PHILIPPINE NATIONAL STANDARD

DPNS DOE 05:2024
ICS 55.220; 75.160.30

LPG retail outlet and safety practices – General requirements

BUREAU OF PHILIPPINE STANDARDS (BPS)
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- International Organization for Standardization (ISO)
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Foreword

This Philippine National Standard (PNS) for LPG Retail Outlet and Safety Practices - General Requirements was prepared by the Department of Energy's (DOE) Technical Committee on Petroleum Processes and Facilities (BPS/TC 68) through its Technical Working Group (TWG) - LPG Retail Outlet. This Standard was approved for adoption as Philippine National Standard by the Bureau of Philippine Standards.

This Standard provides minimum facility requirements for LPG Retail outlet who engaged in the direct and exclusive trade and sale of LPG in cylinders to end-consumers whose maximum floor stack is determined by the DOE.

It is anticipated that the user of this Standard and the materials referenced herein would form the basic requirements for safe, environment-friendly, responsible retailing operations of LPG and act as the primary and minimum requirements in this sector of the Downstream Oil Industry.

The provisions in this PNS are voluntary in nature and may be used as a reference by any interested party. Compliance to this Standard or part/s thereof is voluntary unless otherwise imposed or referred to by law, or regulations issued by competent authorities. Existing laws or regulations shall prevail when there is a conflict with this PNS.

Published by the Bureau of Philippine Standards

1 Scope

This Standard specifies the minimum facility requirements for LPG Retailers to ensure the safe and proper storage of LPG cylinders and cartridges during retail operations. An LPG Retail Outlet facility consists of the LPG display and storage area for LPG cylinders available for sale and empty or returned cylinders/cartridges, and an optional space for business transactions.

This Standard also incorporates the Safety Practices that should be observed in the operations and upkeep of display and storage area used for the sale and storage of LPG in cylinders/cartridges. Covered in the Safety Practices are Storage, Stacking, and Handling of LPG cylinders/cartridges, Personnel Safety, and Informational Signages.

2 Normative references

The following document is referred to in the text in such a way that some or all of their content constitutes provisions 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.

PNS 03-1:2020 Transportable and refillable steel cylinders for liquefied petroleum gas (LPG) - Part 1: Specification

PNS ISO 18172-1:2014 Refillable Welded Stainless Steel Cylinders - Part 1: Test Pressure 6 MPa and Below

PNS ISO 7866:2014 Gas cylinders - Refillable seamless aluminum alloy gas cylinders - Design, construction, and testing

PNS ISO 11119:2011 Gas cylinders of composite construction - Specification and test methods - Part 3: Fully wrapped fiber-reinforced composite gas cylinders with non-load-sharing metallic or non-metallic liners

PNS/DOE 02:2023 LPG transport – Bulk and cylinders – Requirements and safe operating practices.

PNS/DOE FS 2:2018 with Amd. 1:2020 Liquefied Petroleum Gas (LPG) refilling plant – General requirements

PNS/DOE 04:2023 LPG dealers' showroom, warehouse, and safety practices- General requirements

3 Terms and definition

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

3.1
cartridge
LPG cartridge
any portable pressure vessel or container for LPG with water capacity of up to one hundred fifty (150) liters, or as may be prescribed under PNS and designed for the sale, transportation, storage, or household/ commercial/ industrial consumption of LPG

3.2
cylinder
LPG cylinder
any portable pressure vessel or container for LPG with water capacity of up to one hundred fifty (150) liters, or as may be prescribed under PNS and designed for the sale, transportation, storage, or household/ commercial/ industrial consumption of LPG

3.3
delivery personnel
person who delivers LPG cylinders/cartridges to customers

3.4
LPG
Liquefied Petroleum Gas which consists of commercial propane gas or commercial butane gas or a mixture of the two gases, with properties conforming to the standards set forth under PNS, distributed or sold to consumers either in LPG cylinders through a pipeline system, bulk storage tanks, or other means of distribution

3.5
LPG Retail Outlet
any duly authorized outlet or facility primarily engaged in the direct trade or sale of LPG in cylinders, cartridges, and any other LPG ancillary products to end-consumers.

