

SUBSIDIARY LEGISLATION 549.52

**CONTROL OF VOLATILE ORGANIC COMPOUND-
VOC EMISSIONS (STORAGE AND DISTRIBUTION
OF PETROL FROM TERMINALS TO SERVICE
STATIONS) REGULATIONS**

10th June, 2016

LEGAL NOTICE 228 of 2016, as amended by Legal Notice 70 of 2017.

1. The title of these regulations is the Control of Volatile Organic Compound-VOC Emissions (Storage and Distribution of Petrol from Terminals to Service Stations) Regulations.

Citation.

2. (1) For the purpose of these regulations and unless the context otherwise requires:

Definitions and scope.

"approved auditor" means an auditor which has been approved by the authority competent in approving such persons, who holds a warrant to practice the profession of an ingénieur under the Ingénieria Act or the equivalent professional qualification as provided under the Mutual Recognition of Qualifications Act, who has suitable training, sufficient knowledge and experience and capability as approved by the competent authorities to certify that terminals, service stations and road tankers are compliant with the standards set by the relevant technical Schedules of these regulations, and who is duly registered with the joint competent authorities;

Cap. 321.
Cap. 451.

"the competent authority" means the Environment and Resources Authority;

"existing service stations" means service stations granted development planning consent before the 01 January 2012;

"gantry" means any structure at a terminal at which petrol can be loaded on to a single road tanker at any one time;

"intermediate storage of vapours" means the intermediate storage of vapours in a fixed roof tank at a terminal for later transfer to and recovery at another terminal. The transfer of vapours from one storage installation to another at a terminal shall not be considered as intermediate storage of vapour within the meaning of these regulations;

"loading installation" means any facility at a terminal at which petrol can be loaded onto mobile containers. Loading installations for road tankers shall comprise one or more 'gantries';

"major refurbishment" means a significant alteration or renewal of the station infrastructure, particularly tanks and pipes;

"mobile container" means any tank transported by road, rail or waterways used for the transfer of petrol from one terminal to another or from terminal to a service station;

"new service stations" means service stations granted

development planning consent after the 01 January 2012;

"petrol" means any petroleum derivative, with or without additives, having a Reid Vapour Pressure (RVP) of 27.6 kilopascals or more, which is intended for use as a fuel for motor vehicles with the exception of liquefied petroleum gas (LPG);

"petrol vapour capture efficiency" means the amount of petrol vapour captured by the Stage II petrol vapour recovery system compared to the amount of petrol vapour that would otherwise be emitted to the atmosphere in the absence of such a system and expressed as a percentage;

"Stage II petrol vapour recovery system" means equipment aimed at recovering the petrol vapour displaced from the fuel tank of a motor vehicle during refilling at a service station and which transfers petrol to a storage tank at the service or back to the petrol dispenser for resale;

"storage installation" means any stationary tank at a terminal used for the storage of petrol;

"target reference value" means the guideline given for the overall assessment of the adequacy of technical measures in the Schedules and is not a limit value against which the performance of individual installations, terminals and service stations will be measured;

"terminal" means any facility which is used for the storage and loading of petrol onto road tankers, rail tankers, or vessels, including all storage installations on the site of the facility;

"throughput" means the largest total annual quantity of petrol loaded from a storage installation at a terminal or from a mobile containers into a service station during the three preceding years;

"vapour recovery unit" means equipment for the recovery of petrol from vapours including any buffer systems at a terminal;

"vapour" means any gaseous compound which evaporates from petrol;

"vapour/petrol ratio" means the ratio between the volume at atmospheric pressure of petrol vapour passing through the Stage II petrol vapour recovery system and the volume of petrol dispensed;

"vessel" means an inland waterway vessel as defined in Chapter 1 of Directive of the European Parliament and of the Council 2006/87/EC of the 12th December 2006 laying down technical requirements for inland waterway vessels and repealing Council Directive 82/714/EEC.

(2) These regulations transpose European Parliament and Council Directive 94/63/EC of 20 December 1994 on the control of volatile organic compound (VOC) emissions resulting from the storage of petrol and its distribution from terminals to service stations, Directive 2009/126/EC of the European Parliament and of the Council of the 21 October 2009 on Stage II petrol vapour recovery during refuelling of motor vehicles and service stations and Commission Directive 2014/99/EU of 21 October 2014

amending, for the purposes of its adaptation to technical progress, Directive 2009/126/EC on Stage II petrol vapour recovery during refuelling of motor vehicles and service stations.

