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Railway applications — Ground based services — Water restocking equipment

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee RAE/1, Railway Applications.

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

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Contents

Page

Foreword

This document (EN 16362:2013) 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of an identical text or by endorsement, at the latest by June 2014, and conflicting national standards shall be withdrawn at the latest by June 2014.

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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 2008/57/EC.

For relationship with EU Directive 2008/57/EC, see informative Annex ZA which is an integral part of this document.

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

1 Scope

This European Standard specifies the interface requirements for water restocking equipment, and the on board system to preserve the quality of the water supply. It is applicable to railway vehicles fitted with water taps for use in toilets, washing facilities, water dispensers and catering equipment and the railway infrastructure at designated servicing sites.

This European Standard is not applicable to filling railway vehicles with water for the purpose of engine cooling, steam heating or work equipment on on-track machines.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 806 (all parts), *Specification for installations inside buildings conveying water for human consumption*

EN 806-2:2005, *Specification for installations inside buildings conveying water for human consumption — Part 2: Design*

EN 12502-1, *Protection of metallic materials against corrosion — Guidance on the assessment of corrosion likelihood in water distribution and storage systems — Part 1: General*

EN 15877-2:2013, *Railway applications — Markings of railway vehicles — Part 2: External markings on coaches, motive power units, locomotives and on track machines*

3 Terms and definitions

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

3.1
railway infrastructure
all installations required for the running of railway vehicles including operating and support facilities

EXAMPLE Tracks, crossings, catenaries, signals, maintenance depots.

4 Requirements

4.1 On vehicles

4.1.1 Water system

4.1.1.1 Standard temperature range

Where a railway vehicle has a requirement for water taps for use in toilets, washing facilities, water dispensers and catering equipment using water it shall be fitted with a system to supply water for this purpose. The water system shall be designed and insulated such that:

— with the vehicle heating system operational the water system shall function normally at external temperature of −20 °C;

— the water system shall function normally after the heating system is turned off with the vehicle internal temperature of 20 °C and external temperature of –10 °C for 12 h, and then the vehicle internal temperature returned to 20 °C.

The verification of this requirement shall be by successful completion of the test in accordance with Annex C.

4.1.1.2 Low ambient temperature range

It is permissible for water systems to be designed to withstand lower minimum temperature than shown in 4.1.1.1. The technical documentation shall state the minimum ambient temperature the system is designed for, where this is below –20 °C.

NOTE For example T1 in EN 50125–1 requires a minimum of –25 °C.

4.1.1.3 All water systems

The water system from the inlet up to and including the storage tank shall be able to withstand the maximum pressure and flow rate shown in 4.2.3.

NOTE Where a water level indicator is fitted then suitable examples are shown in Annex A.

4.1.2 Coupling for water supply

For each independent water system within scope of this standard, a filling coupling shown in Figure 1 shall be fitted on each side of the vehicle, or each side on a vehicle end. The filling coupling shall be positioned with the centre of the coupling aperture at a maximum 1 600 mm above rail level. Filling couplings shall be marked as shown in EN 15877-2:2013, 4.5.15, Figure 48 if compliant with 4.1.1.1 and EN 15877-2:2013, 4.5.15, Figure 47 if compliant with 4.1.1.2.