3.6
Safety Data Sheet
SDS
document that must accompany all chemicals and is supplied by the distributor which provides important physical characteristics, ecological, health, safety, and toxicological information on chemical substances or a mixture of ingredients used at the workplace

3.7
shall
indicates a provision that is mandatory

4 LPG Retail Outlet – General Requirements

4.1 Pure LPG Retail Outlet

a. Maximum aggregate quantity of LPG stored inside the establishment is 350 kgs for all brands and sizes, or as may be defined by existing regulations of agency having jurisdiction.

4.2 LPG Retail Outlet with Other Merchandise

a. Maximum aggregate quantity of LPG stored inside the establishment is 110 kgs for all brands and sizes, or as may be defined by existing regulations of agency having jurisdiction.
b. Maximum aggregate quantity of LPG less than 1kg stored inside the establishment is 110 kgs for all brands, or as may be defined by existing regulations of agency having jurisdiction.

4.3 LPG Retail Outlet Layout

4.3.1 The floor space shall be properly delineated such as display area, filled and unfilled cylinders/cartridges storage area, and merchandise area as appropriate.

4.3.2 Maximum allowable cylinders with collar per square meter of floor area for filled and unfilled cylinders:

a. 4 x 4 for 1.4 kg and 2.7 kg cylinders
b. 3 x 3 for 5 kg, 7kg, and 11 kg cylinders
c. 2 x 2 for 22 kg and 50 kg cylinders

4.3.2.1 Maximum allowable stacking height of cylinders with collar for filled and unfilled cylinders shall not exceed 1.3 meters (approximately equal to 2 stacking of 11 kg cylinders) or the following number of stackings:

a. 1.4 kg: 4 cylinders
b. 2.7 kg: 4 cylinders
c. 5 kg: 3 cylinders
d. 7 kg: 2 cylinders
e. 11 kg: 2 cylinders
f. 22 kg: no stacking allowed
g. 50 kg: no stacking allowed

4.3.3 Cylinders with collar below 5 kg shall not exceed four (4) stacking.

4.3.4 Stacking of cylinders with collar above 11 kg is not allowed.

4.3.5 Maximum height of stacking for cylinders without collar and cartridges in crates shall not exceed 1.3 meters.

4.3.6 The maximum allowable number of filled cylinders is subject to Bureau of Fire's (BFP) relevant guidelines applicable for the type of building or premise.

4.3.7 Cylinders may be stacked against a fire wall since the aggregate capacity of an LPG retail outlet is only up to 350 kg.

4.3.8 Provision of at least one (1) meter wide gangway for every stack.

4.3.9 Provision for an opening to allow natural air circulation and to prevent accumulation of LPG vapor in the event of a leak.

4.3.10 The gas leak detector must be mounted at the wall with a metal bracket, or any non-combustible material.

4.3.11 The gas leak detector should be mounted not more than one (1) foot from the floor or as per manufacturer's recommendation.

4.3.12 There must be a calibrated weighing scale capable of measuring the entire range of the Retailer's product line.

4.3.13 The weighing scale must be calibrated annually.

4.3.14 A price display board must be prominently visible within the area for the consumers.

4.3.15 Relevant government permits must be prominently displayed.

4.3.16 Consider utilizing energy efficient equipment and lighting system, investing in solar lights, and adoption of energy saving measures such as turning off lights during breaks or when not in use.

4.4 Storage Area

In the event that the Retailer/Retail Outlet has a storage area, the following provisions shall apply:

a. The maximum number of cylinders to be stored in the facility is subject to BFP's technical and safety assessment. The storage area must comply with the appropriate fire safety provisions.
b. The individual stockpile of cylinders must have at least 1 meter gangways to facilitate ease of retrieval or checking in case of leaks.

