BS EN 17863:2023

BSI Standards Publication

Railway applications — Ground based services — Coach hygiene requirements

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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.

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Published by BSI Standards Limited 2023

ISBN 978 0 539 20475 9

ICS 45.060.20

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 October 2023.

Amendments/corrigenda issued since publication

Date	Text affected

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 17863

October 2023

ICS 45.060.20

English Version

Railway applications - Ground based services - Coach hygiene requirements

Applications ferroviaires - Stations service - Exigences d'hygiène des matériels roulants destinés au transport de passagers

Bahnanwendungen - Versorgungsdienste - Hygieneanforderungen des Personenverkehrs

This European Standard was approved by CEN on 28 August 2023.

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Ref. No. EN 17863:2023 E

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European foreword

This document (EN 17863:2023) 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of an identical text or by endorsement, at the latest by April 2024 and conflicting national standards shall be withdrawn at the latest by April 2024.

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1 Scope

This document specifies the requirements for hygiene and cleanliness on railway vehicles and where appropriate the necessary interfacing infrastructure equipment.

The areas specifically concerned on the railway vehicle include toilets, toilet doors, hand wash facilities, baby changing facilities, feminine hygiene articles management and fresh water supply. In the catering areas for water supply and disposal systems only.

This document also includes extensive guidance and best practice to assist in the design, manufacture, operation and maintenance of railway vehicle hygiene equipment.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 33:2019, *WC pans and WC suites - Connecting dimensions*

EN 547-3:1996+A1:2008, *Safety of machinery - Human body measurements - Part 3: Anthropometric data*

EN 997:2018, *WC pans and WC suites with integral trap*

EN 1717:2000, *Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow*

EN 13129:2016, *Railway applications - Air conditioning for main line rolling stock - Comfort parameters and type tests*

EN 13272-1:2019, *Railway applications - Electrical lighting for rolling stock in public transport systems - Part 1: Heavy rail*

EN 14750-1:2006, *Railway applications - Air conditioning for urban and suburban rolling stock - Part 1: Comfort parameters*

EN 16362:2013, *Railway applications - Ground based services - Water restocking equipment*

EN 16584-2:2017, *Railway applications - Design for PRM use - General requirements - Part 2: Information*

EN 16584-3:2017, *Railway applications - Design for PRM use - General requirements - Part 3: Optical and friction characteristics*

EN 16585-1:2017, *Railway applications - Design for PRM use - Equipment and components onboard rolling stock - Part 1: Toilets*

EN 16585-3:2017, *Railway applications - Design for PRM use - Equipment and components on board rolling stock - Part 3: Clearways and internal doors*

EN 16922:2017+A1:2019, *Railway applications - Ground based services - Vehicle waste water discharge equipment*

EN 17343:2020, *Railway applications - General terms and definitions*

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EN 45545-2:2020, *Railway applications - Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components*

EN 45545-6:2013, *Railway applications - Fire protection on railway vehicles - Part 6: Fire control and management systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 17343:2020 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp/

3.1
black water
water previously used in the toilet

Note 1 to entry: This is a combination of water, human waste, toilet chemicals, toilet paper.

3.2
grey water
water previously used in the handwash sink

Note 1 to entry: This is a combination of water and soap only.

3.3
purple water
water previously used in the kitchen sink, dishwasher waste and shower

Note 1 to entry: This is a combination of water, soap, fats, cleaning chemicals.

3.4
water intended for human consumption
water meeting European Directive 2020/2184 used for human consumption, food preparation and washing/bathing, as set out in 4.1.2

3.5
low use toilet
toilet cabin with an anticipated daily use of less than 10 occasions

3.6
square socket key
Berne key
key in accordance with EN 14752:2019+A1:2021, Annex H

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4 Water equipment

4.1 Water supply and storage

4.1.1 Fresh water supply

4.1.1.1 Material

The tanks and the filling and emptying pipes shall be made of material that will not deteriorate and, in particular, material used shall not be corrosive or toxic.

Materials used shall be suitable for water fit for human consumption.

