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Driver's cabs with berths, rooftop sleepers and rest areas in coaches

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DGUV Regeln are compilations of content relating to particular areas, work procedures or workplaces. They explain the specific prevention measures that can be taken by employers to meet their duty of preventing occupational accidents, occupational diseases and work-related health hazards.

In areas for which no occupational accident regulations have been issued by the state or the accident insurance institutions, DGUV Regeln describe how occupational accidents, occupational diseases and work-related health hazards can be avoided. They also provide access to the experience gained by the accident insurance institutions through their prevention work.

Due to the particular way they are created and the fact that their content focuses on specific operational processes or areas of use (oriented towards specific sectors/modes of operation/areas), DGUV Regeln are technical recommendations aimed at protecting safety and health. They are of major practical relevance and and are highly informative, while also being viewed as essential by the majority of stakeholders and can therefore be used as appropriate guidelines for accident prevention activities. DGUV Regeln do not entail a legal presumption of conformity.

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Preliminary notes

Freight and passenger transport vehicles are often equipped with berths that allow drivers to spend their breaks and rest periods inside their vehicles. Vehicles with EC type-approval are not subject to any road traffic regulations governing the design of berths.

When procuring or providing a vehicle, a company owner must ensure that such berths can also be accessed and used during breaks and rest periods. Although such periods are not working hours, they must be included in a risk assessment in the same way as rooms in a stationary workplace that have been made available for staff during breaks or on-call periods. The ergonomic design, air conditioning and noise level during breaks and rest periods have an impact on the driver's rest and relaxation and therefore on their safety during the subsequent journey.

This DGUV Regel specifies the contents of DGUV Vorschrift 70 and 71, "Vehicles".

It provides technical specifications and sums up the experiences of the prevention work of the accident insurance institutions with regard to the design, equipment and operation of driver's cabs with berths, rooftop sleepers and rest areas in coaches.

The requirements in this DGUV Regel do not rule out other protective measures, provided that such measures are at least equally safe and ensure the same level of health protection.

This DGUV Regel does not affect applicable provisions on rest periods as specified in EC Regulation No. 561/2006 as well as in German and international transport law, especially regulations on resting in driver's cabs, rooftop sleepers and rest areas of coaches during journeys. This also applies to transport legislation on the design and features.

In addition, the instructions of vehicle and rooftop sleeper manufacturers must also be observed.

1 Scope

This DGUV Regel applies to

- cabs of trucks and semi-trailer towing tractor (vehicle classes N_1, N_2, N_3)[1] with interior berths,
- rooftop sleepers of trucks and semi-trailer towing tractor (vehicle classes N_1, N_2, N_3) located separately from the cab interior, and
- rest areas in coaches (vehicle classes M_1, M_2, M_3).

This DGUV Regel does not apply to berths in mobile homes or similar vehicle bodies, e.g. vehicles with accommodation units attached to their driver's cabs.

[1] Vehicle classes: see Annex XXIX of the Straßenverkehrs-Zulassungs-Ordnung (StVZO)

2 Definitions

For the purpose of this DGUV Regel, **berths** are fixed or folding beds that can be used for breaks or rest periods.

For the purpose of this DGUV Regel, **cabs** with berths are cab interiors in which one or several fixed or folding beds are located behind the driver's and passengers' seats.

Berths located in the interior of a cab also include add-on pods attached to the rear wall of the driver's cab and accessible from the cab interior, e.g. in a car transporter.
On the other hand, seats whereby a more or less comfortable resting position can be achieved by adjusting the angle of the backrest, such as reclining or sleeper seats, do not qualify as berths for the purpose of this DGUV Regel.

For the purpose of this DGUV Regel, **rooftop sleepers** are spaces or pods equipped with berths above the cab roof of the vehicle or spaces situated above the driver's and passengers' seats. They are partially or completely separated from the interior of the cab. Rooftop sleepers are also called rooftop cabins and top sleepers.

For the purpose of this DGUV Regel, **rest areas** are areas in coaches which are equipped with berths and are situated separately from the passenger space. Such areas are intended entirely for use by the vehicle crew, not passengers.