4.4.1 Open-air Storage Area

4.4.1.1 LPG cylinders should be stored in a well-ventilated or open air, flat floor, and ground level location.

4.4.1.2 The storage area should be protected by an adequate security fence to prevent trespassing, vandalism, and unauthorized access. Recommended minimum height of the security fence is 1.8 meters.

4.4.1.3 The floor of the storage area should be level, free from depressions, and compacted or paved with suitable materials and design to carry the expected load.

4.4.1.4 The storage location shall be at ground level and never in cellar or basement, ensuring easy accessibility.

4.4.1.5 Any loading platform, and any roof provided over a storage place, shall be predominantly constructed with non-combustible or fire resistive materials.

4.4.1.6 Provision of gas detectors depending on the number of filled cylinders in storage. Installation and location of gas detectors is subject to manufacturer's recommendation.

4.4.2 Enclosed Storage Area

4.4.2.1 Building should not be part of a theatre, school, hotel, supermarket, or a place of worship.

4.4.2.2 Posts, walls, roofing, and trusses shall be made of non-combustible materials like steel/concrete.

4.4.2.3 Provision for an opening to allow natural air circulation and to prevent accumulation of LPG vapor in the event of a leak.

4.4.2.4 The electrical outlet shall be properly protected from spark or possible source of ignition. Electrical outlets may also be weather/waterproof.

4.4.2.5 No electrical appliances shall be present within the storage area.

4.4.2.6 Provision of gas detectors depending on the number of filled cylinders in storage. Installation and location of gas detectors is subject to manufacturer's recommendation.

5 Safety Practices

5.1 Cylinder in Storage

Filled cylinders to be stored shall comply with PNS 03-1, PNS ISO 18172-1:2014, PNS ISO 7866:2014, and PNS ISO 11119-3:2014.

5.1.1 Cylinders stored in buildings shall not be located near exits, stairways, or in areas normally used or intended to be used, for the safe egress of occupants. Restricted areas not allowed for cylinder storage shall have proper markings and signages delineating such areas for proper guidance.

5.1.2 Cylinders in storage shall be located to minimize exposure to excessive temperature rises, physical damage, or tampering.

5.1.3 All cylinders whether filled or unfilled shall be stored upright with valves in the uppermost position.

5.1.4 Valves of both filled and unfilled cylinders (POL valve type) should always be closed while in storage.

5.2 Transport of LPG Cylinders

5.2.1 Vehicles used for the transport of LPG cylinders may be further guided by PNS/DOE 02:2023.

5.2.2 Cylinders shall be transported in an upright position. They should be secured or chained to prevent them from shifting or falling. If the delivery vehicle cannot get near the cylinder installation, cylinders can be rolled on its foot ring, not on its side.

5.2.3 The cylinders should not be dropped or thrown from the vehicle but should be eased to the ground or lowered on to shock pads if vehicles are not equipped with hydraulic lifter. A rubber pad, rope mat, or even an old tire will ease the shock of filled cylinders as they are lowered from the vehicle bed to the ground.

5.2.4 Security seals should always be placed on filled cylinders to prevent tampering of the cylinder and to prevent foreign matters such as dirt, water, etc. from entering the cylinder valves.

5.2.5 Plastic caps should always be placed on the pressure relief valve (PRV) to prevent the entry of foreign matters such as dirt, water, etc. that may possibly affect the performance of the PRV.

5.2.6 In case the relief valve on a cylinder opens while being transported or set, the cylinder should be moved to a safe place and vented until the pressure reduces and the relief valve re-sets.

5.2.7 Cylinders should be returned to the plant for reconditioning of their valves. Venting should be done in an open field. Always have the fire extinguishers ready for an emergency.

