
Železniške naprave - Talna oskrba - Oprema za ponovno polnjenje tekočine, ki se uporablja za obdelavo izpušnih plinov (AUS 32)

Railway applications - Ground based services - Exhaust treatment fluid (AUS 32) refilling equipment

Bahnanwendungen - Versorgungseinrichtungen - Nachfüllvorrichtung für Abgasreinigungsflüssigkeit (AUS 32)

Applications ferroviaires - Services au sol - Équipement de remplissage du fluide de traitement des gaz d'échappement (AUS 32)

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English Version

**Railway applications - Ground based services - Exhaust
treatment fluid (AUS 32) refilling equipment**

Applications ferroviaires - Services au sol - Équipement
de remplissage du fluide de traitement des gaz
d'échappement (AUS 32)

Bahnanwendungen - Versorgungseinrichtungen -
Nachfüllvorrichtung für Abgasreinigungsflüssigkeit
(AUS 32)

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 17824:2022) 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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Introduction

This document contains requirements regarding equipment for railway vehicles and railway infrastructure for filling railway vehicles with a NO_x reduction agent AUS 32 (32 % aqueous urea solution) as specified in ISO 22241-1, hence forward referred to as AUS 32. These minimum requirements describe the target system to be available across Europe to assist use of the railway network.

The urea solution (AUS 32) as referred to in this document is commercially available and may exist under various trade names. Trade names of products commercially available include: AdBlue®, ARLA 32®, DEF, etc..

NOTE This information is given for the convenience of users of this document and does not constitute an endorsement by CEN of the products named.

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1 Scope

This document specifies interface requirements on vehicles and on ground based refilling and storage equipment for any railway vehicle fitted with internal combustion engine(s) requiring a NO_x reduction agent AUS 32 (32 % aqueous urea solution) as specified in ISO 22241-1.

It is also applicable to mobile or temporary refilling points for AUS 32.

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 13617-2, *Petrol filling stations - Part 2: Safety requirements for construction and performance of safe breaks for use on metering pumps and dispensers*

EN 50122-1:2011¹, *Railway applications — Fixed installations — Electrical safety, earthing and the return circuit — Part 1: Protective provisions against electric shock*

ISO 22241-1, *Diesel engines — NO_x reduction agent AUS 32 — Part 1: Quality requirements*

ISO 22241-3:2017, *Diesel engines — NO_x reduction agent AUS 32 — Part 3: Handling, transportation, and storage*

3 Terms and definitions

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

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

NATO STANAG

North Atlantic Treaty Organisation standardisation agreement

4 Requirements

4.1 System requirement

Railway vehicles fitted with an internal combustion engine that requires AUS 32 shall either have:

- 1) pumped refilling system with mechanical and electrical couplings and storage tank on the railway vehicle compliant with 4.2. This is intended to permit routine regular refilling of the AUS 32 tanks on the vehicle without the need for constant attendance by servicing personnel.

or

- 2) manual top-up system that informs the user that AUS 32 requires refilling, and a tank provided to be refilled, as set out in 4.4, similar to systems used on road vehicles and construction machinery.

¹ Document impacted by A1:2011, A2:2016, A3:2016, A4:2017 and AC:2012.

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It is permitted to also fit additional alternative refilling connections to suit local servicing requirements.

Designated refilling points on railway infrastructure that store and dispense AUS 32 shall be fitted with at least one mechanical and electrical coupling compliant with 4.3.1. It is permitted to also fit additional alternative filling couplings to suit local conditions at the fuelling point where alternative AUS 32 couplings are fitted to the vehicles serviced in this location.

Mobile refilling points to dispense AUS 32 shall be fitted with couplings compliant with 4.3.1. or suitable for use with the open system described in 4.4.

4.2 On vehicles**4.2.1 On board AUS 32 system**

The AUS 32 system from the inlet up to and including the storage tank shall be able to withstand the maximum pressure and flow rate shown in 4.3.2.

All parts of the AUS 32 storage tank and pipework on the vehicle that come into contact with the AUS 32 shall be chemically and structurally stable under known service conditions and shall be corrosion free. Materials likely to come into contact with the AUS 32 shall be resistant to attack by the AUS 32.

4.2.2 Mechanical coupling for AUS 32 fluid supply

Vehicles shall be fitted with the male part of a self sealing coupling compliant to NATO STANAG-3756, with a nominal diameter of 25 mm, type DDC 1" in a material that does not react with AUS 32, such as inox or hard alloy.

The connections shall be on each side of the vehicle between 600 mm and 1 600 mm above rail level, measured to the centre of the connection. Where the connection is recessed from the vehicle bodyside they shall not be recessed further than 100 mm deeper than the local bodyside. Where the connections are set back from the vehicle bodyline and contained within a box structure, the connection shall have space around it to allow removal of dust cap (whilst wearing thick gloves). A typical example of the installed system is shown in Figure 1.

The connection on the vehicle shall have a dust cap that is capable of being removed without tools. It shall be retained to the vehicle by flexible connection to prevent loss. It is recommended that the colour of the dust cap should be blue.

In the immediate vicinity of the filling connection there shall be a label denoting "AUS 32" or recognized trade name such as "AdBlue", to clearly identify the use of the coupling.



Figure 1 — Typical installation of AUS 32 coupling and electrical connector

4.2.3 Electrical connector for AUS 32 supply control circuit

An electrical connector shown in Annex A shall be fitted on each side of the vehicle (for the electrical circuit shown in Figure 4). The electrical connection shall be in close proximity, and should be no greater than 1 000 mm, from the mechanical coupling described in 4.2.2.

To ease the identification it is recommended that the connector on the vehicle is coloured blue and labelled as described in 4.2.2.