NOTE Materials are certified to nationally agreed standards of materials for water fit for human consumption, such as 4MS standards, which is an agreement (initially between four EU member states) for the harmonization of tests for the hygienic suitability of products in contact with drinking water.

The combination of differing materials should be analysed to avoid electrolytic corrosion. Consideration should be given to the choice of material so that it does not reduce the water quality. It is normally a compromise between the best quality and durability.

The materials shall sustain the lifetime of a railway vehicle of 25 years to 40 years. The design of the system shall take account of the need to change components with a lifetime shorter than the anticipated lifetime of the vehicle.

4.1.1.2 Drainage

Water tanks and pipes shall be provided with a drainage system designed to ensure complete emptying and efficient rinsing and meet the requirements of EN 16362:2013, 4.1.4.

The water pipe system shall be drainable for all pipes. System shall automatically drain the pipe system if the internal temperature falls below 3 °C ± 1 °C (including sensor tolerances) in the area of the pipework. It is permitted for trace heating to be fitted to toilet pipes to prevent freezing as an alternative to drainage.

It is possible to carry out physical tests in a climatic chamber to assess where the temperature sensor should be fitted to predict the likeliest position of the coldest position.

From the test described in EN 16362:2013, 4.1.1.1 if the car body cannot withstand 12 h at −10 °C the water pipe system shall be drained if the coach is stabled without shore supply. This drainage shall either be automatic, or an instruction is provided that drainage should be carried out – see 7.2. As design guidance it is preferable to also be able to drain pipework manually where this is automatic.

4.1.1.3 Control of leakage

The freshwater system and its surroundings should incorporate design features to prevent, or detect and report, water leaking into the car body. It is permissible for the design to permit water onto the toilet floor area, but it shall prevent this from spreading to the passenger compartment/vestibule/car body unless this is a deliberately defined area.

4.1.2 Water intended for human consumption

Water intended for hand washing and showering shall be fit for human consumption.

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Water intended for use for making hot drinks shall be heated to a minimum of 80 °C and:

a) be water intended for drinking;

or

b) the water shall be sterilized immediately before use for example by ultraviolet radiation or micro filtration;

or

c) supplied directly from freshwater containers/bottles.

Water intended for use for drinking water shall:

d) be water intended for drinking;

or

e) provide freshwater containers/bottles.

4.1.3 Recycled water

Treated black water, treated purple water and untreated grey water shall only be reused for toilet flushing if it doesn't contain particles greater than 0,5 mm diameter and no more than 500 ppm. Optically the reused water shouldn't be different to drinking water; that means that in normal conditions the reused water should be colourless and the turbidity should be lower than 5 NTU, as specified in EN ISO 7027-1:2016. In addition, the pH of the reused water should be in the range of 6 to 9.

NOTE Normal conditions means not adding unintended fluids to the system such as ink, milk, soft drinks, etc.

Treated grey water is permitted to also be reused for hand washing and showering if it meets water fit for human consumption requirements.

4.1.4 Storage tank

4.1.4.1 Freshwater storage tank

The capacity of freshwater storage tanks shall be calculated using parameters shown in EN 16922:2017+A1:2019, 5.2.2 and 5.2.5. The size of the freshwater tank is a compromise between the anticipated daily usage and preservation of the stored water quality. As guidance, to retain the optimal hygienic quality of the potable water the usable volume of the freshwater storage tank should ideally store only two/three days' water supply.

The freshwater tank shall be capable of draining manually without any electrical or pneumatic supply. The draining flow of the freshwater tank shall be compliant with EN 16362:2013, 4.1.4. As design guidance it is preferable for the driver of multiple units to be able to drain all freshwater tanks from the driving position when electrical energy is available.

Fresh water tanks shall have a hatch for inspecting and cleaning the freshwater tanks. The access hatch shall have a minimum size of 20 000 mm^2, but it should be 40 000 mm^2 where this is possible. The minimum dimension of the access hatch shall be 160 mm diameter or the relation between width and height of a rectangular hatch shall not be greater than 2 to 1. The access hatch shall be accessible without draining a maximum of 80 % of the capacity of the fresh water. As design guidance the least water to be drained is preferable and it is recommended that 50 % should be used when possible. The access hatch of the freshwater tank shall be accessible without removing any other parts (excluding insulation materials). When the freshwater tank is located inside a cabinet or behind a panel, it is permitted to have access to the hatch of the freshwater tank by opening a door or other hatch.