5.3 Guidelines for Delivery Personnel

Before being permitted to make deliveries, a delivery personnel should be fully instructed on the purpose and use of equipment such as valves, gauges, and other appurtenances. The following are guidelines for making a safe and proper delivery to customers:

a. Delivery personnel should always be neat-looking and in proper uniform when making delivery. They should always be courteous and polite to customers.
b. Cylinders shall be moved in a manner that avoids damage to the floor. Pushcart shall be used in delivering 50 kg cylinders.
c. Cylinders to be replaced must be checked by delivery personnel that they are indeed empty.

d. Ensure there are no open flames around the cylinder during delivery. Smoking is not allowed.
e. Delivery personnel should make a safety check on other equipment (i.e., flexible hose, regulator, changeover device, etc.) every delivery
f. If there are piles of rubbish near the installation, the delivery personnel should ask the customer to remove them at once.
g. Delivery personnel must provide an Official Receipt (OR) or Sales Invoice (SI) to the customer.

5.4 Safety Procedures and Informational Sign

5.4.1 Cylinders for display should not be kept beside flammable materials, staircases, exits, or anywhere that might obstruct an escape route.

5.4.2 Naked lights or smoking should be strictly prohibited anywhere near the cylinders/cartridges.

5.4.3 The LPG retail outlet shall be clearly marked with safety signages on each externally visible side and the entrances of the storage area. These signages shall indicate:

a. A warning notice – "Highly Flammable LPG".
b. A Globally Harmonized System (GHS) symbol for Flammable Gas; See Figure 1.
c. The prohibition sign – "No smoking or naked flames, no cellphones and cameras", and "Unauthorized person not allowed".

Figure 1 – GHS symbol for Flammable chemicals

d. Emergency Response Procedures and emergency contact numbers in case of gas leaks or fire: BFP, nearest hospital, LGU – Disaster Risk Reduction and Management Office.

5.4.4 Access of vehicles and mechanical handling equipment into the storage area shall be strictly controlled to prevent collision with cylinders.

5.4.5 Hazardous and other known flammable products other than LPG should be stored separately at an adequate distance.

5.4.6 Filled and unfilled cylinders are properly segregated, and signage is clearly displayed.

5.4.7 There should be enough gangway for access of personnel during inspection and emergency.

5.4.8 There should be at least 2 x 9.07 kg (20 lbs) Dry Chemical Powder Fire Extinguishers. They should be in good working condition and are readily accessible.

5.5 Personnel Safety

5.5.1 There should be a designated Department of Labor and Employment Occupational Safety and Health (DOLE-OSH) trained safety officer, responsible officer trained by an accredited/recognized safety training organization by DOE, or LPG Company.

5.5.2 All staff should be knowledgeable to use Fire Extinguishers in case of fire.

5.5.3 All personnel should know the Emergency Response Procedures in accordance with their internal company policies.

5.5.4 All staff handling cylinders should wear the appropriate Personal Protective Equipment (PPE) such as pants and cotton shirt preferably made of static-free fabric, safety shoes, and gloves.

5.5.5 Provision of an updated LPG Safety Data Sheet (SDS).

6 Resiliency Statement

Any new downstream oil facility shall be constructed and operated with high regard to the latest design and operational requirement to address natural events such as earthquakes, fault movement, storm surge, flooding, or typhoon conditions as recognized by competent government agencies most likely to affect the general area where the facility shall/is to be located.

6.1 All stakeholders in the Downstream Oil Industry (DOI) must have a Resiliency Compliance Plan (RCP) in accordance with the adoption and mainstreaming of resiliency programs in the planning, project implementation and operations of the energy sector implemented by Task Force on Energy Resiliency (TFER).