(3) These regulations apply to the operations, installations, vehicles and vessels used for storage, loading and transport of petrol from one terminal to another or from a terminal to a service station and to the dispensing of petrol to motor vehicle fuel tanks at service station.

3. (1) The operator shall communicate to the competent authority the information listed in Part A of Schedule I.

Requirements for terminals.

(2) Terminals shall not be allowed to store, load and unload petrol in Malta, unless they are in possession of a permit from the competent authority.

(3) The competent authority shall not grant a permit to store, load and unload petrol unless an approved auditor certifies that:

- (a) the storage installations at these terminals operate in accordance with the technical provisions of Schedule IV, in order to reduce the total annual loss of petrol from the storage installations of the terminal to below the target reference value of 0.01% mass by mass (m/m) of the throughput;
- (b) loading and unloading equipment at terminals is designed and operated according to the technical provisions of Schedule V, in order to reduce the total annual loss of petrol resulting from loading and unloading of mobile containers at terminals to below the target reference value of 0.005% mass by mass (m/m) of the throughput;
- (c) all road tanker loading gantries at the terminal meet the technical provisions of Schedule VIII.

(4) In order to calculate the mass of petrol lost from the storage installation at the terminal the procedure outlined by Schedule II part C shall be used and wherever relevant reference shall be made to Schedule III.

(5) In order to calculate the mass of petrol lost from the loading and unloading of mobile containers at the terminal the procedure outlined by the relevant parts of Schedule II part B.

(6) Sub-regulation (3)(b) and (c) is not applicable to existing terminals with a throughput less than 10,000 tons per year.

(7) Mobile containers shall not be loaded with petrol at any terminal unless the containers have been registered with the competent authority.

(8) The operator is required to monitor the mean concentration of vapours in the exhaust from the vapour recovery unit according to a method which has been approved by the competent authority. The competent authority will establish whether continuous or discontinuous measurements will be required. If discontinuous

*CONTROL OF VOLATILE ORGANIC COMPOUND-VOC
EMISSIONS (STORAGE AND DISTRIBUTION OF
PETROL FROM TERMINALS TO SERVICE STATIONS)*

4

[S.L.549.52

Requirements for
mobile containers.

measurements are employed, at least four measurements per hour must be made.

(9) The concentration of vapours (corrected for dilution during treatment) in the exhaust from the vapour recovery unit shall not exceed the hourly average of 35 g/Nm³.

4. (1) All the mobile containers handling petrol, including those retrofitted for bottom loading in accordance with Schedule VIII, shall be registered with the competent authority.

(2) The competent authority shall refuse to register mobile containers unless an approved auditor certifies that the mobile container is:

- (a) compliant with the technical provisions of Schedule VII; and
- (b) vapour tight and that the mobile container's vacuum or pressure valves are vapour tight.

(3) If after unloading of petrol the mobile container is subsequently used for products other than petrol, in so far as vapour recovery or intermediate storage of vapours is not possible, ventilation may, after consultation with and permission from the Environment and Resources Authority, be allowed in a geographical area where emissions are unlikely to contribute significantly to environmental or health problems.

(4) The provisions of sub-regulation (1) shall not apply to losses of vapours resulting from measuring options using dipsticks in relation to:

- (a) existing mobile containers; and
- (b) new mobile containers which came into operation from 31 December 1995 to the 31 December 1999.

Requirements for
service stations.

5. (1) The operator shall communicate to the competent authority the information listed in Schedule I, part B and the status of compliance with the provisions of Schedule VI.

(2) The competent authority shall refuse to issue a permit with respect to:

- (a) any service station unless an approved auditor certifies -
 - (i) that loading and storage equipment at the service station is designed and operated in accordance with the technical provisions of Schedule VI, part A; and
 - (ii) that this loading and storage equipment is designed to reduce the total annual loss of petrol resulting from loading into storage installations at service stations to below the target reference value of 0.01% of the throughput mass by mass (m/m);
- (b) all service stations unless an approved auditor certifies

that the service station is compliant with the technical provisions of Schedule VI part B.