3 Requirements on fittings in driver's cabs with berths, rooftop sleepers and rest areas in coaches

3.1 Basic requirements

Berths must be safe spaces for anyone spending time on them.
They must also

- provide sufficient space for movement and
- be easy and convenient to reach and to leave.

3.1.1 Surfaces

The surface of a berth and its surroundings must meet the following criteria:

- It must not contain materials, e.g. glazing, with properties that are likely to cause injuries. In the event of an accident, the severity and consequences must be kept as much as possible to a minimum.
- Injuries must be unlikely to occur from the design of a surface, e.g. edges, corners and sections, or from their proper assembly. In the event of an accident, the severity and consequences of injuries must be minimal.
- Any potential impact points in the head area must be adequately padded. *The same applies to operating devices and the controls of doors, windows, cabinets as well as any roofs and hatches that can be opened. To arrive at an assessment, it is possible to use, mutatis mutandis, section 5.1 of UN/ECE Regulation No. 21, "Uniform provisions concerning the approval of vehicles with regard to their interior fittings".*

3.1.2 Ergonomics

The following ergonomic requirements apply to berths and are intended to prevent physical injuries:

- the surface of a berth must allow adaptation to a person's weight, spinal shape and recumbent posture
- the berth must be as large as possible – see sections 3.2.2, 3.3.2, 3.4.2
- it must support a person's contours, regardless of their recumbent position
- it must allow/facilitate air circulation and provide control over the level of humidity

Lightweight mattresses are easier to handle than heavy ones.
To ensure hygiene, the mattress cover must be washable at a temperature of at least 60°C.

3.1.3 Noise

Cabs with berths, rooftop sleepers and rest areas must be designed in such a way that the noise level in the berths is as low as possible for anyone resting on them. Protective measures must be based on state-of-the-art technology.

See sections 3 and 7 of the German Ordinance on Noise and Vibration Protection at Work (LärmVibrationsArbSchV)
Consideration must be given to noise exposure both while the vehicle is in motion and when it is stationary.
According to section 7 (1) no. 1 of the Regulation, priority must be given to technical measures that minimise airborne noise, e.g. through shielding or encapsulation, and by applying measures that minimise structure-borne noise by means of damping, sound-proofing or insulation of such noise. When the vehicle engine is switched off, the self-generated noise level caused by the vehicle in the interior must not exceed an equivalent continuous level of 60 dB (A) during normal operational use. This must be measured at ear height while the person is lying on their back on the relevant berth. Self-generated noise is caused, for instance, by the heating, ventilation and air conditioning of a vehicle.
If ambient noise from the outside can be expected while the vehicle is stationary, it may be necessary to equip it with additional sound insulation (e.g. acoustic packages).

3.1.4 Vibrations

Berths in driver's cabs, rooftop sleepers and rest areas must be designed so as to minimise the risk of vibration exposure while a person is lying on a berth during a journey. Protective measures must be based on state-of-the-art technology.

See sections 3 and 10 of the German Ordinance on Noise and Vibration Protection at Work (LärmVibrationsArbSchV)
The company owner can obtain the required information from the vehicle manufacturer or distributor or from other readily available sources. If observance of the relevant trigger and exposure limits cannot be determined with sufficient confidence, the company owner must determine exposure through measurements.

3.1.5 Heating and air conditioning

Any space within a vehicle that contains berths must have an auxiliary heating system and auxiliary air conditioning that both work independently of the vehicle engine, so that the area can be kept at an appropriate temperature.

According to DIN EN 1646-1, "Leisure accommodation vehicles – Motor caravans – Part 1: Habitation requirements relating to health and safety", a heating system is appropriate if, at an outside temperature of 15°C, it reaches an average difference of at least 35°C between the inside and outside temperatures.

Any space within a vehicle that contains berths must have a healthy room temperature while it is in use. To determine the room temperature conducive to good health, refer to section 3a of the German Ordinance on Workplaces (Arbeitsstättenverordnung – ArbStättV) in conjunction with section 3.5 no. 2 of the Annex of the same ordinance and section 4.2 no. 3 of the Technical Rules for Workplaces, "Room temperature" (ASR A3.5).

Auxiliary air conditioning may not be required if other suitable measures are in place to ensure a healthy room temperature during breaks and rest periods.