6.2 Effective risk assessment shall put into account, but not necessarily be limited to the following:

a. Identify and analyze risk involved
b. Assess risk potential and impact
c. Identify controls to mitigate and reduce risk
d. Implement the control measure as planned

6.3 As a guide, a facility owner may use the template below in the conduct of its individual facility risk assessment:

Hazard/Risk Assessment Table

Description of Hazard/Risk	***Possibility of Occurrence**	****Severity of Impact**	**Control Measure (Include Engineering, Administrative and PPE)**
Name of Person who conducted the assessment		Signature	Date
Name of Supervisor		Signature	Date

*rated as low, medium or high
**rated from 1 to 5, 1 being the lowest in terms of severity of impact and 5 being highest

Annex A
(Informative)

Figure A.1 – LPG Retail Outlet Sample Layout (Front View)

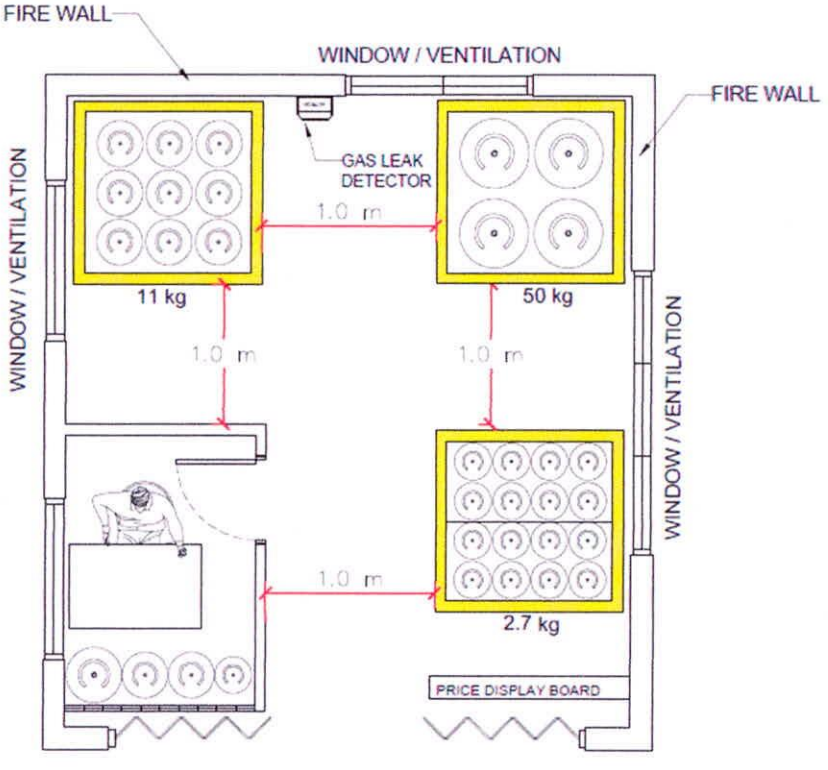

Figure A.2 – LPG Retail Outlet Sample Layout (Top View)

Annex B
(Informative)