(3) Service stations shall not load petrol into their storage installations and dispense petrol to a motor vehicle fuel tank unless they are in possession of a permit from the competent authority.

(4) The provisions of sub-regulation (2)(b) shall apply to:

- (a) 'new' service stations if their actual or intended throughput exceeds 500 m³ per annum;
- (b) 'new' service stations irrespective of their actual or intended throughput if they are situated under living quarters or in working areas;
- (c) 'existing' service stations if they undergo a major refurbishment and if their actual or intended throughput:
 - (i) exceeds 500 m³ per annum; or
 - (ii) exceeds 100 m³ per annum if it is situated under permanent living quarters or working areas;
- (d) 'existing' service stations having a throughput exceeding 3000 m³ per annum by the 31 December 2018.

(5) In order to calculate the mass of petrol lost from the storage installation at the service station the procedure outlined by Schedule II, Part A shall be used.

(6) Mobile containers shall not be allowed to unload petrol into the storage installations at any service station unless they have been registered with the competent authority.

(7) The provisions of sub-regulations (1), (3) and (5) are not applicable to service stations with a throughput less than 100m³/year.

6. The Environment and Resources Authority or other designated authority responsible for the environment shall be responsible for the enforcement of these regulations.

Responsibility for enforcement.

7. Any person shall be guilty of an offence under these regulations if:

Offences under these regulations.

- (a) he fails to comply with any order lawfully given in terms of any provision of these regulations; or
- (b) he contravenes any restriction, prohibition or requirement imposed by or under these regulations; or
- (c) he conspires, attempts, aids, or abets, any other person by whatever means, including advertising, counselling or procurement to contravene the provisions of these regulations or to fail to comply with any such provisions, including any order lawfully given in terms of any of the provision of these regulations, or to contravene any restriction, prohibition or requirement

imposed by or under the said regulations.

Penalties.

8. Any person who commits an offence against these regulations shall, on conviction, be liable:

- (a) on a first conviction to a fine (*multa*) of not less than one thousand two hundred euro (€1,200) but not exceeding two thousand three hundred euro (€2,300);
- (b) on a second or subsequent convictions, to a fine (*multa*) of not less than two thousand three hundred euro (€2,300), but not exceeding eleven thousand six hundred euro (€11,600) or to imprisonment for a term not exceeding two years, or to both such fine and imprisonment:

Provided that whenever any person is found guilty of committing an offence under these regulations by means of a vehicle, the owner of the said vehicle, where applicable, shall be held liable in the same manner and degree:

Provided further that the court shall order any person who has been found guilty of committing an offence against these regulations to pay for the expenses incurred by the public entities and, or other persons acting on their behalf involved in the implementation of these regulations and restitution of the environment as a result of the said offence, the revocation of any permit issued by the competent authority and the confiscation of the *corpus delicti*.

Applicability of the
Criminal Code.
Cap. 9.

9. (1) The provisions of articles 23 and 30(1) of the Criminal Code shall, *mutatis mutandis*, apply to proceedings in respect of offences against these regulations, so however that the disqualification from holding or obtain a licence, permit or authority shall in no case be for less than one year.

Cap. 9.

(2) Notwithstanding the provisions of article 370 of the Criminal Code, proceedings for an offence against these regulations shall be taken before the Court of Magistrates (Malta) or the Court of Magistrates (Gozo), as the case may be, and shall be in accordance with the provisions of the Criminal Code regulating the procedure before the said courts as courts of criminal judicature.

Cap. 9.

(3) Notwithstanding the provisions of the Criminal Code, the Attorney General shall always have a right of appeal to the Court of Criminal Appeal from any judgement given by the Court of Magistrates (Malta) or the Court of Magistrates (Gozo) in respect of proceedings for any offence against these regulations.

SCHEDULE I

CALCULATION OF THE LOSS OF PETROL

A. Annual fugitive emissions from the storage of petrol at terminals and from the loading and unloading of mobile containers at terminals

The operator shall communicate to the competent authority the estimates of:

- (a) the mass of petrol lost from the storage installations at terminals;
- (b) the mass of petrol lost from the loading and unloading of mobile containers at terminals; and
- (c) the throughput of the terminal.

