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SANS 10087-8:2010

Edition 2

SOUTH AFRICAN NATIONAL STANDARD

The handling, storage, distribution and maintenance of liquefied petroleum gas in domestic, commercial and industrial installations

Part 8: Filling containers for LP gas operated fork lift vehicles in-situ

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Table of changes

Change No.	Date	Scope

Foreword

This South African standard was prepared by National Committee SABS/TC 1019, *Gas supply, handling and control (fuel, industrial and medical gases)*, in accordance with procedures of the SABS, in compliance with annex 3 of the WTO/TBT agreement.

This document was published in August 2010.

This document supersedes SABS 087-8:1976 (edition 1, reprinted in 1979).

This document is referenced in the Local Government Municipal Systems Act, 2000 (Act No. 32 of 2000) and the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).

Reference is made in 3.2.1 to "relevant legislation". In South Africa this means the Mine Health and Safety Act, 1996 (Act No. 29 of 1996).

Reference is made in 3.2.2 and clause 5 to "safety legislation". In South Africa this means the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) (as amended from time to time).

SANS 10087 consists of the following parts, under the general title, *The handling, storage distribution and maintenance of liquefied petroleum gas in domestic, commercial and industrial installations*:

Part 1: Liquefied petroleum gas installations involving gas storage containers of individual water capacity not exceeding 500 L and a combined water capacity not exceeding 3 000 L per installation.

Part 2: Installations of LPG systems in mobile units, including but not limited to caravans, motor homes, park homes and mobile kitchens.

Part 3: Liquefied petroleum gas installations involving storage vessels of individual water capacity exceeding 500 L.

Part 4: The transportation of LP gas including the design, construction, inspection, fittings, filling, maintenance and repair of LP gas bulk vehicles and rail tank cars.

Part 6: The application of liquefied petroleum and compressed natural gases as engine fuels for internal combustion engines.

Part 7: Storage and filling premises for refillable liquefied petroleum gas (LPG) containers of gas capacity not exceeding 19 kg and the storage of individual gas containers not exceeding 48 kg.

Part 8: Filling containers for LP gas operated fork lift vehicles in-situ.

Part 10: Mobile filling stations for refillable liquefied petroleum gas (LPG) containers of capacity not exceeding 9 kg.

Annex A is for information only.

Compliance with this document cannot confer immunity from legal obligations.

Reaffirmed and reprinted in May 2017.
This document will be reviewed every five years and be reaffirmed, amended, revised or withdrawn.

Introduction

This standard is developed to accommodate the companies who fill fork lift containers at dedicated sites, including containers being filled in-situ.

Contents

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The handling, storage, distribution and maintenance of liquefied petroleum gas in domestic, commercial and industrial installations

Part 8:
Filling containers for LP gas operated fork lift vehicles in-situ

1 Scope

1.1 This part of SANS 10087 covers the requirements for the filling of containers in-situ for LP gas operated fork lifts from fixed storage and filling equipment, including the siting and safe use of this equipment.

1.2 It does not cover safety precautions or the filling procedure for motor vehicles and stationary engines, which can be found in SANS 10087-3.

1.3 It does not cover the requirements for the single valve or any filling by mass of fork lift containers which is covered by the requirements given in SANS 10087-3.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. Information on currently valid national and international standards can be obtained from the SABS.

EN 1762, *Rubber hoses and hose assemblies for liquefied petroleum gas, LPG (liquid or gaseous phase), and natural gas up to 25 bar (2,5 MPa) – Specification*.

SANS 1186-1, *Symbolic safety signs – Part 1: Standard signs and general requirements*.

SANS 1825, *Gas container test stations – General requirements for periodic inspection and testing of transportable refillable gas containers*.

SANS 10019, *Transportable pressure receptacles for compressed, dissolved and liquefied gases – Basic design, manufacture, use and maintenance*.

SANS 10086-1, *The installation, inspection and maintenance of equipment used in explosive atmospheres – Part 1: Installations including surface installations on mines*.

SANS 10087-1, *The handling, storage, distribution and maintenance of liquefied petroleum gas in domestic, commercial, and industrial installations – Part 1: Liquefied petroleum gas installations involving gas storage containers of individual water capacity not exceeding 500 L and a combined water capacity not exceeding 3 000 L per installation.*

SANS 10087-3, *The handling, storage, distribution and maintenance of liquefied petroleum gas in domestic, commercial, and industrial installations – Part 3: Liquefied petroleum gas installations involving storage vessels of individual water capacity exceeding 500 L*.