Sample LPG Cylinder Sizes and Dimensions

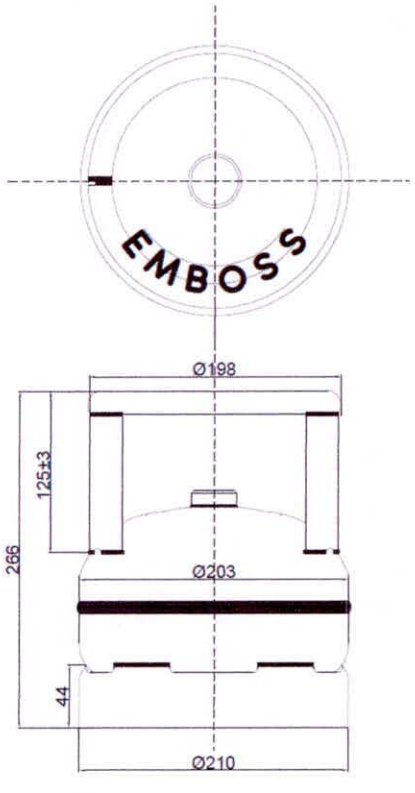

Figure B.1 – 1.4 kg 203 mm diameter assembly details

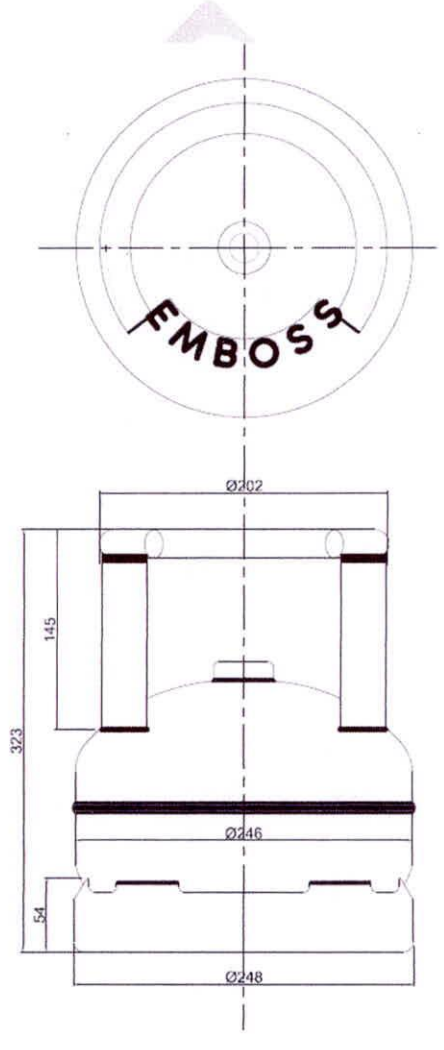

Figure B.2 – 2.7 kg 246 mm diameter assembly details

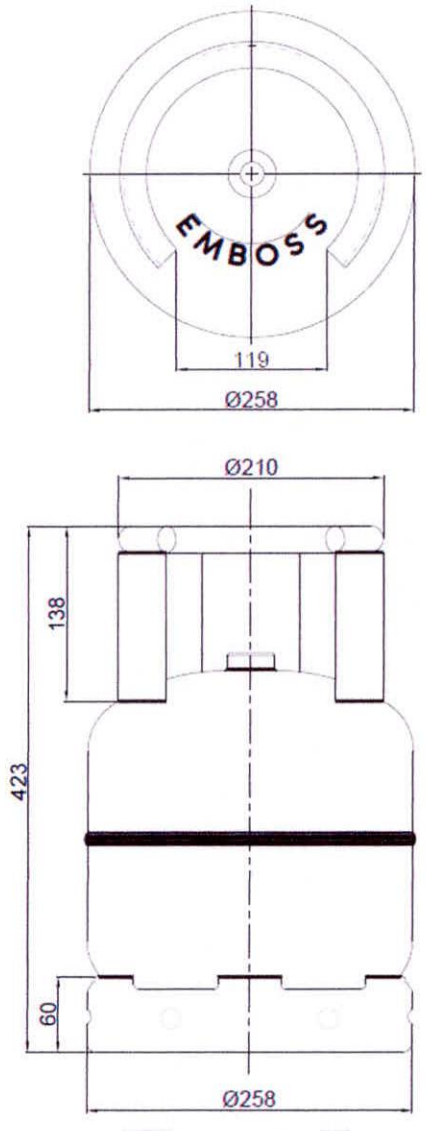