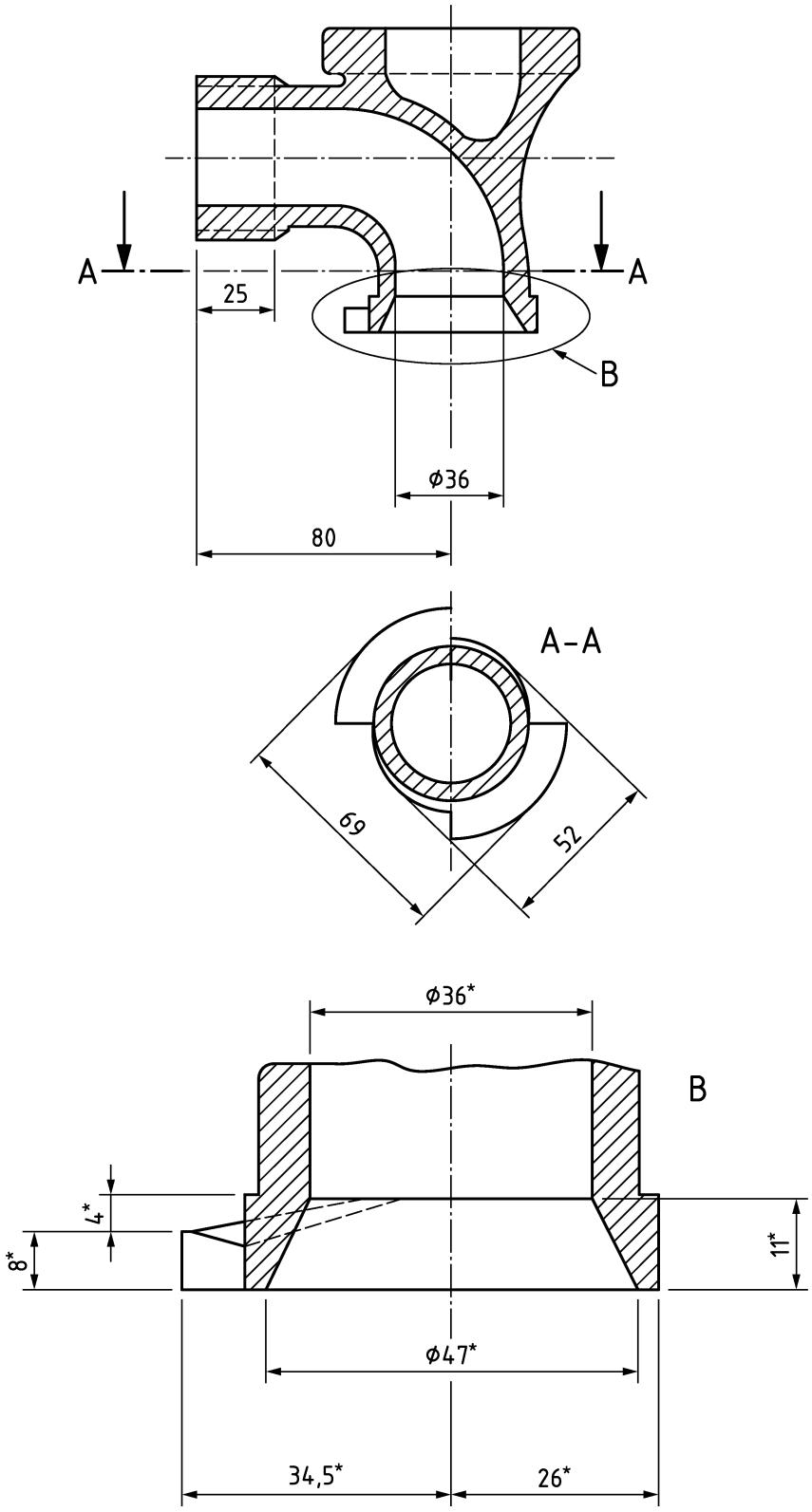
All other water systems used on railway vehicles, for example for engine cooling, steam heating or work equipment on on-track machines, shall be incapable of use with the filling coupling shown in Figure 1.

The inlet pipes between the filling coupling and the water tanks shall either have:

— an internal diameter of 36 mm, equal to that of the bore of the bayonet joint;

— or, is permitted to have a smaller diameter inlet pipe where it can be demonstrated that the vehicle can be filled within 4 min using a supply pressure of 3 bar.

Dimensions in millimetres



Key

* Mandatory dimensions

Figure 1 — Standard water filling coupling

The filling connection described in 4.1.2 shall not be used for the purpose of water filling for engine cooling, steam heating or work equipment on on-track machines.