SANS 10087-6, *The handling, storage, distribution and maintenance of liquefied petroleum gas in domestic, commercial, and industrial installations – Part 6: The application of liquefied petroleum and compressed natural gases as engine fuels for internal combustion engines*.

SANS 10087-7, *The handling, storage, distribution and maintenance of liquefied petroleum gas in domestic, commercial, and industrial installations – Part 7: Storage and filling premises for refillable liquefied petroleum gas (LPG) containers of gas capacity not exceeding 19 kg and the storage of individual gas containers not exceeding 48 kg*.

SANS 10108, *The classification of hazardous locations and the selection of apparatus for use in such locations*.

SANS 10142-1, *The wiring of premises – Part 1: Low-voltage installations*.

SANS 10142-2, *The wiring of premises – Part 2: Medium-voltage installations above 1 kV a.c. not exceeding 22 kV a.c. and up to and including 3 MVA installed capacity.*

SANS 10400 (SABS 0400), *The application of the National Building Regulations*.

3 Definitions

For the purpose of this document, the following definitions apply.

3.1
approved
approved by the approving authority

3.2
approving authority
appropriate of the following:

3.2.1
within the scope of the relevant legislation (see foreword) and in respect of the control of the general safety: the chief inspector;

3.2.2
within the scope of the safety legislation (see foreword) and in respect of the control of general safety: the chief inspector;

3.2.3
within the scope of SANS 10400 and in respect of the evaluation and control of installations in accordance with this part of SANS 10087: the local authority in whose area of jurisdiction the installation is installed

3.3
competent person
person having the knowledge, training and experience specific to the work or task being performed

3.4
container
container that complies with SANS 10019 and that is approved for the storage and conveyance of liquefied petroleum gas and of individual water capacity not exceeding 50 L

3.5
filling area
area that comprises the following equipment:

a) filling pump;

b) gas supply; and

c) filling point

3.6
filling enclosure
enclosure within the filling area that includes the filling pump and gas supply that is expressly equipped and used for refilling or storage of gas containers (or both)

3.7
filling point
point where the connection is made to the fork lift container for filling purposes

3.8
liquefied petroleum gas
LPG
commercial butane, commercial propane, or a mixture of light hydrocarbons (predominantly propane, propene, butane and butene) that is gaseous under conditions of ambient temperatures and pressure, and that is liquefied by an increase of pressure or a lowering of temperature (see also SANS 1774)

4 Filling area and site

NOTE See annex A for typical layout of filling fork lift trucks.

4.1 Safety distances

For safety distances from bulk storage and filling equipment, other sources of ignition and boundaries etc., use the requirements as given in SANS 10087-3.

For safety distances from liquid filling containers to filling points see SANS 10087-3.

4.2 Filling enclosure

The filling enclosure shall be clearly demarcated and shall be in the open, away from any combustible materials, and there shall not be any source of ignition within the radius of 5 m of the filling point, and any flame or fire within a radius of 15 m. No unauthorized person shall be allowed to enter the filling enclosure.

4.3 Filling area

The filling area shall have a firm level base of non-combustible material e.g. concrete, and to minimize the possibility of gas accumulation shall contain no pits, drains, depressions or under-floor openings of any kind within a radius of 5 m of the filling point.

4.4 Roof covering

The filling area may have a canopy or roof of non-combustible material to provide weather protection and to protect the filling equipment from direct sunlight. The canopy or roof, (when fitted) shall be at least 2,5 m above floor level and so designed as to allow free movement of air past the filling equipment and the operator and to obviate the danger of gas accumulation.

4.5 Side walling

Where climatic conditions necessitate the provision of side sheeting, (excluding firewall and boundary walls) it shall be of a non-combustible material and ventilation shall be provided at ground and eaves level to prevent the accumulation of gas.

Where side sheeting is used, it shall terminate at least 150 mm below the eaves and 150 mm above ground level. Where solid walls other than firewalls or screening walls are used, either the above spacing applies or airbricks (without vermin proof gauze) spaced not more than 250 mm apart shall be provided in all the walls at ground and eaves level. Where solid walls are used there shall not be more than two adjoining walls on any site. The openings shall cover at least 10 % of the floor area.

4.6 Safety hazard signage

At least two sets of symbolic safety signs, that comply with the requirements for PV_1 signs (smoking prohibited), PV_2 signs (fire or lights (or both) prohibited) and PV_3 signs (thoroughfare for pedestrians prohibited) and PV_{27} signs (cellular phones prohibited) given in SANS 1186-1 should be placed at the boundary of the filling enclosure and one set of symbolic safety signs in the case of storage facilities less than 250 kg. The position and method of placement shall be in accordance with approved practice. Each sign shall be of dimensions at least 190 mm × 190 mm.

