BS EN 12561-2:2011
*Incorporating corrigendum August 2011*

BSI Standards Publication

# Railway applications — Tank wagons

## Part 2: Bottom emptying devices for liquid products including vapour return

**National foreword**

This British Standard is the UK implementation of EN 12561-2:2011. It supersedes BS EN 12561-2:2002 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee RAE/1/-/9, Railway Applications - Wagons (Tank/Freight).

A list of organizations represented on this committee can be obtained on request to its secretary.

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**Amendments/corrigenda issued since publication**

| Date | Text affected |
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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 12561-2

June 2011

ICS 13.300; 45.060.20

Supersedes EN 12561-2:2002

English Version

# Railway applications - Tank wagons - Part 2: Bottom emptying devices for liquid products including vapour return

Applications ferroviaires - Wagons citernes - Partie 2 : Dispositifs de vidange par le bas pour produits liquides, y compris la récupération de vapeur

Bahnanwendungen - Kesselwagen - Teil 2: Untenliegende Entleereinrichtung für flüssige Stoffe einschließlich Gaspendelung

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Ref. No. EN 12561-2:2011: E

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# Foreword

This document (EN 12561-2:2011) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2011, and conflicting national standards shall be withdrawn at the latest by December 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12561-2:2002.

This European Standard *Railway applications — Tank wagons* consists of the following parts:

— *Part 1: Identification plates for tank wagons for the carriage of dangerous goods;*

— *Part 2: Bottom emptying devices for liquid products including vapour return;*

— *Part 3: Bottom filling and emptying devices for gases liquefied under pressure;*

— *Part 4: Devices for top filling and emptying of liquid products;*

— *Part 5: Devices for vapour return while filling or emptying of liquid products;*

— *Part 6: Manholes;*

— *Part 7: Platforms and ladders;*

— *Part 8: Heating connections.*

The changes made during this revision are editorial because of the change of the title of part 1 and the necessary updates of references.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

# 1 Scope

This European Standard specifies requirements on and characteristics of bottom emptying devices on tank wagons used for the carriage of liquid substances of RID. This European Standard specifies the most important dimensions of connection devices for the emptying of the tank. Safety functions of these devices are subject to RID requirements and not described in this document.

This European Standard is applicable to bottom vapour return devices where fitted to tank wagons.

This European standard applies to new tank wagons built after the 1st January 2010.

# 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.

EN ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*

EN ISO 286-1, *Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes — Part 1: Basis of tolerances, deviations and fits (ISO 286-1:2010*)

EN 14564, *Tanks for transport of dangerous goods – Terminology*

ISO 3419, *Non-alloy and alloy steel butt-welding fittings*

ISO 4200:1991, *Plain end steel tubes, welded and seamless — general tables of dimensions and masses per unit length*

ISO 7005-1:1992, *Metallic flanges — Part 1: Steel flanges*

# 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14564 and the following apply.

**3.1**
**auto vent valve**
tank ventilation device linked with the internal bottom valve, which opens simultaneously with the internal bottom valve

NOTE 1 The auto vent valve is a valve that only opens during discharge.

NOTE 2 As the auto vent valve remains closed during transport, it meets the requirements of RID.

**3.2**
**stop valve**
part of the internal bottom valve comprising the disc, the gasket, the spring and the seat

# 4 Requirements

## 4.1 General

Emptying devices shall be designed to minimise product residue in all their constituent parts following loading and unloading.

Tank wagons for liquid chemical and petroleum products with bottom emptying devices shall be fitted with a double arm outlet pipe designed to empty the tank and in conformity with this standard.

## 4.2 Locks and seals

External valves as well as internal bottom valves shall be capable of being secured in their closed position to prevent any unintentional opening through impact or an inadvertent act.

The operating controls of the external valves shall also be equipped with devices to which a seal can be properly attached.

For customs seals, a hole of diameter 15 mm shall be required.

## 4.3 Dimensions

All dimensions are given in millimetres. Unless otherwise specified in this European Standard the tolerances of EN ISO 286-1 apply for all dimensions.