ASR A3.5 states that a healthy room temperature is a temperature that leads to a good heat balance in the human body, i.e. a balance between the supply, generation and dissipation of heat.

The temperature must be as uniform as possible, both vertically and horizontally.

Heating installations in spaces where berths are located must be designed and installed in such a way that their operation does not cause fire or explosion hazards or other health hazards through exhaust gas or lack of oxygen. This means that

- there must be no traces of exhaust gas in spaces occupied by humans within the vehicle,
- there must be no hazard of exhaust gas entering the heated air,
- the fuel supply must stop automatically as soon as the flames have gone out,
- there must be no hazard of a possible lack of oxygen in the heated space, caused by unstoppable safety ventilation or air extraction.

See also No. 27 "Heating systems" of the "Technical requirements for vehicle parts during type approval" under section 22a of the Straßenverkehrs-Zulassungs-Ordnung (StVZO).

3.1.6 Insulation

Spaces containing berths must be insulated so as to minimise any potential temperature increase when the outside temperature is high and to minimise any potential drop in temperature when the outside temperature is low.

3.1.7 Electrics

Hazards from electric power must be avoided. VDE regulations must be observed when using an inverter and when feeding in and distributing electricity from the main power supply.

The arrangement, design and condition of electrical equipment must be such that it can withstand any expected strain and that it can adequately reduce the risk of starting and spreading a fire.

Where applicable, see also DIN VDE 0100-717 and DIN VDE 0100-721 "Low-voltage electrical installations"
"Part 7-717: Requirements for special installations or locations – Mobile or transportable units"
"Part 7-721: Requirements for special installations or locations – Electrical installations in caravans"

3.1.8 Lighting and darkening

Berths must have sufficient lighting that can be switched on and off independently of the interior lighting of the driver's cab or passenger space. Any dazzling of the driver must be avoided.

It must be possible to darken the area around a berth, e.g. using curtains on windows. This also applies where windows are fitted as emergency exits.

3.1.9 Materials used for interior fittings

The materials used for interior fittings and any adhesives and other installation materials must not release harmful vapours.

3.2 Additional requirements on driver's cabs with berths

3.2.1 Access facilities

Berths that are 800 mm or higher above the access platform must have suitable access facilities and handrails for safe access and exit.

Suitable access facilities are, for instance:

- *a fixed raised platform in front of a berth:*
  - *platform: minimum width: 300 mm, minimum depth: 250 mm*
  - *maximum height: 500 mm above cab floor*
  - *maximum vertical distance from upper edge of berth: 800 mm*
  - *tread with slip-resistant surface*
- *ladders:*
  - *maximum distance between lowest rung or step and cab floor: 500 mm*
  - *maximum distance between upper rung and step from berth: 500 mm*
  - *maximum distance between rungs: 280 mm*
  - *minimum stepping depth: 20 mm*
  - *minimum footwell depth: 150 mm*
  - *minimum distance between bars: 300 mm*
  - *treads with slip-resistant surface*
  - *folding ladders: smooth operation, without crushing or shearing points*
  - *effective prevention of unintentional disengagement and displacement*
  - *sufficient strength*

A ladder is sufficiently strong if, for example, a test has been applied following the procedure in no. 5.2 of DIN EN 131-2 "Ladders – Part 2: Requirements, testing, marking" and the ladder meets all the specified requirements. The procedure is different for a suspended access ladder as the test load must be applied to the lowest rung.

Support facilities, e.g. grab rails and structural elements of the berth designed for this purpose, such as recessed grips, must be positioned within easy reach, must be ergonomically designed and must have appropriate dimensions. Grab rails must be at least 150 mm in length, their distance from structural components must be at least 50 mm, and their diameters must be no less than 16 mm and no more than 38 mm.

3.2.2 Dimensions

The following dimensions apply to a berth in a driver's cab:

Table 1 Dimensions of a berth in a driver's cab

	Minimum (mm)	Recommended (mm)
Width of berth along entire length	≥ 600	≥ 700
Length of berth	≥ 1900	≥ 2000
Headroom above berth, from upper edge of mattress	≥ 550	≥ 650

The minimum dimensions can be found in the "Driver's Cab Guidelines" in section 30 of the Straßenverkehrs-Zulassungs-Ordnung (StVZO).