5 Electrical equipment

Electrical equipment installed or used on or in the vicinity of the filling site shall be in accordance with the relevant requirements of SANS 10087-3. All electrical and electronic installations shall comply with the requirements of the safety legislation (see foreword), Electrical Installation Regulations or Electrical Machinery Regulations, together with, SANS 10086-1, SANS 10108, and SANS 10142-1. An emergency stop switch shall be provided. This switch shall be located outside of the filling enclosure for easy access.

Uncertified electrical equipment or systems shall not be installed in hazardous locations.

6 Location of containers and dispensing equipment

The location of containers or bulk tank equipment shall be as in SANS 10087-1 and SANS 10087-3. The location of dispensing equipment shall be in accordance with the requirements as given in annex B of SANS 10087-3. It also indicates the area that needs to be enclosed. Enclosures shall be compliant with the requirements as given in SANS 10087-7.

7 Equipment

7.1 General

All original equipment, maintenance and replacement of equipment (such as hoses, pumps pipes valves etc.) shall be in accordance with the relevant requirements as given in SANS 10087-3.

7.2 Hose assembly

Each dispenser hose assembly shall be provided either with a pull-away coupling or a safety break connection designed to part at loads of approximately 25 kg to protect the dispenser in the event of a "drive-off" with the hose. The coupling shall be designed to part cleanly and seal both ends to prevent loss of contents.

The hoses shall be in accordance with the requirements EN 1762.

Hose end nozzles shall not allow the flow of product unless connected to the fork lift cylinder connection.

Where hoses are in service they shall be tested annually and be replaced after 5 years.

8 Fork lift container and valves

8.1 Containers shall comply with the design specification requirements of SANS 10019. Containers used for fork lifts shall be so designed as to accommodate the engagement of a device to ensure the correct orientation of the container when in use. For inspection purposes the container shall be subjected to the requirements as given in SANS 1825, this will include the reject criteria and scrapping of containers.

8.2 Single outlet containers are required to be fitted with a dip tube for use in the liquid phase when in the horizontal position. The container is protected by means of a safety relief valve connected to the vapour space and the valve outlet is protected by means of an excess flow valve. The single outlet valve ensures that the container is filled by mass in the vertical position and shall be transported and stored in this position. When put to use it is in the horizontal position. Labelling shall indicate the above requirements and those given in SANS 10019.

8.3 Multi-outlet containers with the appurtenances attached to the barrel or dome of the container are required to be fitted with a dip tube for use in the liquid phase when in the horizontal position. The container is protected by means of a safety relief valve connected to the vapour space and the valve outlet is protected by means of an excess flow valve.

Containers with the appurtenances fitted in the dome section and used in the horizontal position shall be transported and stored in the vertical position. In addition the following appurtenances shall be fitted to the container:

a) a contents gauge operated in the horizontal position and labelled accordingly;

b) a vapour equalising valve piped to the vapour phase; and

c) a fixed liquid level gauge indicating the 80 % liquid level in both horizontal and vertical position of the container with appurtenances in the dome or where the appurtenances are fitted in the barrel a fixed liquid level gauge indicating the 80 % liquid level shall be fitted in the horizontal position of the container.

9 Container exchange and storage

Storage for exchange containers shall be strictly in accordance with the relevant requirements given in SANS 10087-7.

10 Prevention and control of fires involving LPG

10.1 Fire fighting and protection facilities are to be provided as per the requirements as given in SANS 10087-7.

10.2 Fire-fighting facilities shall be available and in position before filling commences and the operator of the LPG equipment shall have been properly trained in their use. (See SANS 10087-7).

11 Filling operations

11.1 General

Containers of the single valve outlet type shall be filled by mass in a filling site complying with the requirements of SANS 10087-3.

11.2 Procedure before filling in-situ

1) The fork lift truck shall be made safe prior to any filling taking place by:

   a) switching off the engine;

   b) applying the hand brake to the "on" position;

   c) placing the chocks in position in front of the wheels; and

   d) removing the ignition key from the vehicle.

2) The dispensing of LPG shall be carried out only by a qualified operator who is fully conversant with the system and has been qualified in terms of the requirements as given in SANS 10087-7. In addition to the requirements as given in SANS 10087-7 the operator shall be trained with the operating instructions of the manufacturers of the equipment concerned, a copy which shall be available at the enclosure. These requirements shall form part of the operating instructions.

3) The filling facilities, i.e. the storage container(s), pipework, hoses, pumps and other dispensing equipment as well as the fire-fighting equipment, shall be inspected before filling commences.