4.1.3 Protection of coupling

The filling coupling shall be fitted with a shield to protect against contamination by dirt and snow. This shield shall cover the outside of the filling coupling with a minimum overlap of 12 mm all around the cover.

The shield shall be designed to allow condensation and overflow water to drain off freely, this is to ensure that the filling coupling will not become frozen. A typical example of a water filling coupling shield is shown in Figure B.1.

4.1.4 Drainage

Each vehicle water supply system shall be capable of completely draining by the operation of one switch or lever, it is also permitted that one button can discharge a complete train. It is permitted for the discharge to be operated additionally by a thermostat-controlled discharge valve which is actuated automatically before the water in the supply circuit freezes.

When the vehicle is level, it shall be possible to empty the water supply system completely with a minimum flow rate of 1 l/s, leaving no trapped liquid. It is permitted for this time limit to be deliberately exceeded in the case of thermostat-controlled graduated drainage, whenever there is a risk of parts of the system freezing up. It is also permitted for this time limit to be exceeded by individual items of catering equipment.

All water tanks and pipes shall be provided with a drainage system designed to ensure complete emptying and efficient rinsing. This is permitted to be individually per tank in addition to drainage as part of the centralised drainage system.

The devices facilitating the drainage of the water system for toilet compartments shall be identified immediately adjacent to the fitting controlling the operation of these devices with markings as shown in EN 15877-2:2013, 4.5.15, Figure 48 if compliant with 4.1.1.1 and EN 15877-2:2013, 4.5.15, Figure 47 if compliant with 4.1.1.2.

4.1.5 Drinking water system

Systems used to supply drinking water shall be constructed of materials, equipment and fittings that have proven suitability for use. As a minimum they shall use materials that are shown in EN 806-2:2005, Annex A.

4.2 On railway infrastructure

4.2.1 Depot supply hose to vehicle

The supply hose shall be flexible and have a coupling on the end to match with the water filling coupling shown in Figure 1. The depot supply pipework and hose shall be suitable for drinking water compliant with EN 12502-1 and EN 806-2.

The hose shall be designed so that it is always capable of draining when not in use.

4.2.2 Protection of end of supply hose

The filling system shall be designed so that the end coupling is always capable of either hanging clear of the ground or in a mild disinfectant solution, fulfilling the requirements of the EN 806 series.

It is permitted for the supply hose coupling to be capable of being fitted with a dirt cover, or capable of being coupled to a suitable protective device for storage. The cover or fixed protective device shall be designed to prevent the ingress of dust and contaminants into the flexible supply pipe whilst retaining the ability to drain the pipe.

4.2.3 Water supply and equipment

The devices shall withstand a water pressure of 6 bar and be able to deliver a water flow rate of 150 l/min.

European experience has shown that an acceptable vehicle filling time requires a minimum water pressure of 3 bar and a minimum flow rate of 80 l/min.

NOTE The TSIs HSR INF and CR INF require that the water supplied to the train is drinking water, as specified in Directive 98/83/EC.

4.2.4 Security of supply

There shall be a device to prevent water going backwards towards the water supply to prevent back siphoning.

A permissible method for achieving this requirement, for example non-return valve, sealed break tank, etc., will vary according to the location of the servicing point. It is recommended to seek guidance from the local water supply company.

4.2.5 Frost protection

Where there is a possibility of ambient temperatures below 0 °C the flexible water supply hose shall be self draining to prevent water remaining in the hose. In addition it is permissible to provide sufficient trace heating to prevent the water in the supply pipe to the flexible hose from freezing.