# 5 Bottom discharge line

## 5.1 General arrangement

The bottom discharge line shall have a nominal diameter of not less than 100 mm.

The bottom discharge line shall consist of:

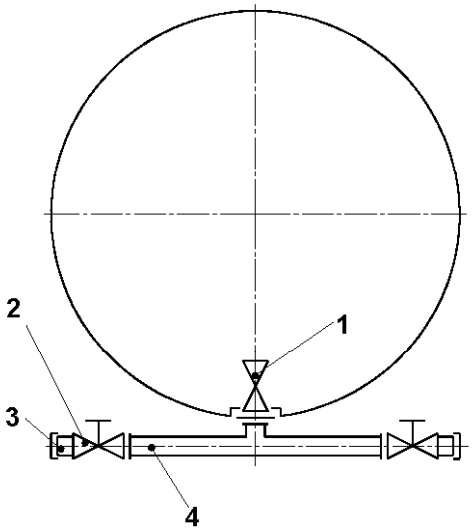
a) ,an internal bottom valve in accordance with 5.2, except for tank wagons intended for the carriage of certain crystallisable or highly viscous substances;

b) an external branch pipe;

c) an external valve shall be fitted at each end of the branch pipe. If a threaded connection is used, it shall be in accordance with the requirements of Clause 8.

NOTE A gravity coupling according to EN 13315 can be used for tank wagons transporting petroleum products.

These fittings shall be arranged as shown in Figure 1.




**Key**

1 internal bottom valve

2 external valve

3 threaded coupling or flange or equivalent device

4 branch pipe

**Figure 1 — General arrangement of bottom discharge line**

## 5.2 Internal bottom valve

Internal bottom valves and associated vent valves need to meet the requirements of RID.

## 5.3 External valves

The flanged connections for the valves shall comply with PN 16 according to ISO 7005-1:1992, face type B.

The setting whether open or closed and/or the direction of closure of external valves shall be capable of being visually verified except when a dry break self-sealing coupling is used.

## 5.4 External branch pipes

The external branch pipes shall be horizontal in order to minimise product residue in the pipe following loading and unloading.

It is recommended that external branch pipes be built with seamless line pipes and butt welding fittings (straight tees, long radius elbows, etc.) made from low temperature steel as specified in ISO 9329-3. If welded pipes are used, they shall exhibit a suitable degree of safety comparable to that of the shell itself.

Dimensions of line pipes shall be as specified by serial 1 Grade F specified in ISO 4200:1991.

Dimensions of butt weld fittings shall be as specified in ISO 3419.

## 5.5 Earthing devices

Two stainless steel earthing plates shall be welded on each side of the tank wagon. Their dimensions shall be at least 40 mm $\times$ 80 mm $\times$ 5 mm. They shall be positioned within the reserved space defined in Figure 3.

## 6 Vapour return line

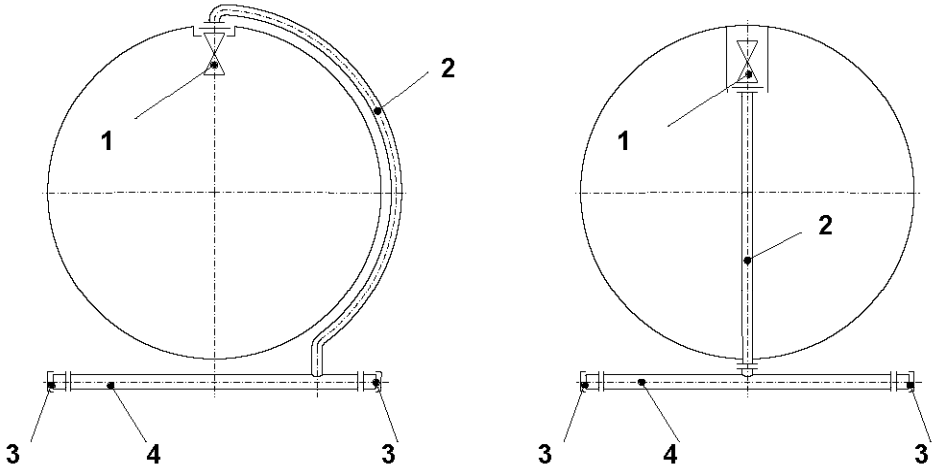
The vapour return line where fitted shall consist of:

a) an auto vent valve or at least one of the vacuum relief valves according to the requirement of 5.2;

b) a branch pipe;

c) at each end of the branch pipe a flange DN 80 PN 16 and e.g. a vapour return coupling according to the requirements of Annex A (informative).