4) The valves and fittings of the fuel system of a vehicle, as well as the container to be filled, shall be inspected to the requirements as provided in SANS 10019 to ensure that they are free from sharp dents, cuts, gouges, distortions, corrosion or any other defect likely to render them unfit for LPG service.

5) The liquid content of the container shall be determined before filling commences by checking the reading on the magnetic float gauge. Where no magnetic float gauge is available on the container the filling shall be done in accordance with the requirements of SANS 10087-3 and shall not be filled in-situ.

11.3 Filling procedure

The following procedure shall be applied after the checks in 11.2 have been completed:

1) Connect the static bonding/earth cable.

2) Ensure that both the hose connection and the shut-off valve are clean.

3) Connect the liquid line from the dispensing pump to the shut-off valve on the fuel container.

4) Open the container valve.

5) Ensure that the hose connector and the tank valve are clean.

6) When provided, connect the vapour return line to the vapour equalising valve.

7) If filling is affected from a multiple container manifold, make sure that all the liquid outlets of the container valves are open.

8) Start the pump.

9) Open the quick-acting valves on the liquid and vapour lines.

10) Check the container appurtenances (using a soapy water solution) to ensure that they are free from leaks. If a leak is detected stop filling the container, label the container as being defective and remove to a safe area.

11) Observe the rise of the liquid level indicated on the magnetic float gauge. This gauge shows percentage contents and not the actual volume.

12) When the float gauge shows 75 % full, slightly open the fixed liquid level gauge. This gauge should show a small jet of vapour.

13) Continue pumping until discharge from the fixed liquid level gauge changes from vapour to liquid.

14) As soon as liquid appears from the fixed liquid level gauge, immediately close the quick-acting valve on the liquid line, and close the fixed liquid level gauge and the quick-acting valve on the vapour line (when provided). The tank will now be 80 % full, which is the maximum permissible volume. Stop the pump.

15) Disconnect both hoses and replace the dust caps.

16) Disconnect the static bonding/earthing cable.

NOTE The use of vapour equalising hoses are not legally permitted, when filling for the purposes of distribution.

11.4 Procedure after filling

1) The static bonding cable shall not be disconnected from the filled container before all the hoses have been disconnected from the container being filled.

2) The filled container shall be checked for leakage from valves, and appurtenances using a soapy water solution. Any leaking container shall be removed immediately from the filling site and the contents shall be decanted in a safe location.

3) When filling operations are to be discontinued for any length of time, or when operations are suspended during night time, all valves controlling the flow of LPG shall be closed.

4) Each dispenser hose assembly shall be provided either with a pull-away coupling or a safety break connection designed to part at loads of approximately 25 kg to protect the dispenser in the event of a "drive-off" with the hose. The coupling shall be designed to part cleanly and seal both ends to prevent loss of contents.

5) The hoses shall be in accordance with a recognized and approved standard (for example, EN 1762) for LPG use.

6) Hose end nozzles shall not allow the flow of product unless connected to a vehicle connection. The hose end nozzle shall be in accordance with SANS 10087-6.

Annex A
(informative)