Some manufacturers offer berths that exceed the dimensions recommended in Table 1. They are far more comfortable for drivers.

Cabs with berths must have a headroom of at least 1.9 metres above the floor space between the seats and an interior width of at least 2.1 metres between the closed doors.

3.2.3 Securing people and cargo

Berths must be fitted with efficient, easy-to-use safety devices that prevent anyone from falling out in normal traffic conditions and which also prevent injuries.

A safety device is easy to use, for instance, if it can be operated with one hand.

A safety device is efficient if, for example, it prevents a manikin from falling out while the vehicle is slowing down at 8 m/s^2. The manikin must have a mass of 100 kg (95th weight percentile of a man), which is similar to the human anatomy. Over a period of at least 80 ms, the arithmetic mean value must be the same as the required vehicle deceleration. During the efficiency test, the manikin must be positioned centrally on the berth. After the test, the safety device must be free from damage or lasting deformations.

Where lower berths are located behind the driver's and passengers' seats, the rear parts of the seats facing the berths can be regarded as adequately efficient safety elements, if they

- *are located directly in front of the berths,*
- *are adequately padded, and*
- *do not leave an unsafe gap of more than 400 mm in the central area of the berth.*

If the gap in the central area of the berth is more than 400 mm, this space must be secured by special precautions, e.g

- *a sufficiently padded sideboard at least 250 mm high (measured above the load-bearing mattress),*
- *an appropriate bracket or*
- *a safety net.*

This also secures items lying on the berths, e.g. against falling off or flying out, and protects people from being injured under normal traffic conditions.

Shelves and storage space must be designed in such a way that nothing can fall off.

3.2.4 Movable beds

Beds that are arranged in such a way that they can be moved, e.g. foldable or height-adjustable beds, must be designed and set up in such a way that they

- are safe and easy to operate,
- can be securely locked in an elevated position,
- must have two independent, securely interlockable safety elements if they might otherwise cause injuries resulting from unintentional unfolding while the vehicle is in motion.

3.2.5 Privacy screens

Glazed surfaces in driver's cabs must be fitted with privacy screens, e.g. curtains.

However, a privacy screen must not obstruct the outside view while driving.

3.3 Additional requirements on rooftop sleepers

3.3.1 Suitability of a vehicle

Fig. 1
Rooftop sleeper above a driver's cab

Rooftop sleepers (Fig. 1) are only permitted above driver's cabs that are suitable for this purpose. They must be safely attached to the driver's cab.

The structure of a rooftop sleeper and the higher roof load affect:

- *how the driver's cab is supported and how it absorbs shocks (suspension)*
- *the hydraulic system responsible for tilting the driver's cab and the safety support mechanisms in tiltable driver's cabs*
- *how the driver's cab deforms in response to external forces, due to the roof cut-out*

A driver's cab qualifies for a licence under transport law if it has a clearance certificate from the truck manufacturer.
This certificate is necessary because the addition of a rooftop sleeper and its roof load can affect the structure of the driver's cab.

The maximum permitted front axle load must not be exceeded.

Rooftop sleepers are not permitted on vehicles where the exhaust is routed upwards behind the driver's cab.

Tilting cabs with rooftop sleepers must be easy and safe to tilt.

Easy and safe means, for example, that the cab can be safely tilted with the rooftop sleeper installed, as intended by the manufacturer.

3.3.2 Dimensions

The following dimensions apply to berths in rooftop sleepers:

Table 2 Dimensions of berths in driver's cabs

	Minimum (mm)	Recommended (mm)
Width of berth	≥ 600	≥ 700
Length of berth	≥ 1900	≥ 2000
Headroom in a rooftop sleeper, measured without mattress	≥ 850	≥ 900

Where a berth (Fig. 2) is arranged in front of the access opening in the direction of travel (see section 3.3.3), it is acceptable to restrict the headroom – measured without mattress – in the front section above the berth. The headroom must be at least 650 mm at that point.