Example of arrangements is given in Figure 2.




**Key**

1 auto-vent valve

2 connecting pipe

3 coupling

4 branch pipe

NOTE These figures are given only as an example.

**Figure 2 — Example of vapour line arrangement**

The vapour return line shall be designed in such a way that the effective cross-sectional area shall not be less than 1 960 mm² (equivalent to a 50 mm diameter pipe). Measures shall be taken to protect shells against the risk of deformation as a result of a negative internal pressure during discharge. Vacuum relief devices shall be installed either at the top of the tank or in the vapour return line.

Where the rate of discharge of tank wagon exceeds 120 $m^3/h$ the cross sectional area of vapour return devices shall be increased accordingly.

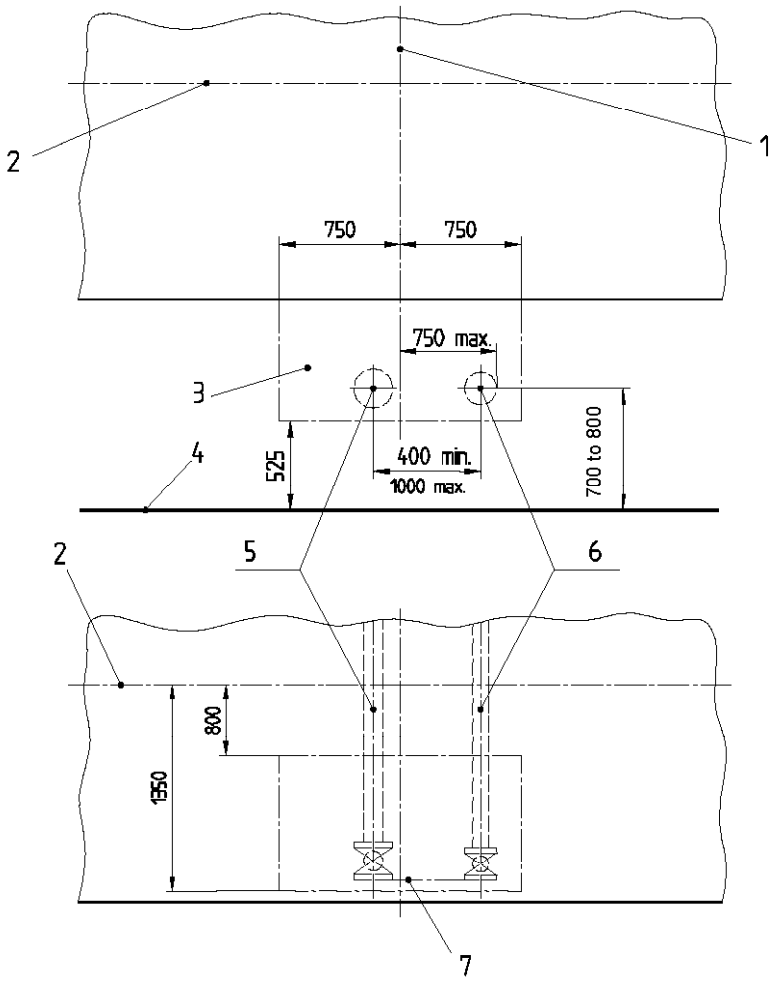
The structure of the vapour return line pipe shall meet the requirements specified in 5.2.

The vacuum relief devices shall also operate when the vapour return devices are not connected during unloading.

## 7 Reserved spaces for connection devices

Except for specific cases agreed between the customer and the manufacturer, the connecting faces of the discharge and vapour return couplings shall be positioned as shown in Figure 3.