In addition:

1. These estimates shall be certified by an approved auditor.
2. The procedure used for the estimation of losses mentioned in paragraphs (a) and (b) above shall be that outlined in Schedule II, part B.
3. Estimates of the throughput shall be backed up by the invoices for the purchasing of petrol during the three preceding years.

B. Annual fugitive emissions from the loading of petrol into storage installations at service stations.

The operator shall communicate to the competent authority the estimates of:

- (a) the mass of petrol lost from loading into storage installations at service stations; and
- (b) the throughput of the service stations.

In addition:

1. These estimates shall be certified by an approved auditor.
2. The procedure used for the estimation of losses mentioned in paragraph (a) above shall be that outlined in Schedule II, part A.
3. Estimates of the throughput shall be backed up by the invoices for the purchasing of petrol during the three preceding years.

SCHEDULE II

PROCEDURE TO CALCULATE PETROL LOSSES

A. Calculation of the Mass of petrol lost from the loading of petrol into the storage installations at service stations.

$$\text{Mass of petrol lost (kg)} = \text{EF}_{\text{Fill}} \times \text{VOL}_{\text{Load}} \times \text{TVP}$$

Where:

EF_{Fill} = Emission Factor from table 1, depending on filling mode.

VOL_{Load} = Volume of product loaded annually (in m³)

TVP = True Vapour Pressure of product at loading temperature (in kPa). If unknown this value can be taken to be equal to 19°C (the annual average temperature for the Maltese Islands).

Table 1 NMVOC Emission Factors for Loading Mobile Containers

Filling Mode	Emission Factor EF_{Fill}
stage 1b in operation without vapour balancing	0.0244×10^{-2}
stage 1b in operation with vapour balancing	0.0011×10^{-3}

B. Calculation of the Mass of petrol lost from loading operations at terminals.

1. Uncontrolled Emissions

$$\text{Mass emitted (kg)} = EF_{\text{Load}} \times \text{VOL}_{\text{Load}} \times \text{TVP}$$

Where:

EF_{Load} = Emission Factor from Table 2, depending on loading mode.

VOL_{Load} = Volume of product loaded annually (in m^3)

TVP = True Vapour Pressure of product at loading temperature (in kPa). If unknown this value can be taken to be equal to 19°C (the annual average temperature for the Maltese Islands).

Table 2 NMVOC Emission Factors for Loading Mobile Containers

Loading Mode	Emission Factor EF_{Load}
Road Tanker, Bottom Loading No Vapour Balancing during Previous Off-Loading	8.60×10^{-3}
Road Tanker, Top Loading No Vapour Balancing during Previous Off-Loading	9.40×10^{-3}
Road Tanker, Bottom or Top Loading Vapour Balancing during Previous Off-Loading	2.28×10^{-2}
Rail Tanker	1.08×10^{-2}
Marine tanker - typical cargo tank condition	6.10×10^{-3}
Barge - typical cargo tank condition	1.17×10^{-2}

Emissions Controlled with a Vapour Recovery Unit (VRU)

(a) VRU Fitted with a continuous emissions monitor

$$\text{Mass emitted (kg)} = 1.00 \times 10^3 \times \text{MEAS}_{\text{CONC}} \times \text{VOL}_{\text{LOAD}} \times (1 - 0.01\text{TVP})$$

Where:

$\text{MEAS}_{\text{CONC}}$ = Measured VRU vent concentration (in g/m^3)

VOL_{Load} = Volume of product loaded annually (in m^3)

TVP = True Vapour Pressure of product at loading temperature (in kPa). If unknown this value can be taken to be equal to 19°C (the annual average temperature for the Maltese Islands).

(b) VRU of known efficiency

$$\text{Mass emitted (kg)} = \text{Uncontrolled emissions} \times [1 - (\text{EFF} \times \text{Time}_{\text{ON}} \times 1 \times 10^{-4})]$$

Where:

Uncontrolled emissions is calculated as shown in B part 1.

EFF = Average percentage efficiency of the VRU over the reporting period.

Time_{ON} = Percentage of the time that the emissions reduction equipment is operational when required during the reporting period.

C. Calculation of the Mass of petrol lost from storage installations at terminals.
Mass Emitted (kg) = Standing Loss + Working Loss

1. Standing Loss and Working Loss from a fixed roof storage tank

$$\text{Standing Loss (kg)} = 48.5 \times D^{1.73} \times H^{0.51} \times C$$

Where:

D = the diameter of the tank in metres.