4.3 Information and instruction

4.3.1 For railway vehicles

Where water is intended for use on the train as drinking water instructions shall be provided for the necessary hygiene requirements to retain the drinkability of the water supply. As a minimum these instructions shall include:

— on-board staff duties for the operation of any installed equipment associated with the provision of drinking water; and

— maintenance instructions to retain the integrity of equipment (e. g. steriliser cleaning regime, exchange rate of UV tubes, etc.);

— maintenance instructions to ensure drinking water quality in water system.

NOTE The initial maintenance instructions are normally best provided by the designer of the railway vehicle.

4.3.2 For fixed installations

Where a water supply at a servicing location is intended for the supply of drinking water for use on the train as drinking water instructions shall be provided for the necessary hygiene requirements to retain the drinkability of the water supply. As a minimum these instructions shall include:

— servicing point employees duties with regard to requirements before attaching pipe to vehicle;

— servicing point employees duties with regard to storage of flexible water connection;

— servicing point employees duties with regard to any other operating instruction to ensure continued hygiene and hence drinkability of water;

— maintenance instructions to retain the integrity of equipment (e. g. sterilising solution change); this shall include the recommendations for keeping the level of bacteriological contamination in accordance with Council Directive 98/83/EC.

NOTE The initial maintenance instructions are normally best provided by the designer of the water installation.

Annex A
(informative)

Water level indication for railway vehicles

A.1 Water level indicator

A.1.1 General

If a water level indicator on the outside of a railway vehicle is required this annex gives two typical examples.

A.1.2 Mechanical water level indicator

This indicator shows the water level in the tank at any time, from the inside or outside of the vehicle simultaneously.

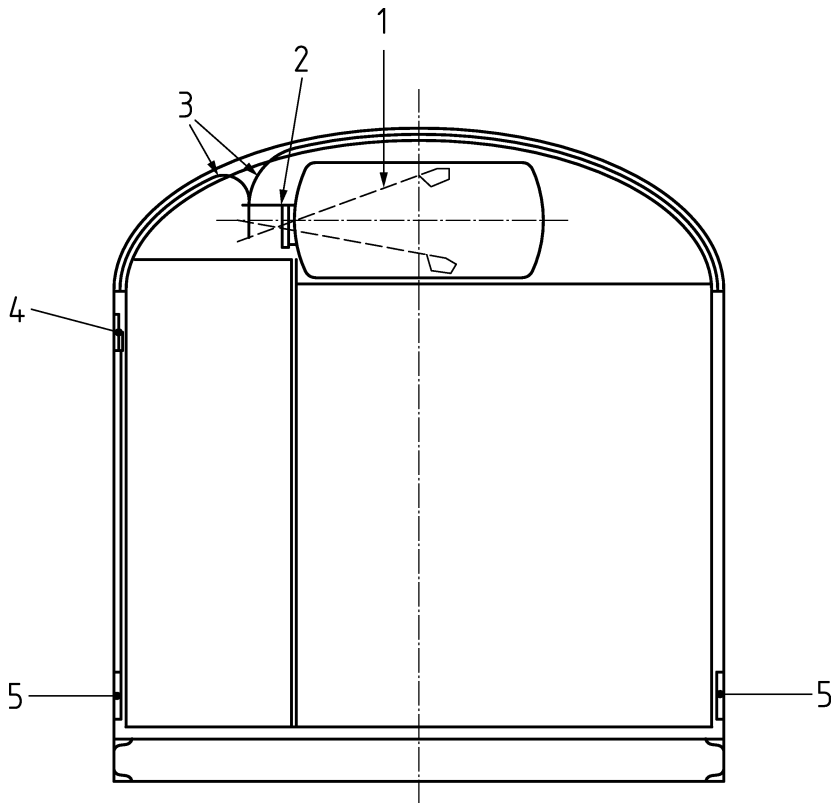
It is mechanically controlled by the float in the tank and includes:

— the float itself with its system of rods;

— two Bowden cables of stainless steel and plastic material; and

— marking plates (or cursors) sliding vertically in recesses provided in the side of the vehicle and thus indicating the water level.