Dimension in millimetres




**Key**

1 middle of tank wagon
2 tank longitudinal axle
3 reserved space
4 top of rails
5 branch pipe of discharge line
6 branch pipe of vapour return line
7 Distance between vertical planes

NOTE 1 These dimensions are given for new and empty tank wagons.

NOTE 2 These dimensions are based on the international loading gauge. For domestic traffic in Great Britain and for traffic of continental tank wagons running in Great Britain, the Kinematic gauge for Great Britain rules defined in the Technical Specification for Interoperability for Freight Wagons also apply.

**Figure 3 — Reserved spaces for connection devices**

Distance between vertical planes shall where possible be kept to a minimum.

## 8 Threaded coupling

Except for specific cases agreed between the customer and the manufacturer, the bottom discharge lines shall be fitted with a threaded coupling as shown in Figure 4 and given in Table 1 and caps as shown in Figure 5. The caps shall be fitted with a loss preventing device.

Dimension in millimetres

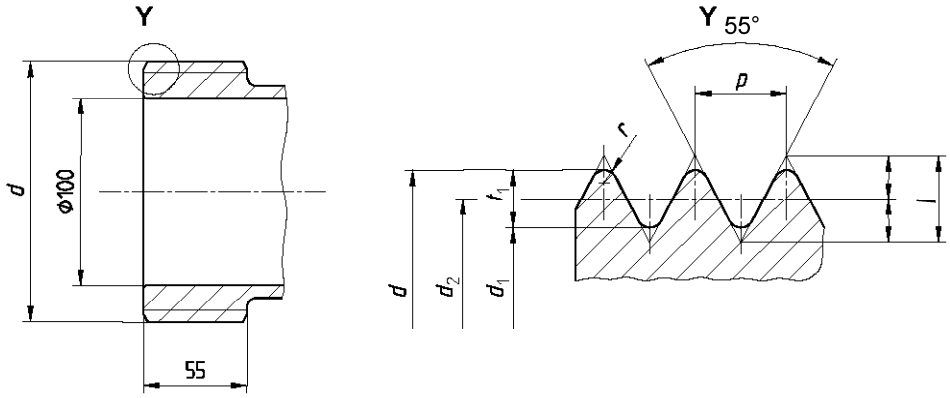



**Figure 4 — Coupling dimensions**

**Table 1 — Thread dimensions**

| External diameter | Minor diameter | Pitch diameter | Pitch | Number of thread per 25,4 mm | Radius | Thread height | Section | Gasket |
|---|---|---|---|---|---|---|---|---|
| $d$ | $d_1$ | $d_2$ | $p$ | $z$ | $r$ | $t_1$ | | $Td_3$,$e$ |
| mm | mm | mm | mm | | mm | mm | $mm^2$ | mm |
| 139,705 | 127,313 | 133,509 | 9,677 | 2 5/8 | 1,329 | 6,196 | 12 730 | $130 \times 3$ |

General limit deviations are ± 0,25 mm except for threads where tolerances from EN ISO 228-1 apply.

