Approved tank requirements concerning the provisions for vapour recovery systems of mobile containers carrying petrol

Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009

This Code sets out the requirements and practical advice for compliance with Part 4A of the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 ("the 2009 Regulations"), as inserted by regulation 5 of the Carriage of Dangerous (Amendment) Regulations 2019[1]. If you follow these requirements and the advice given you will have satisfied the legal requirements in respect of those specific matters on which the Code gives advice.

However, the Code has a special legal status. If you are prosecuted for breach of health and safety law, and it is proved that you did not follow the relevant provisions of the Code, you will need to prove that it was not reasonably practicable for you to do more to satisfy the requirement, or that there was no better practicable means than the one you used to satisfy the requirement.

Notice of Approval

By virtue of section 15(4)(a) of the Health and Safety at Work etc Act 1974 and in accordance with regulations 23B and 23C of Part 4A of the 2009 Regulations, the Secretary of State for Transport has on 24 April 2019 approved this document entitled *Approved tank requirements concerning the provisions for vapour recovery systems of mobile containers carrying petrol* for the purposes of specifying the detailed tank requirements which have to be met in order to comply with the said Regulations.

The *Approved tank requirements concerning the provisions for vapour recovery systems of mobile containers carrying petrol* must come into force on 24 October 2019.

Signed

Roh Hathlia
Head of the Dangerous Goods Division
Department for Transport
24 April 2019

Introduction

1 This document has been approved by the Secretary of State for Transport for the purposes of regulations 23B and 23C of Part 4A of the 2009 Regulations.

2 The Regulations impose requirements by reference to this document and to that extent it is legally binding.

3 This document implements that part of the European Parliament and Council Directive 94/63/EC on the control of volatile organic compound (VOC) emissions resulting from the storage of petrol and its distribution from terminals to service stations[2], which applies to mobile containers.

Approved Tank Requirements

Duty holders

4 The operator of any tank which is intended to be, or is being, used for the carriage of petrol must take all reasonable steps to ensure that such of the requirements specified in the approved tank requirements as are relevant to that tank are complied with.

5 Any person who designs, manufactures, imports, supplies, modifies, repairs, examines, tests, certifies or fills any tank which is certified to be, or is being, used for the carriage of dangerous goods must ensure, insofar as they are matters within his or her control, that such of the requirements specified in this document as are relevant to that tank are complied with in relation thereto.

Approved Tank Requirements

Scope

6 The requirements of this document apply to mobile containers certified to carry petrol from one terminal (see definitions, paragraph 9) to another, or from a terminal to a service station (see definitions). They apply to all mobile containers constructed after 31 August 1996 and to all existing road tankers retrofitted for bottom loading after 31 August 1996.

7 This document gives a minimum specification for bottom loading and vapour recovery systems to ensure compatibility between the equipment of road tankers and the installation at terminals and at service stations.

Approved Tank Requirements

Definitions

8 Words and expressions which are defined in the 2009 Regulations or in the Health and Safety at Work etc Act 1974 (HSW Act) have the same meaning in this document unless the context requires otherwise or an alternative definition is given in this publication.

9 For the purpose of this document:

(a) 'vapours' means any gaseous compound which evaporates from petrol;

(b) 'terminal' means any facility which is used for the storage and loading of petrol onto road tankers, rail tank wagons, or vessels, including all storage installations on the site of the facility;

(c) 'service station' means any installation where petrol is dispensed to motor vehicle fuel tanks from stationary storage tanks;

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

(e) 'vapour-recovery unit' means equipment for the recovery of petrol from vapours including any buffer reservoir systems at a terminal;

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

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

(h) '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 must not be considered as intermediate storage of vapour;

(i) 'overfill prevention system' means the gantry-mounted controller connected

to sensors mounted at a pre-determined high level in a tank truck that will, in the event that a sensor detects liquid, signal the gantry control valve to cease loading flow in order to prevent the overfilling of the tank.

Approved Tank Requirements

General requirements for mobile containers

Residual vapours

10 Mobile containers must satisfy the following requirements:

(a) mobile containers must be designed so that residual vapours are retained in the container after unloading of petrol, except for the release of internal overpressure through the breather devices;

(b) mobile containers which supply petrol to service stations and terminals must be designed so that they can accept and retain return vapours from the storage installations at the service stations or terminals, except for the release of internal overpressure through the breather devices. For rail tankers this is only required if they supply petrol to service stations or to terminals where intermediate storage of vapours is used;

(c) mobile containers must be designed so that the retained vapours referred to in sub-paragraphs (a) and (b) can be transferred to an installation designed to accept said vapours.

Approved Tank Requirements

Specific requirements for road tankers

Design of the liquid loading and discharge system

11 The liquid loading and discharge pipework which is connected to the primary closure (foot valve) of each compartment of the tank must terminate in an adaptor for bottom loading and unloading in accordance with EN 13083:2008+A1:2013[3] (Note: this standard has replaced API Recommended Practice 1004[4] as the defining standard for bottom loading "API" adaptors in Europe)

Approved Tank Requirements

Design of the vapour recovery system

12 The vapour recovery pipework including any valves and fittings must be designed to take account that when a 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 as measured on the tanker side of the vapour-collection adaptor.

13 The vapour recovery pipework must be connected through a vapour transfer valve, in accordance with EN 13082:2008+A1:2012[5], to each compartment so as to enable the compartment to be isolated from the pipework during the carriage operation.

14 The outlet of the vapour recovery pipework must be terminated, at the end remote from the compartment, in a Vapour collection adaptor and in accordance with EN 13081:2008+A1:2012[6] (Note: this standard has replaced API Recommended Practice 1004 as the defining standard for bottom loading "API" adaptors in Europe).