Figure B.3 – 5.0 kg 258 mm diameter assembly details

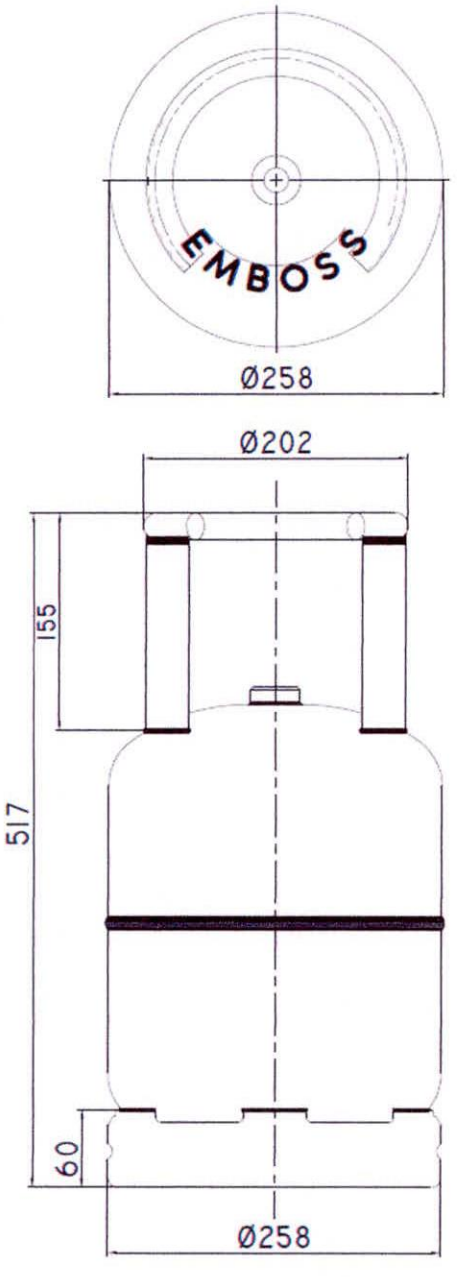

Figure B.4 – 7.0 kg 258 mm diameter assembly details

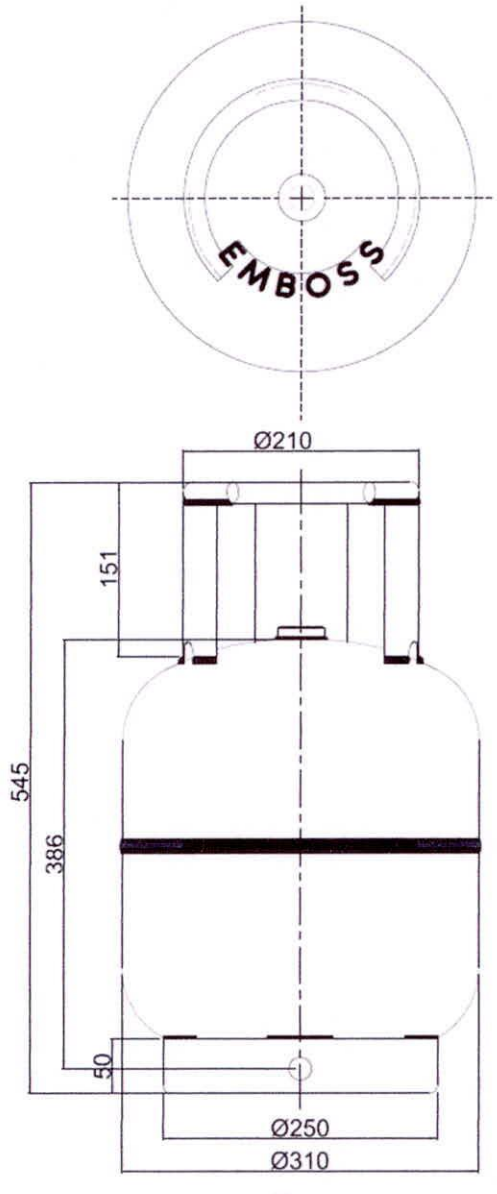

Figure B.5 – 11.0 kg 310 mm diameter assembly details