Figure A.1 shows the layout of the equipment fitted in a typical situation on a vehicle.



Key

1 float

2 bracket

3 bowden cables

4 internal indicators

5 external indicators

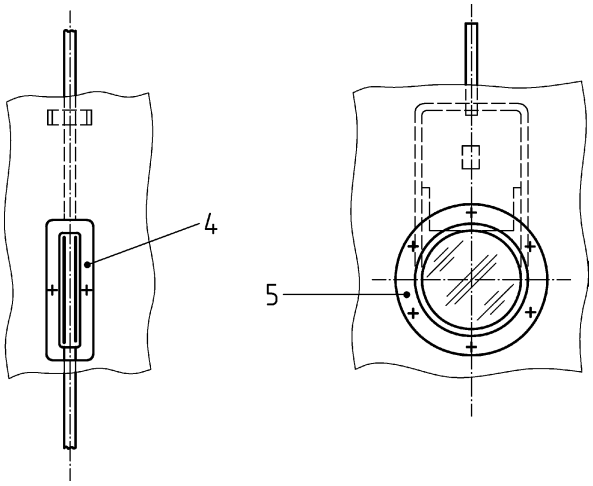
Figure A.1 — Cross section through vehicle showing layout of mechanical water level indicator

The Bowden cables are fixed to the end of the float lever situated outside the water tank. At the lower end of each one, level with the recess in the bottom of the side wall, a marking plate is suspended, the lower edge of which represents the water level. The recess may be either circular or rectangular.

The visible surface of the rear of the casing containing the indicator is in the same dark colour as the side wall of the vehicle, while the marking plate itself is in a light colour. When the tank is filled the low friction Bowden cable draws the marker plate upwards and the latter, moving in its slide, exposes the dark surface of the rear of the casing, while during emptying, the marker plate descends gradually, and its light coloured surface indicates that the tank needs refilling. The indicator may be fitted to the outside of the vehicle through a circular opening in the external plating, as shown in Figure A.2.

The marker plate should be heavy enough to ensure that the Bowden cable always remains taut.

The device may also incorporate an indicator inside the vehicle without any appreciable increase in the friction resistance encountered by the sliding parts, by attaching an additional marker plate to the Bowden cable, inside the coach, in the side corridor.



Key

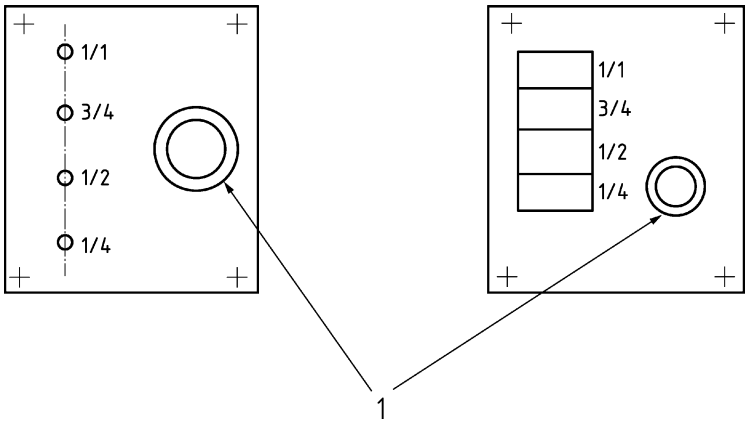
4 internal indicators

5 external indicators (mechanical)

Figure A.2 — Water level indicator

A.1.3 Electrical water level indicator

This system uses sensors in the water tank and illuminated indicator panel is used to indicate the water level as shown in Figure A.3.



Key

1 activation button

Figure A.3 — Electrical external water level indicator

A.1.4 Low water level indicator

An additional indicator could also be fitted to the casing, or remote location (for example on the outside of the vehicle or train management system), to show when the minimum water level is reached.

