPG working area equipment | 13 |
| Annex B (informative) Fuel unloading methods | 14 |
| Annex C (informative) Container depressurising method | 20 |
| Annex D (informative) Gas-freeing methods | 22 |
| Annex E (informative) Emergency measures guidelines | 24 |
| Annex F (informative) Leak detection methods | 27 |
| Bibliography | 29 |

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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 16652-1:2016

<https://standards.iteh.ai/catalog/standards/sist/6c7c6ba6-076f-4553-8aad-d52bd1d49770/sist-en-16652-1-2016>

EN 16652-1:2016 (E)**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.

(standards.iteh.ai)

SIST EN 16652-1:2016

<https://standards.iteh.ai/catalog/standards/sist/6c7c6ba6-076f-4553-8aad-d52bd1d49770/sist-en-16652-1-2016>

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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

3.1

liquefied petroleum gas **LPG**

<https://standards.iteh.ai/catalog/standards/sist/6c7c6ba6-076f-4553-8aad-d52bd1d49770/sist-en-16652-1-2016>
SIST EN 16652-1:2016

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

EN 16652-1:2016 (E)**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

SIST EN 16652-1:2016

<https://standards.iteh.ai/catalog/standards/sist/6c7c6ba6-076f-4553-8aad-d52bd1d49770/sist-en-16652-1-2016>

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

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.

EN 16652-1:2016 (E)

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:

- iTeh STANDARD PREVIEW**
(standards.iteh.ai)
- 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:

- 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.

EN 16652-1:2016 (E)

5.3 Fuel unloading

5.3.1 Liquid LPG shall be safely removed from the LPG container by a competent person when:

- a leak exists which cannot be stopped by shutting off the remote-controlled service valve or by closing the service valve, if present;
- any container accessory is removed for service or replacement; or
- the container is taken out of service.

WARNING — It cannot be assumed that because the contents gauge shows empty or there is no indication of gas pressure in the container, that no fuel is present. Refrigeration effects from rapid blowing-down can leave a residue of unvaporized cold liquid LPG in the container. The container will contain gaseous LPG unless it has been made gas-free.

5.3.2 Liquid LPG shall be unloaded through the outlet connection of the container either by:

- returning to a service container, or
- flaring, or
- venting in a controlled and safe manner, or
- a combination of any of these options.

The LPG container should be removed from the vehicle before unloading unless this is considered dangerous due to the condition of the container.

NOTE Annex B gives examples of such methods.

5.3.3 When it is impossible to unload the fuel through the outlet connection of the container due to fault(s) of any of the outlet valves these valves shall be repaired or replaced after having depressurized the container.

NOTE Annex C gives an example of a depressurizing method.

5.3.4 For environmental protection reasons:

- LPG should be returned to a service container; and
- a container containing more than 5 l of liquid LPG should not be unloaded by venting or flaring.

5.3.5 The service container is not an automotive container and shall:

- be equipped with a contents gauge;
- be equipped with an overfill protection device (OPD);
- be equipped with a pressure gauge; and
- be of the liquid off-take type, if it is intended for carrying out the transfer of LPG back to the container.

NOTE See Directive 2010/35/EU[9] or Directive 97/23/EC[10] and national law for additional requirements.