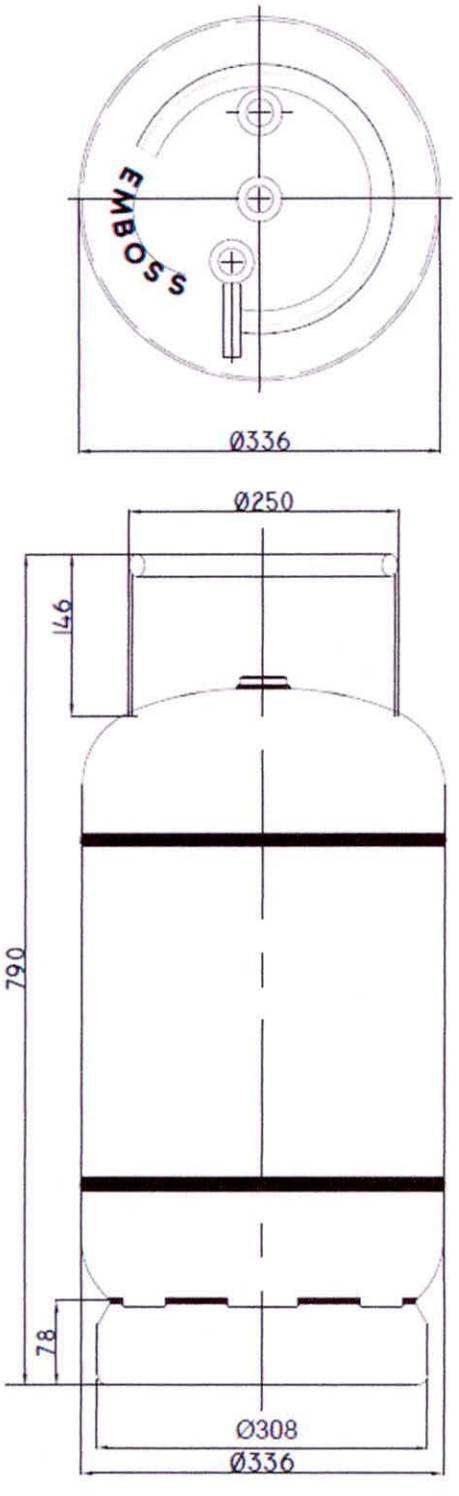

Figure B.6 – 22.0 kg 336.5 mm diameter assembly details

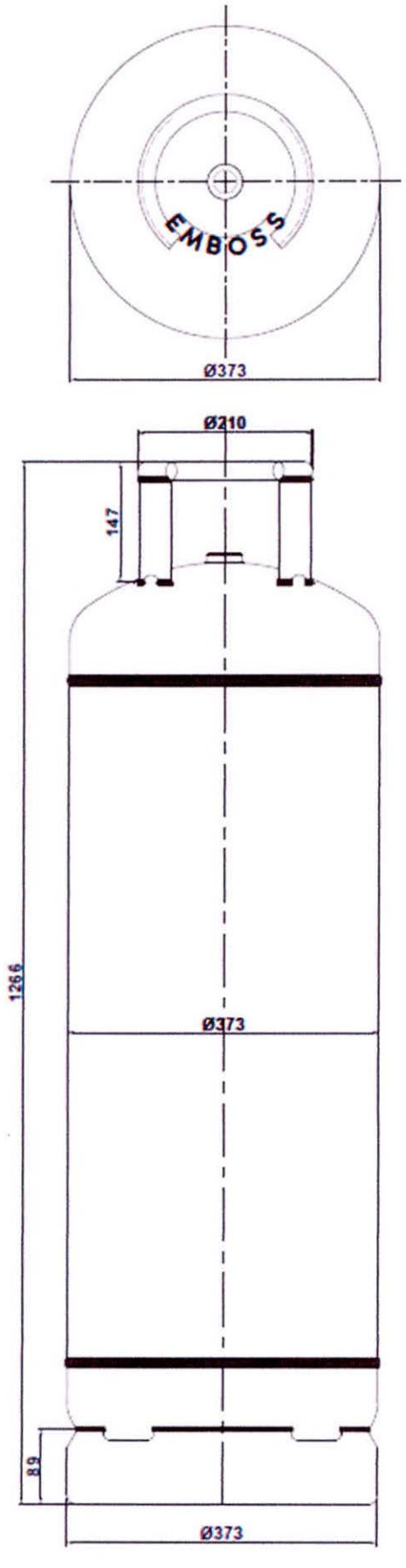

Figure B.7 – 50.0 kg 373 mm diameter assembly details

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