A.2 Electrical filling stop function

An additional system can be used to stop the inflow of water when it reaches the maximum level. Such a design shall also be capable of use at a fixed installation without the electrical filling stop.

Annex B
(informative)

Water coupling cover

A typical cover for use on vehicles is shown in Figure B.1.

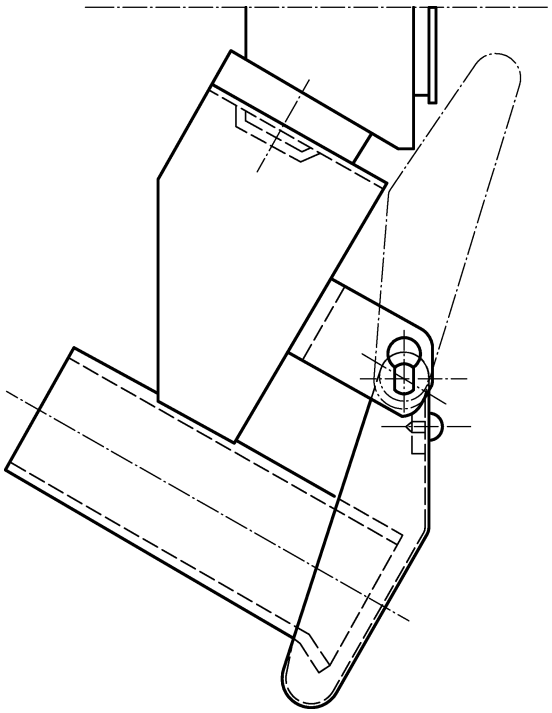


Figure B.1 — Example of suitable shield for standard water filling coupling

Annex C
(normative)

Test procedure

The test is carried out at an external temperature of –10 °C for a period of 5 h. During the test, the mean interior temperature in the passenger areas shall be adjusted to +20 °C.

At least 5 h prior to the test, the water tanks shall be filled with water of a temperature < +15 °C. Each type of tank is filled as follow the first to 1/4 and each one more (same type) to 3/4 of their respective capacities.

The installations shall be checked for proper functioning after filling and immediately before commencement of the freeze protection test in order to ensure that all pipes are filled with water.

For the freeze protection test the energy supply of the vehicle is turned off at least 12 h. The temperatures of the tanks, valves, pipes and all parts prone to freezing are measured. The test should be interrupted if the water system is in danger of freezing (no function of automatic draining).

Once the freeze protection test has been completed, the installations shall be checked for proper functioning (release by the freeze protection system). The functional test is followed by pre-heating and filling of water again. If the functional test has not been successful, it shall be repeated at specific intervals (approximately 15 min) after pre-heating (interior temperature: +18 °C) and release by the freeze protection system until the sanitary installations function properly.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC

This European Standard has been prepared under a mandate given to CEN/CENELEC/ETSI by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the Directive 2008/57/EC[1)].

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in Table ZA.1 for HS Infrastructure, Table ZA.2 for HS Rolling Stock, Table ZA.3 for CR Infrastructure and Table ZA.4 for CR Locomotives and Passenger Rolling Stock, Table ZA.5 for CR/HSR Infrastructure and Table ZA.6 for CR/HSR Locomotives and Passenger Rolling Stock confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations

1) This Directive 2008/57/EC adopted on 17th June 2008 is a recast of the previous Directives 96/48/EC 'Interoperability of the trans-European high-speed rail system' and 2001/16/EC 'Interoperability of the trans-European conventional rail system' and revisions thereof by 2004/50/EC 'Corrigendum to Directive 2004/50/EC of the European Parliament and of the Council of 29 April 2004 amending Council Directive 96/48/EC on the interoperability of the trans-European high-speed rail system and Directive 2001/16/EC of the European Parliament and of the Council on the interoperability of the trans-European conventional rail system'.