The refilling of the fresh water tank shall be possible with power on or off on the train.

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4.1.4.2 Retention storage tank

The capacity of retention tanks shall be calculated using parameters shown in EN 16922:2017+A1:2019, 5.2.2 and 5.2.5. As design guidance the recommendation is that it should be tailored to four days' predicted amount, given by calculation according to EN 16922:2017+A1:2019, however this depends on the intended use of the train as the tanks size is a compromise between vehicle mass and operational needs.

4.1.4.3 Level indication

The design of the system should consider the need for water level indication in on-board storage tanks. Some previously used examples are described in EN 16362:2013, Annex A. The indication should consider the necessity for the accuracy of the display, this should consider whether it is necessary to show the precise fluid volume or an indication of tank level.

There is also the potential to include the tank levels into the remote condition monitoring systems so that enroute servicing points could have advanced warning of location of tanks needing replenishment.

If a train control and management system (TCMS) is available, the message "freshwater tank empty" shall be reported in the TCMS. As design guidance, if a TCMS is available, the continuous actual level in the freshwater tank should be reported to the TCMS. If more information is available, for example retention tank reached 95 %, this should also be reported to the TCMS.

4.2 Hand wash basin

4.2.1 Dimensions

The wash basin shall be sufficient size for comfortable washing of hands and shall be no smaller than 220 mm wide and 160 mm from front to back. The shape of the wash basin should contain the normal use with no overflow of water during acceleration and braking of up to 0,1 g if the actual design accelerations of the train are not higher.

The sink drain shall be situated at the lowest point of the sink bowl; it shall be always open to discharge (i.e. not be fitted with a plug).

The sink drain shall be fitted with a perforated plate, or similar device, to prevent large objects entering the discharge pipe - no object greater than 4 mm diameter shall be able to pass through the drain, except where there are no valves fitted beyond the sink drain, in this case the maximum size shall be 6,5 mm. Items smaller than 3 mm diameter shall pass through. The design of the drain shall permit the draining of 1 l of water in 10 s.

The tap discharge point shall be a minimum of 95 mm above the rim of the wash basin and positioned to permit the washing of hands under running water.

The design of the tap discharge shall minimize the likelihood of splashing with water during use. As an example, this could be proven with no obstruction and then with the presence of hands simulated by a 100 mm diameter disc placed 50 mm beneath the water tap outlet and check that no water is splashed outside the wash basin.

To prevent vandalism damage, the wash bowl unit and its fixing shall withstand a static force of 1 000 N, applied across a 55 mm diameter area, centred at any point of the upper plane of the wash basin, without damage or permanent deformation.

4.2.2 Water supply/heating (& legionella)

The volume of water supplied per actuation shall be a minimum of 180 mL in a minimum of 7 s. As design guidance 250 mL is a preferred volume to achieve acceptable washing of hands.

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Where the hand wash water supply is heated (excluding frost prevention) the water at a sink shall either be available at a temperature of minimum 13 °C and maximum 22 °C (or ambient external temperature) without manual control by passenger while the train or the coach is in passenger service, or a mixer tap fitted. If a mixer tap is fitted, the warm water supply should be heated at a temperature of minimum 60 °C in order to prevent the supply water against Legionella.

The design of the mixer tap shall prevent scalding water, the maximum temperature at the delivery point shall not exceed 43 °C.

NOTE On some designs of mixer tap there is a special design feature for disinfection which allows greater temperature, but this is completed under controlled conditions.

Due to the possibility of bacteria growth, water supply tanks shall be designed to enable the tank and all pipework to be flushed, rinsed and drained when required.

If a water tap is turned on by a proximity sensor this shall be indicated by a sign see Figure A.13.

4.2.3 Soap supply

Washing facilities shall be fitted with:

— a liquid soap dispenser; or

— a foam soap dispenser; or

— be supplied with solid soap bars.