H = vertical height of the tank in metres.

C = a coefficient which depends on the colour, according to Table 3 below.

Tank Colour	Coefficient C
White	1.00
Aluminium	1.20
Black	1.83
Other	1.6

$$\text{Working loss (kg)} = 0.878 \times \text{VOL}$$

Where:

VOL = volume of petrol dispensed annually in metres cubed (m³)

2. Standing Loss and Working Loss from a floating roof storage tank

$$\text{Standing Loss (kg)} = 9.35 \times C_J \times V^n \times D$$

Where:

C_J = a coefficient for the floating roof tank depending on the nature of the seal, according to Table 3 below.

v = annual average wind speed at the site in km/h. If unknown this value can be taken to be equal to 17 km/h (the annual average wind speed for the Maltese Islands).

n = wind coefficient related to the type of seal, according to Table 4 below.

D = tank diameter in metres.

Table 4 Coefficient for the different floating tank seals (see Schedule II)

Type of Seal	C _J	n
Mechanical-shoe primary seals		
primary only	0.52	1.53
With shoe mounted secondary seal	0.48	1.17
With rim-mounted secondary seal	0.13	0.97
Liquid-mounted resilient filled seal		
primary only	0.55	1.03
With weather shield	0.45	0.93
With rim-mounted secondary seal	0.51	0.43

**CONTROL OF VOLATILE ORGANIC COMPOUND-VOC
EMISSIONS (STORAGE AND DISTRIBUTION OF
PETROL FROM TERMINALS TO SERVICE STATIONS)**

10 [S.L.549.52

Vapour-mounted resilient filled seal primary only	0.42	2.10
With weather shield	0.37	2.00
With rim-mounted secondary seal	0.09	2.23

$$\text{Working Loss (kg)} = 5.13 \times \text{VOL} \times (\text{MxD}^{-1})$$

Where:

VOL = volume of petrol dispensed annually in metres cubed (m³)

M = clingage coefficient:

M = 0.0015 for light rust;

M = 0.0075 for dense rust;

M = 0.15 for gunite lining;

D = tank diameter in metres.

3. Standing Loss and Working Loss for a tank fitted with an internal floating deck.

$$\text{Standing Loss (kg)} = 2.85 \times [(0.518\text{S} + 2.15\text{P})\text{D}^2 + (3.28\text{F} + 4.57\text{A})\text{D} + 134 \text{ B}]$$

Where:

D = diameter of the reservoir in metres.

F = a coefficient for the seal of the floating deck

F = 6.3 for a vapour-mounted resilient seal;

F = 2.9 for a liquid-mounted resilient seal;

F = 2.4 for a vapour-mounted resilient seal with a rim-mounted secondary seal;

F = 1.5 for a liquid-mounted resilient seal with a rim-mounted secondary seal;

S = a coefficient related to the structure of the internal deck, according to table 4 below;

P = internal deck penetration coefficient, according to Table 4 below;

A and B = coefficients related to the configuration of the tank, according to Table 5 below.

Table 5 Tank and Deck coefficients

Type of Tank and Deck	S	A	B	P
Tank with pipe columns				
Deck welded or bolted in its entirety	0.800	1.000	1.000	0.000
other type of deck	1.000	1.000	1.000	0.240

Tank without pipe columns				
Deck welded or bolted in its entirety	0.274	0.567	0.784	0.000
other type of deck	0.474	0.587	0.784	0.340

Working Loss (kg) = $5.13 \times R \times \text{VOL} \times (M \times D^{-1})$

Where:

R = coefficient related to the tank configuration.

R = 1 for a tank without pipe columns;

R = 1 if the tank has pipe columns and $D < 40\text{m}$;

R = 1.1 if the tank has pipe columns and $40\text{m} < D < 70\text{m}$;

R = 1.2 if the tank has pipe columns and $D > 70\text{m}$;

VOL = volume of petrol dispensed annually in metres cubed (m³)

M = clingage coefficient:

M = 0.0015 for light rust;

M = 0.0075 for dense rust;

M = 0.15 for gunite lining;

D = tank diameter in metres.

