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Železniške naprave - Talna oskrba - Oprema za higieno potniškega železniškega vozila

Railway applications - Ground based services - Passenger rolling stock hygiene equipment

Bahnanwendungen - Versorgungsdienste - Hygieneanforderungen des Personenverkehrs

Applications ferroviaires - Services au sol - Équipements d'hygiène des matériels roulants destinés au transport de passagers

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45.060.20 Železniški vagoni Trailing stock

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Railway applications - Ground based services - Passenger rolling stock hygiene equipment

Applications ferroviaires - Services au sol -
Équipements d'hygiène des matériels roulants destinés
au transport de passagers

Bahnanwendungen - Versorgungsdienste -
Hygieneanforderungen des Personenverkehrs

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 256.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 17863:2022) has been prepared by Technical Committee CEN/TC 256 “Railway Applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

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prEN 17863:2022 (E)**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, baby changing facilities, menstrual 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.

<std>EN 33:2019, *WC pans and WC suites - Connecting dimensions*</std>

<std>EN 547-3:1996+A.1:2008, *Safety of machinery – Human body measurement. Part 3: Anthropometric data*</std>

<std>EN 997:2018, *WC pans and WC suites with integral trap*</std>

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

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

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

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

<std>EN 16362:2013, *Railway applications - Ground based services - Water restocking equipment*</std>

<std>EN 16584-1:2017, *Railway applications - Design for PRM use - General requirements - Part 1: Contrast*</std>

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

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

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

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

<std>EN 17343:2020, *Railway applications - General terms and definitions*</std>

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

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

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 terminological 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

4 Water equipment

4.1 Water supply and storage

4.1.1 Fresh water supply

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 potable water.

NOTE Materials are certified to nationally agreed standards of materials for potable water, such as DVGW or ACS.

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.

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The design life of a railway vehicle is normally 25 - 40 years; consideration should be given to the ability of materials to sustain this service life or the design of the system should take account of the need to change components.

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 Clause 4.1.4

The water pipe system shall be drainable for all pipes. System shall automatically drain the pipe system if the internal toilet temperature falls below 4° C. It is permitted for trace heating to be fitted to toilet pipes to prevent freezing as an alternative to drainage.

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 6.2. As design guidance it is preferable to also be able to drain pipework manually where this is automatic.

The freshwater system and its surroundings shall 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 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 by ultraviolet radiation or micro filtration
- or
- c) supplied directly from freshwater containers/bottles

Water intended for use for drinking water shall:

- a) be water intended for drinking
- or
- b) provide freshwater containers/bottles.

Water intended for washing and showering shall be potable or meet the requirements of 4.1.3.

4.1.3 Recycled water

Treated black water, treated purple water and untreated grey water shall only be used for toilet flushing if it is liquid only. The appearance and odour should be treated to be acceptable for the user.

Treated grey water is permitted to be reused for handwashing if it meets potable water requirements.

4.1.4 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 day's 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 Clause 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.

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 mm², but it should be 40 000 mm² where this is possible. The access hatch shall be accessible without draining more than 50 % of the capacity of the fresh water. As design guidance the least water to be drained is preferable. 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 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 day's predicted amount, given by calculation according to EN 16922:2017+A.1:2019, however this depends on the intended use of the train as the tanks size is a compromise between vehicle mass and operational needs.

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 Wash hand basin

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4.2.1 Dimensions

The wash basin shall be built of material resistant to corrosion, staining and abrasion.

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 and 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.

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To prevent vandalism damage, the wash bowl unit and its fixing shall withstand a static force of 1000 N, applied across a 55mm diameter area, without damage or permanent deformation.

4.2.2 Water supply/heating (& legionella)

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

Where the hand wash water supply is heated 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 scolding 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 pipework to be flushed when required.

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

4.2.3 Soap supply

Washing facilities shall be fitted with a liquid/foam soap dispenser or be supplied with solid soap bars.

If a soap dispenser is fitted the tank shall be easily 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 example 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.

As design guidance the soap dispenser outlet is best placed directly above the sink such that spillage of soap in use falls into the sink.

4.2.4 Hand sanitiser

It is permissible to fit a sanitiser dispenser.

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

For a sanitiser dispenser, except as shown below, it shall be possible to refill by pouring sanitiser from above from a separate container without removing the sanitiser tank and without spillage. This is fulfilled if there is an unobstructed free space of 80 mm, as a minimum, above the sanitiser tank. Where the sanitiser used is flammable, additional care in the design shall be taken to ensure that there is little chance of spillage, or the filling of the tank shall be completed remote from the coach.

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

As design guidance the sanitiser outlet is best placed directly above the sink such that spillage of sanitiser in use falls into the sink.

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.

The outlet of the dryer or dispenser shall be a maximum of 1200 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 A.3.

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 to not put paper towel in the toilet bowl as shown in A.2.

Where a paper towel dispenser is fitted, the position shall permit the easy refilling of the paper. Where a paper towel dispenser is fitted, passengers should be discouraged from gaining access to the paper container by the fitting of locks. It is normal practice to gain access to consumable products by use of a square key. The hand towel dispenser shall have a pictogram, as shown in A.4, on the inside to describe the orientation and folded state requirements of the hand towels. The stock level of paper shall be clear to servicing staff.

Wherever hand towels are used a waste bin shall be provided, see 5.3.7.

prEN 17863:2022 (E)**4.3 Shower****4.3.1 Dimensions**

The shower shall permit a standing person to wash hair and body. The floor shall be non-slip and direct water to a drain.

A shelf for soap shall be provided.

The shower shall be fitted with a grab hand rail.

4.3.2 Water supply/heating (& legionella)

Water supply for showers shall be fitted with mixer taps. The design of the mixer tap shall prevent scolding water and the maximum temperature at the delivery point shall not exceed 43° C.

The hot water temperature, before the mixer tap, shall be a minimum of 60 °C to discourage legionella.

4.4 Waste water (from sink and shower)**4.4.1 Sink**

Grey water from the hand wash sink shall be directed to:

- a) to its own retention tank
- b) the toilet retention tank via a non-return valve that will permit the flow in one direction only, to avoid pathogenic germs rising back into the wash basin.
- c) straight to the track or via an intermediate tank or non-return valve to avoid pressure pulses in tunnels.

The grey water system shall be designed to prevent the wheel/rail noise from outside the coach entering the toilet cubicle through the drain.

For gravity operated grey water systems from the handbasin, the cross section of the grey water outlet (hoses and piping) shall be at least 800 mm². The shape shall be circular or elliptical.

4.4.2 Shower

The purple water from the shower shall be directed to:

- a) to its own retention tank
- b) the toilet retention tank via a non-return valve that will permit the flow in one direction only, to avoid pathogenic germs rising back into the wash basin.

For gravity operated purple water systems from the shower, the cross section of the purple water outlet (hoses and piping) shall be at least 1100 mm². The shape shall be circular or elliptical.

5 Toilet**5.1 Provision of toilet****5.1.1 Fitment**

The requirement for provision and number of toilets on the train shall be taken at the design stage. This is normally done at the specification stage of design and in cooperation between the manufacturer and the intended operators.