Table ZA.1 — Correspondence between this European Standard, the HS TSI INF published in the OJEU dated 19 March 2008 and Directive 2008/57/EC

Clause/subclauses of this European Standard	Chapter/§/annexes of the TSI	Corresponding text, articles/§/annexes of the Directive 2008/57/EC	Comments
The whole standard applies.	4. Description of the infrastructure domain 4.2 Functional and technical specifications of the domain 4.2.26 Fixed installations for servicing trains §4.2.26.3 Water restocking equipment	Annex III, Essential requirements 1 General requirements 1.1 Safety Clause 1.1.3 Clause 1.1.5 1.2 Reliability and availability 1.3 Health Clause 1.3.1 1.4 Environmental protection Clause 1.4.1 1.5 Technical compatibility 2. Requirements Specific to Subsystem 2.5 Maintenance 2.5.1 Health and safety 2.5.2 Environmental protection 2.5.3 Technical compatibility 2.6 Operation and traffic management 2.6.1 Safety §2	When the CR/HSR TSI INF (Table ZA.5) comes into effect this table shall be withdrawn.

Table ZA.2 — Correspondence between this European Standard, the HS TSI RST published in the OJEU dated 26 March 2008 and Directive 2008/57/EC

Clause/subclauses of this European Standard	Chapter/§/annexes of the TSI	Corresponding text, articles/§/annexes of the Directive 2008/57/EC	Comments
The whole standard applies.	4. Characteristics of the subsystem 4.2 Functional and technical specification of the subsystem 4.2.9 Servicing 4.2.9.5 Water restocking equipment Annex M V Inlet connections for water tanks	Annex III, Essential requirements 1 General requirements 1.1 Safety Clause 1.1.3 Clause 1.1.5 1.2 Reliability and availability 1.3 Health Clause 1.3.1 1.4 Environmental protection Clause 1.4.1 1.5 Technical compatibility 2. Requirements Specific to Subsystem 2.4 Rolling stock 2.4.1 Safety §4 2.4.3 Technical compatibility §3 2.5 Maintenance 2.5.1 Health and safety 2.5.2 Environmental protection 2.5.3 Technical compatibility 2.6 Operation and traffic management 2.6.1 Safety §2	When the CR/HSR LOCO&PAS RST TSI (Table ZA.6) comes into effect this table shall be withdrawn.

Table ZA.3 — Correspondence between this European Standard, the CR TSI INF published in the OJEU on 14 May 2011 and Directive 2008/57/EC

Clause/subclauses of this European Standard	Chapter/§/annexes of the TSI	Corresponding text, articles/§/annexes of the Directive 2008/57/EC	Comments
The whole standard is applicable	4.Description of the infrastructure subsystem 4.2. Functional and technical specifications of the subsystem, 4.2.13. Fixed installations for servicing trains §4.2.13.4. Water restocking	Annex III, Essential requirements 1 General requirements 1.1 Safety Clause 1.1.3 Clause 1.1.5 1.2 Reliability and availability 1.3 Health Clause 1.3.1 1.4 Environmental protection Clause 1.4.1 1.5 Technical compatibility 2. Requirements Specific to Subsystem 2.5 Maintenance 2.5.1 Health and safety 2.5.2 Environmental protection 2.5.3 Technical compatibility 2.6 Operation and traffic management 2.6.1 Safety §2	When the CR/HSR TSI INF (Table ZA.5) comes into effect this table shall be withdrawn.

Table ZA.4 — Correspondence between this European Standard, the CR LOCO&PAS RST TSI published in the OJEU on 26 May 2011 and Directive 2008/57/EC