NOTE The type of soap dispenser is normally defined at specification stage of design and in cooperation between the manufacturer and the intended operators.

If a soap dispenser is fitted the tank shall be accessible for stocking by servicing staff but protected from general public access to the tank by, for example, a Berne key.

The soap dispenser shall be fitted directly above the hand wash basin, so that any spillage is directly into the basin and labelled - see Figure A.10.

The volume of the liquid soap dispenser shall be a minimum of 0,75 l.

The soap dispenser shall be easy to fill and clean. The design shall consider that any spillage during the filling process does not run into inaccessible spaces. Components that are difficult to clean shall not be located beneath or in the vicinity of the soap filling opening to prevent spillage causing additional cleaning activity.

For a liquid soap dispenser, it shall be possible to refill by pouring soap from above from a separate container without removing the soap dispenser tank and without spillage. This is fulfilled if there is an unobstructed free space of 80 mm, as a minimum, above the soap dispenser tank.

4.2.4 Hand sanitizer

It is permissible to fit a sanitizer dispenser. taking the form of:

— a hand sanitizer dispenser refillable, from a separate container;

— a hand sanitizer dispenser, fitted with a cartridge or a removable disposable or reusable containers.

NOTE The type of sanitizer dispenser and refilling conditions are normally defined at specification stage of design and in cooperation between the manufacturer and the intended operators.

If a sanitizer dispenser is fitted, the tank shall be accessible for stocking by servicing staff but protected from general public access to the tank by, for example, a Berne key.

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For a sanitizer dispenser, except as shown below, it shall be possible to refill by pouring sanitizer from above from a separate container without removing the sanitizer tank and without spillage. This is fulfilled if there is an unobstructed free space of 80 mm, as a minimum, above the sanitizer tank.

Components that are difficult to clean shall not be located beneath or in the vicinity of the sanitizer tank opening to prevent spillage causing additional cleaning activity.

As design guidance the sanitizer outlet is best placed directly above the sink such that spillage of sanitizer in use falls into the sink. The sanitizer shall be labelled – for example see Figure A.14.

4.2.5 Hand dryer/towel

It is permitted to fit either a hand dryer or paper dispenser (or both). It is recommended that an air dryer is fitted for cleanliness, ecological and sustainability reasons, prevent increased litter, fire risk, restocking maintenance requirement and to prevent hand towels blocking the toilet flush system. Hand towels should only be used where considered necessary. It is preferable to fit an electric hand dryer to reduce waste and help the environment.

NOTE The fitment of a hand dryer and/or hand towel dispenser is normally defined at specification stage of design and in cooperation between the manufacturer and the intended operators.

The outlet of the dryer or dispenser shall be a maximum of 1 200 mm above floor level. The dispenser shall meet the reach range as shown in EN 16585-1:2017, Annex B.

The dryer or dispenser shall be easily visible or indicated by a pictogram as given in Figure A.3 in Annex A.

Electric hand dryers shall:

a) be contained in splash proof casing;

b) only operate for a specific period and then shall automatically stop;

c) heating elements automatically de-energize when the blower motor is not operating, or the outlet blocked;

d) de-energize when the temperature exceeds 62 °C;

e) be tamperproof by passengers but maintainable by staff.

Where an electric hand dryer is not fitted, a paper towel dispenser shall be fitted. It is also permissible to fit both.

If the toilet is equipped with a hand paper dispenser, it shall dispense paper on the basis of a single sheet of paper at a time, to prevent overconsumption and potential blocking of the toilet bowl as a result of misuse.

Paper dispenser shall accommodate stored paper of 265 mm by 100 mm. The height should be a minimum of 400 mm. The values quoted here are the largest which will ensure compatibility between servicing points; it is possible to fit smaller size dispensers where the size of paper to replenish the stock is controlled. The type of paper provided in the dispenser shall either be compatible with the toilet flush system or a notice shall be prominently displayed on (or adjacent to) the paper dispenser or inside the toilet lid, to not put paper towel in the toilet bowl as shown in Figure A.2.

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