Wherever required the TVP for petrol can be calculated from:

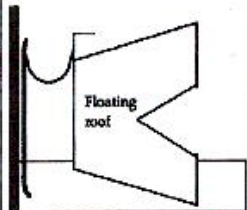
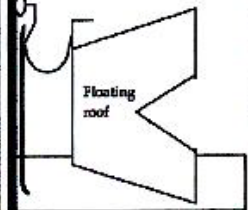
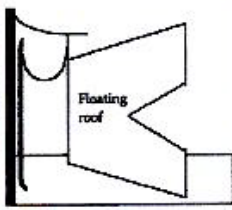
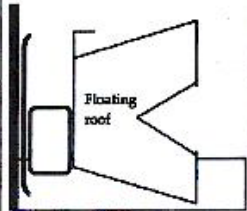
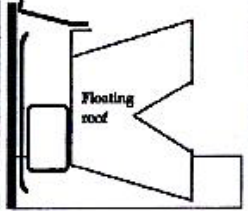
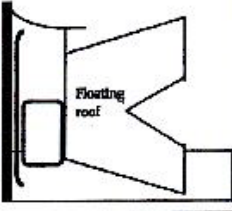
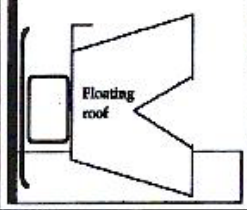
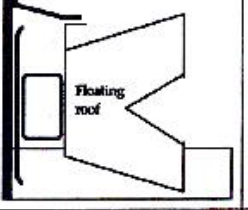
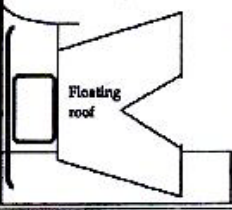
$$\text{TVP} = \text{RVP} \times 10 \text{ EXP } \{[(7.047 \times 10^{-6} \times \text{RVP}) + 1.32 \times 10^{-2}] \times T + [(2.311 \times 10^{-4} \times \text{RVP}) - 5.236 \times 10^{-1}]\}$$

Where:

RVP = Reid Vapour Pressure (in kPa)

T = product loading temperature (in degrees Centigrade)

SCHEDULE III
THE DIFFERENT TYPES OF SEALS

1. Mechanical-shoe primary seals:		
		
primary seal only	with shoe mounted secondary seal	with rim-mounted secondary seal
2. Bottom of the resilient filled seal in contact with the Liquid Phase:		
		
primary seal only	with weather shield	with rim-mounted secondary seal
3. Bottom of the resilient filled seal in contact with the Vapour Phase:		
		
primary seal only	with weather shield	with rim-mounted secondary seal

SCHEDULE IV

REQUIREMENTS FOR STORAGE INSTALLATIONS AT TERMINALS

1. The external wall and roof of tanks above ground shall be painted in a colour with a total radiant heat reflectance of 70% or more. These operations may be programmed so as to be carried out as part of the usual maintenance cycles of the tanks within a period of three years. The competent authority may grant a derogation from this provision where required for the protection of special landscape areas which have been designated by national authority. This provision shall not apply to tanks linked to a vapour recovery unit which conforms to the requirements set out in Schedule V, point 2.
2. Tanks with external floating roofs shall be equipped with a primary seal to cover the annular space between the tank wall and the outer periphery of the floating roof and with a secondary seal fitted above the primary seal. The seals should be designed to achieve an overall containment of vapours of 95% or more as compared to a comparable fixed-roof tank with no vapour-containment controls (that is a fixed-roof tank with only vacuum/pressure relief valve).
3. All new storage installations at terminals, where vapour recovery is required according to regulation 3 (see Schedule V) shall be either:
 - (a) fixed-roof tanks connected to the vapour recovery unit in conformity with the requirements of Schedule V; or
 - (b) designed with a floating roof, either external or internal, equipped with primary and secondary seals to meet the performance requirements set down in point 2.
4. Existing fixed-rooftanks shall either:
 - (a) be connected to a vapour recovery unit in conformity with the requirements of Schedule V; or
 - (b) have an internal floating roof with a primary seal which should be designed to achieve an overall containment of vapours of 90% or more in relation to a comparable fixed-roof tank with no vapour controls.
5. The requirements for vapour-containment controls mentioned under points 3 and 4 do not apply to fixed-roof tanks at terminals, where intermediate storage of vapours is permitted according to Schedule V, point 1.