Typical layout for filling LPG fuelled fork lift trucks

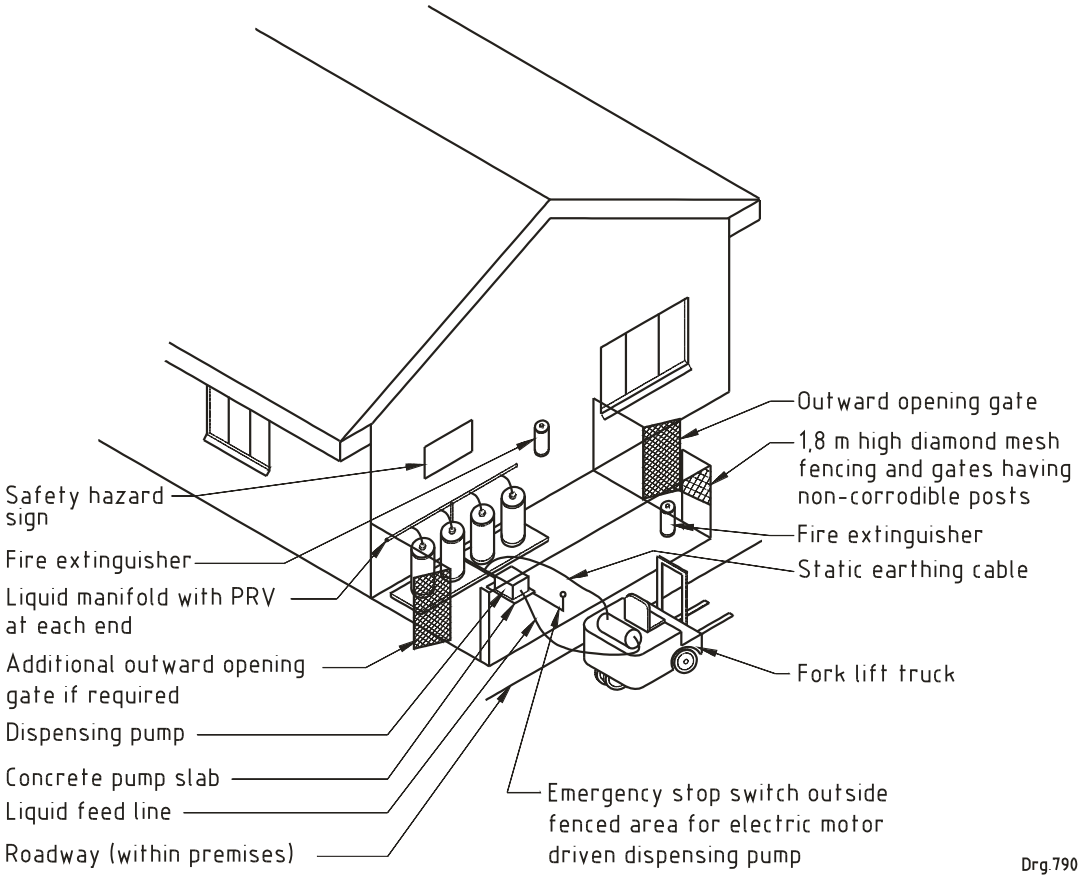

Figure 1 — Typical layout for filling LPG fuelled fork lift trucks

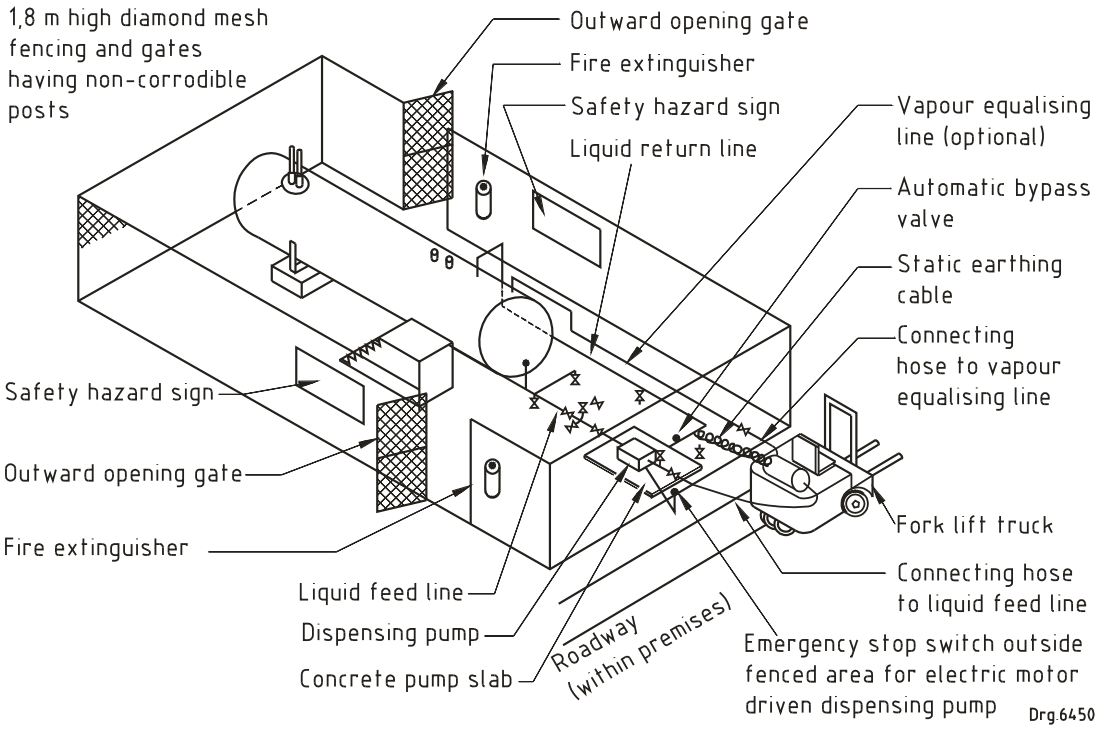

Figure 2 — Typical layout for filling LPG fuelled fork lift trucks from bulk storage tanks

Bibliography

SANS 1774, *Liquefied petroleum gases*.