The connections on the vehicle shall be between 600 mm and 1 600 mm above rail level, measured to the centre of the connection. They shall not be recessed further than 100 mm deeper than the local bodyside. Where the connections are set back from the vehicle bodyline contained within a box structure, the male connector (train side) shall have space around it to allow connection.

It is recommended that the male connector is angled downwards to reduce the risk of water ingress and to assist the manual coupling, uncoupling action.

4.2.4 On board AUS 32 storage tank

The vehicle storage tank shall keep the AUS 32 at a temperature of $-10\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$. Heating shall be provided and a control system to ensure the temperature is automatically kept within this range.

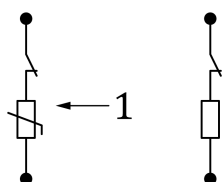
NOTE The optimum temperature range of $0\text{ }^{\circ}\text{C}$ to $+30\text{ }^{\circ}\text{C}$ will maintain the quality of the AUS 32.

A common design of on board AUS 32 system is for the AUS 32 to be constantly circulated between the storage tank and the after-treatment system doser, which will cool the doser and heat the AUS 32. However, consideration should be given for the supply and return pipes on the vehicle to have trace heating if prolonged periods of static AUS 32 containment is possible.

With the tank filled to maximum permitted level and pressure, there shall be no leakage from the tank or system when the vehicle is operated in the most adverse track condition for leaks.

The vehicle shall be fitted on each side with an indicator showing the level of AUS 32. This indicator shall be easily seen (and read) from the filling point. It is advantageous to additionally have the level available for display on the train management system (TMS) screen where such a system is fitted.

The tank shall be fitted with level detection, connected to the electrical connection shown in Annex A. The full electrical circuit is shown in Figure 4. The level detector contacts shall be compatible with the electrical power shown in 4.3.6. There shall be a resistance of $560\ \Omega$ in series with the float switch (E in Figure 4) fitted on the vehicle. It is permitted to fit a thermistor with an operating range of $140\ \Omega$ up to a maximum of $560\ \Omega$ in place of the fixed resistance as shown in Figure 2.



Key

- 1 the overflow circuit with thermistor

Figure 2 — Overfill switch with thermistor or resistor

The tank shall be fitted with a vent valve or overflow such that if the tank is overfilled the AUS 32 will spill from the vehicle noticeable from the refilling position such that the spilt AUS 32 does not collect on the vehicle.

4.3 On railway infrastructure

4.3.1 General

The installation at the servicing point shall either be fixed or mobile equipment meeting the requirements shown in 4.3.

The design of fixed installation shall consider the prevention of contamination from spillage of AUS 32.

AUS 32 purity is essential, even the smallest quantities of oil/dirt/fuel/water/dust/lubricants can seriously damage the exhaust treatment system on the vehicle. To avoid contamination filters shall be fitted at each dispensing point. It is recommended that these should be in the range of 40 - 70 microns particle filter.

4.3.2 System design

The ground-based storage tank shall keep the AUS 32 at a temperature of between -6°C to $+25^{\circ}\text{C}$. Heating and cooling shall be provided and a control system to ensure the temperature is automatically kept within this range to avoid crystallization and/or degradation of the AUS 32.

The design of the storage facility should consider that AUS 32 is not stored longer than 18 months.

The tank and fixed pipework shall be metallic and compatible with AUS 32, i.e. it shall be urea resistant material capable of withstanding the supply pressure.

There shall be filters installed between storage tank and dispense point to remove contaminants from the liquid AUS 32.

The supply pressure at the train delivery point shall not exceed 3 bar. The flow rate shall be between 20 l and 35 l per minute.

NOTE This maximum pressure is based on typical water storage systems on rolling stock.

4.3.3 Ground based supply hose to vehicle

The flexible AUS 32 supply hose shall be designed to minimize the likelihood that the end connection lays on the ground.

The end connection shall be the female part of a self-sealing coupling compliant to NATO STANAG-3756, with a nominal diameter of 25 mm, type DDC 1" in a material that does not react with AUS 32, such as inox or hard alloy.

The coupling shall be fitted with a handling collar as shown in Figure 3.

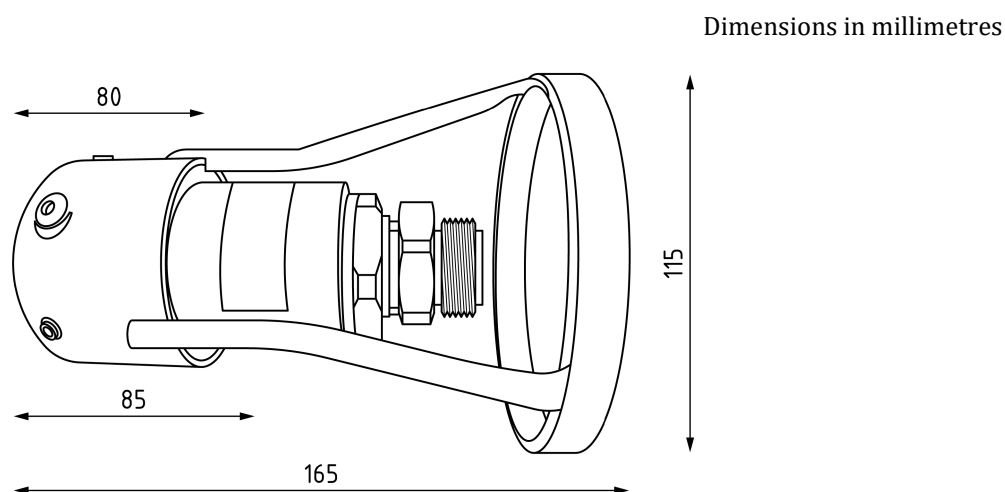


Figure 3 — Standard AUS 32 filling coupling with handling collar