SCHEDULE V

*Amended by:
L.N. 70 of 2017.*

REQUIREMENTS FOR LOADING AND
UNLOADING INSTALLATIONS AT TERMINALS

1. Displacement vapours from the mobile container being loaded shall be returned through a vapour-tight connection line to a vapour recovery unit for regeneration at the terminal.

This provision does not apply to top-loading tankers as long as that loading system is permitted.

At terminals which load petrol onto vessels, a vapour incineration unit may be

substituted for a vapour recovery unit if vapour recovery is unsafe or technically impossible because of the volume of return vapour. The requirements concerning atmospheric emissions from the vapour recovery unit shall also apply to the vapour incineration unit. At terminals with a throughput of less than 25000 tonnes/year, intermediate storage of vapours may be substituted for immediate vapour recovery at the terminal.

2. Measurements of the mean concentration of vapours in the exhaust from the vapour recovery unit (whether continuous or discontinuous as per regulation 3(8)) shall be made over the course of one full working day (seven hours minimum) of normal throughput. The overall measurement error due to the equipment used, the calibration gas and the procedure used shall not exceed 10% of the measured value. The equipment used shall be capable of measuring concentrations at least as low as 3g/Nm³. The precision shall be at least 95 of the measured value.

3. The competent authority shall ensure that the connection lines and pipe installations are checked regularly for leaks.

4. The competent authority shall ensure that loading operations are shut down at the gantry in the case of a leak of vapour. Equipment for such shutdown operations shall be installed at the gantry.

5. Where top-loading of mobile containers is permissible, the outlet of the loading arm shall be kept near the bottom of the mobile container, in order to avoid splash loading.

SCHEDULE VI

A. REQUIREMENTS FOR LOADING AND STORAGE INSTALLATIONS AT SERVICE STATIONS AND TERMINALS WHERE THE INTERMEDIATE STORAGE OF VAPOURS IS CARRIED OUT

Vapours displaced by the delivery of petrol into storage installations at service stations and in fixed-roof tanks used for the intermediate storage of vapours shall be returned through a vapour-tight connection line to the mobile container delivering the petrol. Loading operations may not take place unless the arrangements are in place and properly functioning.

B. ADDITIONAL REQUIREMENTS FOR SERVICE STATIONS

1. Service Stations shall be equipped with a Stage II Petrol Vapour Recovery system.

2. The efficiency of the Stage II petrol vapour recovery system shall be equal or greater than 85% as certified by the manufacturer in accordance with Standard EN16321-1:2013.

3. For petrol vapour recovery systems where the petrol vapour is transferred to an underground storage tank at the service station, the vapour/petrol ratio shall be equal to or greater than (>)0.95 but less or equal to (<) 1.05.

4. The operator shall ensure that the in-service petrol vapour capture efficiency of the Stage II petrol vapour recovery systems is tested at least once a year in accordance with Standard EN 16321-2:2013.

5. If the operator opts to install an automated monitoring system, the operator

shall make sure that the petrol vapour capture efficiency of the Stage II Petrol Vapour Recovery system is tested at least once every three years by an approved auditor.

6. The automated monitoring system in paragraph 5 above shall:
 - (a) automatically detect faults; in the proper functioning of the Stage II petrol vapour recovery system and in the automatic monitoring system itself; and
 - (b) indicate faults to the service station operator and
 - (c) automatically stop the flow of petrol from the faulty dispenser if the fault is not rectified within 7 days.
7. When a service station has installed a Stage II petrol vapour recovery system, the operator shall ensure that a sign, sticker or other notification informing consumers of this fact is displayed on, or in the vicinity of the petrol dispenser.

SCHEDULE VII

REQUIREMENTS FOR MOBILE CONTAINERS

1. The mobile container shall be designed and operated to retain residual vapours after the petrol is unloaded.
2. The mobile container shall be capable of accepting and retaining the return vapours when supplying petrol to service stations and terminals.
3. Excluding releases through pressure valves, the vapours mentioned in paragraphs 1 and 2 should be retained in the mobile container until reloading takes place at a terminal.