15 The vapour collection adaptor must be fitted with a removable cap retained by a strap or chain.

Approved Tank Requirements

Overfill detection and vehicle earth

16 The compartments of the tank must be fitted at high level with sensors which will detect the level of the product before the tank becomes overfull.

17 The sensors must be either 2-wire thermistor devices, 2-wire optical devices or 5-wire optical devices or a compatible equivalent, provided that the system is 'fail safe'. Thermistor type devices must be of the negative temperature coefficient type.

18 The sensors must be connected to a 10-pin male connector which must be compatible with the female connector providing the link with the gantry-mounted control unit which, when connected to the vehicle, provides a fail-safe permissive signal to enable loading, providing no compartment-overfill sensors detect a high level. The 'common' return wire from each sensor must be connected to the vehicle chassis which in turn must be connected to pin number 10 of the male connector.

Approved Tank Requirements

Location of the adaptors and connector

19 The adaptors for bottom loading, vapour recovery and overfill prevention system plug must be located within an envelope in accordance with Annex A of CEN/TR 15120[7].

20 The above connections must all be on the same side of the vehicle.

Approved Tank Requirements

Safety interlocks and emergency shut-off valves

21 Safety interlocks must be provided:

(a) to ensure that a vapour collection hose is connected to the vapour collection adaptor before loading can commence;

(b) on each vapour transfer valve in the vapour collection system to ensure that the valves are open before loading of the relevant compartment can commence;

(c) to ensure a good electrical connection from the tank vehicle chassis to earth is established before loading can commence.

Approved Tank Requirements

Provision of an information plate

22 Every carrying tank of a road tanker subject to the provisions of the *Approved Tank Requirements* must have securely fastened to it or to its support structure, in a readily accessible position, a corrosion-resistant plate or plates on which the following information is indelibly marked:

(a) the type of overfill detection sensors installed - 2-wire or 5-wire;

(b) the number of compartments that can be loaded simultaneously as determined in accordance with paragraph 24.

23 The above requirement will be satisfied if the information in sub-paragraphs 22(a) and 22 (b) is included on a similar plate giving additional information for other purposes (e.g. the tank data plate), where regulatory requirements permit this additional information to be included on such plates.

Approved Tank Requirements

Loading

24 The number of compartments that may be loaded simultaneously is dictated by the following conditions, compliance with which will ensure that no vapour is released through any of the breather devices:

(a) a maximum liquid loading rate to each compartment of 2500 litres per minute;

(b) the requirements of CEN/TR 15120:2013[7], Clause 5.4.1 are taken into consideration;

(c) all valves, including the vapour collection adaptor, in the vapour collection system on the tanker must be in the open position, except that any valve in the system which vents to atmosphere is in the closed position; and

(d) a back pressure of 55 mbar (generated from the terminal pipework and vapour recovery unit) is present at the inlet (tank side) of the vapour collection adaptor.

Approved Tank Requirements

Testing of the tank and fittings

25 Within the timescales stated in ADR[8], the tank and its fittings, including the vapour recovery system (pipework, flanges, service equipment, etc) must be tested in accordance with the requirements set out in BS EN 12972:2018[9], subject to the following amendments in relation to any breather and safety device:

For devices manufactured before 1 January 2020	For devices manufactured on or after 1 January 2020
No visually detectable leakage[10] shall be seen from the breather device at 80% of its rated relieving pressure when tested in accordance BS EN 14595:2016[11]	No visually detectable leakage[10] shall be seen from the breather device at 90% of its rated relieving pressure when tested in accordance BS EN 14595:2016[11]
The breather device's safety device may be permitted a maximum leakage rate of no more than 15ml in 15 minutes in any of the 90/180/270-degree test positions when tested in accordance with BS EN 14595:2016[11]	No visually detectable leakage[10] shall be seen from the breather device's safety device when tested in any of the 90/180/270-degree test positions when tested in accordance with BS EN 14595:2016[11]

Approved Tank Requirements

Vapour tightness testing of the tank and fittings

26 The tank and fittings must be tested for vapour tightness at intervals not exceeding 36 months.

References

1 Carriage of Dangerous Goods (Amendment) Regulations 2019, Statutory Instrument No. 598

2 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 *Official Journal of the European Communities* Vol 37, No L365,24-33

3 BSI Standards Publication *Tanks for the transport of dangerous goods – Service equipment for tanks – Adaptor for bottom loading and unloading* BS EN 13083:2008+A1:2013

4 American Petroleum Institute Recommended Practice 1004 *Bottom loading and vapour recovery for MC-306 tank motor vehicles* seventh edition, November 1988

5 BSI Standards Publication *Tanks for the transport of dangerous goods – Service equipment for tanks – Vapour transfer valve* BS EN 13082:2008+A1:2012

6 BSI Standards Publication *Tanks for the transport of dangerous goods – Service equipment for tanks – Vapour collection adaptor and coupler* BS EN 13081:2008+A1:2012

7 BSI Standards Publication *Tanks for transport of dangerous goods – Guidance and recommendations for loading, transport and unloading* CEN/TR 15120:2013

8 ADR European Agreement concerning the International Carriage of Dangerous Goods by Road.

9 BSI Standards Publication *Tanks for transport of dangerous goods. Testing, inspection and marking of metallic tanks* BS EN 12972:2018

10 As defined in BS EN 12266-1:2012, Table A.5

11 BSI Standards Publication *Tanks for the transport of dangerous goods – Service equipment – Breather device* BS EN 14595:2016