Clause/subclauses of this European Standard	Chapter/§/annexes of the TSI	Corresponding text, articles/§/annexes of the Directive 2008/57/EC	Comments
The whole standard is applicable.	4.Characterisation of the Rolling stock subsystem 4.2 Functional and technical specifications of the subsystem, 4.2.11 Servicing §4.2.11.4 Water refilling equipment §4.2.11.5 Interface for water refilling	Annex III, Essential requirements 1 General requirements 1.1 Safety Clause 1.1.3 Clause 1.1.5 1.2 Reliability and availability 1.3 Health Clause 1.3.1 1.4 Environmental protection Clause 1.4.1 1.5 Technical compatibility 2. Requirements Specific to Subsystem 2.4 Rolling stock 2.4.1 Safety §4 2.4.3 Technical compatibility §3 2.5 Maintenance 2.5.1 Health and safety 2.5.2 Environmental protection 2.5.3 Technical compatibility 2.6 Operation and traffic management 2.6.1 Safety §2	When the CR/HSR LOCO&PAS RST TSI (Table ZA.6) comes into effect this table shall be withdrawn.

Table ZA.5 — Correspondence between this European Standard, ERA Recommendation N. ERA/REC/10–2012INT Draft Technical Specification for Interoperability Subsystem Infrastructure version 4.0 dated 17.12.2012, and Directive 2008/57/EC

Clause/subclauses of this European Standard	Chapter/§/annexes of the TSI	Corresponding text, articles/§/annexes of the Directive 2008/57/EC	Comments
The whole standard is applicable	4.Description of the infrastructure subsystem 4.2. Functional and technical specifications of the subsystem 4.2.12. Fixed installations for servicing trains §4.2.12.4. Water restocking	Annex III, Essential requirements 1 General requirements 1.1 Safety Clause 1.1.3 Clause 1.1.5 1.2 Reliability and availability 1.3 Health Clause 1.3.1 1.4 Environmental protection Clause 1.4.1 1.5 Technical compatibility 2. Requirements Specific to Subsystem 2.4 Rolling stock 2.4.1 Safety §4 2.4.3 Technical compatibility §3 2.5 Maintenance 2.5.1 Health and safety 2.5.2 Environmental protection 2.5.3 Technical compatibility 2.6 Operation and traffic management 2.6.1 Safety §2	This table comes into effect when the HSR and CR INF TSIs (Tables ZA.1 and ZA.3) have been withdrawn.

Table ZA.6 — Correspondence between this European Standard, the ERA IU LOC&PAS RST TSI final draft V 2.0 dated 11.12.2012, and Directive 2008/57/EC

Clause/subclauses of this European Standard	Chapter/§/annexes of the TSI	Corresponding text, articles/§/annexes of the Directive 2008/57/EC	Comments
The whole standard is applicable.	4.Characterisation of the Rolling stock subsystem 4.2 Functional and technical specifications of the subsystem. 4.2.11 Servicing §4.2.11.4 Water refilling equipment §4.2.11.5 Interface for water refilling Annex G Servicing Annex G-2 interface for water refilling Annex J Technical specifications referred to in this TSI Annex J-1 Standards or normative documents §64 Interface for water filling	Annex III, Essential requirements 1 General requirements 1.1 Safety Clause 1.1.3 Clause 1.1.5 1.2 Reliability and availability 1.3 Health Clause 1.3.1 1.4 Environmental protection Clause 1.4.1 1.5 Technical compatibility 2. Requirements Specific to Subsystem 2.4 Rolling stock 2.4.1 Safety §4 2.4.3 Technical compatibility §3 2.5 Maintenance 2.5.1 Health and safety 2.5.2 Environmental protection 2.5.3 Technical compatibility 2.6 Operation and traffic management 2.6.1 Safety §2	• The TSI references the standard in Annex J-1§64. • This table comes into effect when the HSR TSI RST and CR LOCO&PAS RST TSI (Tables ZA.2 and ZA.4) have been withdrawn.

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Bibliography

[1] EN 50125-1, *Railway applications — Environmental conditions for equipment — Part 1: Equipment on board rolling stock*

[2] UIC 563, *Fittings provided in coaches in the interests of hygiene and cleanliness*[2)]

[3] UIC 627-2, *Filling devices for diesel stock*[2)]

[4] Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption

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

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