SCHEDULE VIII

SPECIFICATIONS FOR BOTTOM- LOADING VAPOUR COLLECTORS AND OVERFILL PROTECTION OF EUROPEAN ROAD TANKERS

1. Couplings

1.1. The liquid coupler on the loading arm shall be a female coupler which shall mate with a 4-inch API (101.6 mm) male adapter located on the vehicle as defined by:

- API Recommended Practice 1004 Seventh Edition, November 1988.

Bottom loading and vapour recovery for MC-306 tank motor vehicles (Section 2.1.1.1 - Type of adapter used for bottom loading)

1.2. The vapour-collection coupler on the loading-gantry vapour-collection hose shall be a cam-and-groove female coupler which shall mate with a 4-inch (101.6 mm) cam-and-groove male adapter located on the vehicle as defined by:

- - API Recommended Practice 1004 Seventh Edition November 1988.

Bottom loading and vapour recovery for MC-306 tank motor vehicles (Section 4.1.1.2 - Vapour recovery adapter)

2. Loading conditions

2.1. The normal liquid-loading rate shall be 2,300 litres per minute (maximum 2500 litres per minute) per loading arm.

2.2. When the terminal is operating at peak demand, its loading gantry vapour collection system, including the vapour recovery unit, is allowed to generate a maximum counter pressure of 55 millibar on the vehicle side of the vapour-collection adapter.

2.3. All approved bottom-loading vehicles will carry an identification plate which specified the maximum permitted number of loading arms which may be operated simultaneously whilst ensuring that no vapours are released via the compartment P and V valves, when the maximum plant back pressure is 55 millibar as specified in 2.2.

3. Connection of vehicle earth/overflow detection

The loading gantry shall be equipped with an overflow-detection control unit which, when connected to the vehicle, shall provide a fail-safe permission signal to enable loading, providing no compartment overflow sensors detect a high level.

3.1. The vehicle shall be connected to the control unit on the gantry via a 10-pin industry-standard electrical connector. The male connector shall be mounted on the vehicle and the female connector shall be attached to a flying lead connected to the gantry-mounted control unit.

3.2. The high-level detectors on the vehicle shall either 2-wire thermistor sensors, 2-wire optical sensors, 5-wire optical sensors or a compatible equivalent, provided the system is fail-safe. (NB: thermistors shall have a negative temperature coefficient.)

3.3. The gantry control unit shall be suitable for both 2-wire and 5-wire vehicle systems.

3.4. The vehicle shall be bonded to the gantry via the common return wire of the overflow sensors, which shall be connected to pin 10 on the male connector via the vehicle chassis. Pin 10 on the female connector shall connected to the control-unit enclosure which shall connected to the gantry earth.

3.5. All approved bottom-loading vehicles shall carry an identification plate (see 2.3) which specifies the type of overflow-detection sensors installed (i.e. 2-wire or 5-wire).

4. Location of the connections

4.1. The design of the liquid-loading and vapour collection facilities on the loading gantry shall be based on the following vehicle-connection envelope.

4.1.1. The height of the centre line of the liquid adapters shall be: maximum 1.4 metres (unladen); minimum 0.5 metre (laden), the preferred height being 0.7 to 1.0 metres).

4.1.2. The horizontal spacing of the adapters shall be not less than 0.25 metres (preferred minimum spacing is 0.3 metres).

4.1.3. All liquid adapters shall be located within an envelope not exceeding 2.5 metres in length.

4.1.4. The vapour-collection adapter should be located preferably to the right of the liquid adapters and at a height not exceeding 1.5 metres (unladen) and not less

than 0.5 metres (laden).

4.2. The earth/overfill connector shall be located to the right of the liquid and vapour-collection adapters and at a height not exceeding 1.5 metres (unladen) and not less than 0.5 metre (laden).

4.3. The above connections shall be located on one side of the vehicle only.

5. Safety interlocks

5.1. Earth/Overfill detection Loading shall not be permitted unless a permissive signal is provided by the combined earth/overfill control unit.

In the event of an overfill condition or a loss of vehicle earth, the control unit on the gantry shall close the gantry-loading control valve.

5.2. Vapour-collection detection Loading shall not be permitted unless the vapour -collection hose has been connected to the vehicle and there is a free passage for the displaced vapours to flow from the vehicle into the plant vapour-collection system.