Dimensions in millimetres

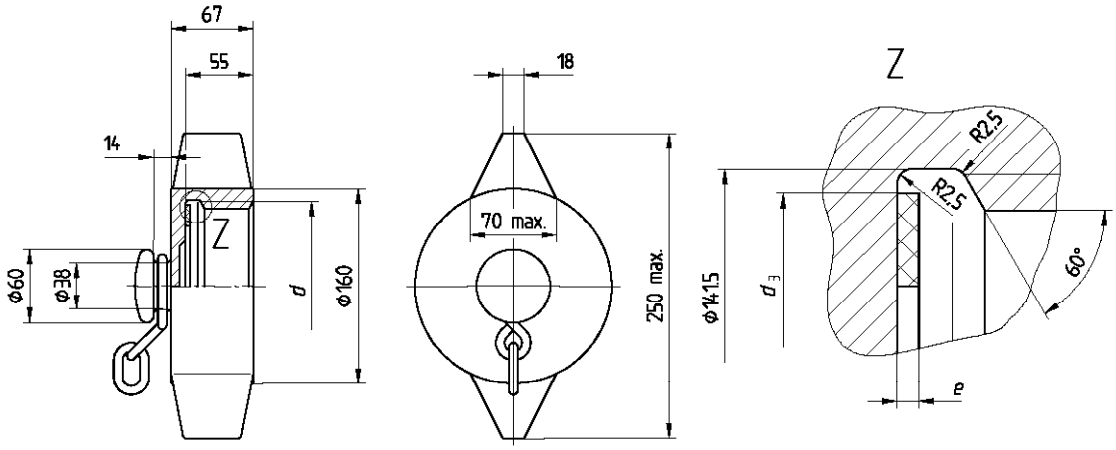



**Figure 5 — Cap dimensions**

NOTE This figure is an example of the caps, other dimensions could be used except 55 mm, d, for Z view and 250 mm for the maximum external dimension of the cap.

# Annex A
(informative)

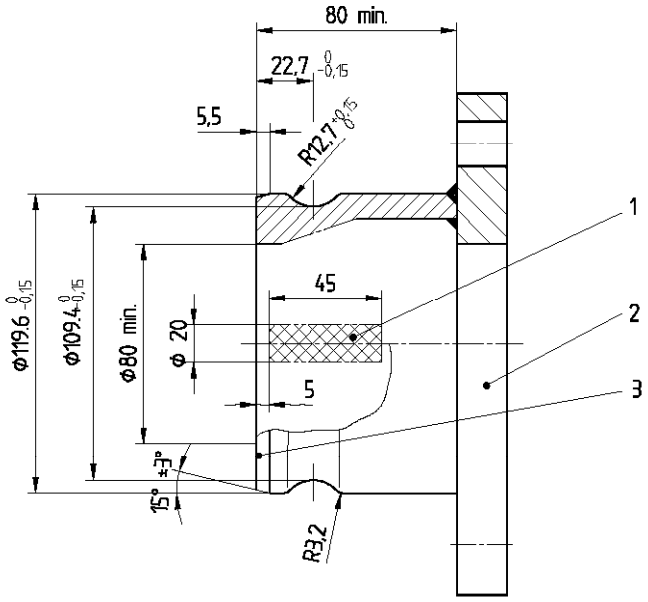
# Quick couplings for vapour return

The vapour return coupling shall consist of a dry quick coupling. It shall be fitted with an internal closure operated by the female part of the coupling.

Dimensions of vapour return couplings shall be as shown in Figure A.1.

The dry coupling shall be provided with an easy-to-handle dust-proof cap with attachment facility to a chain or a stainless steel wire cable. In order to make the vapour return coupling perfectly visible from the outside, its dust-proof cap shall be coloured "yellow-green".

Dimensions in millimetres




**Key**

1 contact area for opening of disc

2 flange DN 80 PN 16

3 sealing surface

Where tolerances are not specified, the general limit deviation is ± 0,5 mm.

**Figure A.1 — Dimensions of vapour return coupling**

# Bibliography

[1] EN 12972, *Tanks for transport of dangerous goods — Testing, inspection and marking of metallic tanks*

[2] EN 13315, *Tanks for transport of dangerous goods — Service equipment for tanks — Gravity discharge coupler*

[3] EN 14432, *Tanks for the transport of dangerous goods — Tank equipment for the transport of liquid chemicals — Product discharge and air inlet valves*

[4] EN 14433, *Tanks for the transport of dangerous goods — Tank equipment for the transport of liquid chemicals — Foot valves*

[5] ISO 9329-3, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 3: Unalloyed and alloyed steels with specified low temperature properties*

[6] RID, *Regulations concerning the International Carriage of Dangerous Goods by Rail*[1)] *implementing Commission Directives 2003/28/EC and 2003/29/EC*

[7] UIC 573:2007, *Technical conditions for the construction of tank wagons*[2)]

1) Commonly known as RID.

2) May be purchased from: Railway Technical Publications (ETF), 16 rue Jean Rey, F-75015 Paris

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