Fig. 2 Berths and shelving in a rooftop sleeper

3.3.3 Access opening to a rooftop sleeper

Rooftop sleepers must have an access opening (Fig. 3) to and from the interior of the driver's cab of at least 500 mm × 450 mm. The goal is to have access openings with a minimum size of 0.3 m². If the opening is rectangular, none of its sides must be less than 450 mm in length.

Access openings that can be closed with hatches or lids must be easy to open from both the inside and the outside, even while the berth is in use. Hatches and lids must not be lockable.

Fig. 3 Access opening in the driver's cab: can be opened downwards in an emergency

In an emergency, it must be possible to open hatches and lids in a downward direction. However, they must be prevented from opening unintentionally.

On the underside of the access opening, there must be a luminescent sign "For emergency use only" (Fig. 3) as well as a luminescent pictogram showing how to operate the access opening.

Access openings must be arranged or designed in such a way that persons cannot fall down and that objects cannot fall onto persons in the driver's cab.

Access openings in the interior of the vehicle must not be located above seats.

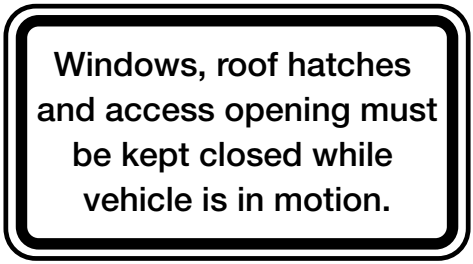

Fig. 4
Note: "Windows, roof hatches and access openings must be kept closed while vehicle is in motion."

All hatches and lids of access openings must bear a notice that can be seen from the driver's cab (Fig. 4), indicating that windows and roof hatches in the rooftop sleeper and the access opening must be kept closed while the vehicle is in motion.

Rooftop sleepers that are not suitable for use while the vehicle is in motion must be fitted with a permanent, clearly recognisable prohibition sign (Fig. 5) by or on the access opening leading to the rooftop sleeper.

For prohibition signs, see DIN 70006-1 "Safety and information signs for vehicles – Part 1: Safety and information signs for commercial vehicles". Prohibition signs must have a diameter of at least 50 mm at a distance of 2 metres, as specified in Table 3 of ASR A1.3.

Fig. 5
Prohibition sign: "Do not stay in rooftop sleeper while vehicle is in motion"

3.3.4 Access facilities

An access facility underneath the access opening must ensure that the rooftop sleeper can be accessed and exited safely. The following precautions must be in place:

- it must be possible to climb up and down without supporting the full weight of the body with one's arms
- below an access opening (in vertical projection) there must be a horizontal, slip-resistant platform (i.e. an access platform) of at least 300 mm × 250 mm
- there must be a distance of more than 800 mm between the platform and the upper edge of the berth, together with suitable platforms

Suitable access facilities must be designed as follows:

- distances
  - maximum distance between lowest rung or step and cab floor: 500 mm
  - maximum distance between rungs: 280 mm
  - maximum distance between upper rung or step and berth: 500 mm
- platforms must have a footwell depth of at least 150 mm and a width of at least 300 mm
- treads must have slip-resistant surfaces
- if a ladder is detachable, it must be possible to secure it against accidental detachment while it is in an ascending position
- effective measures must be taken to ensure that it cannot be accidentally unhooked or shifted
- suitable grab facilities must be arranged along the access facility
- the access facility must be sufficiently strong and robust

Grab rails must be at least 150 mm in length, their distance from structural components must be at least 50 mm, and their diameters must be no less than 16 mm and no more than 38 mm.

A ladder is sufficiently strong if, for example, a test has been applied following the procedure in no. 5.2 of DIN EN 131-2 "Ladders – Part 2: Requirements, testing, marking" and the ladder meets all the specified requirements. The procedure is different for a suspended access ladder as the test load must be applied to the lowest rung.

Folding and swivelling access facilities to rooftop sleepers must be secured against unintentional movement. It must not be possible to remove such access facilities without the use of tools.

Movable and detachable access facilities must allow the user to stow them away safely or at least to fix them securely while the vehicle is in motion.

Access facilities to rooftop sleepers must not have sharp edges, corners or sections.

3.3.5 Emergency exits

A rooftop sleeper must be equipped with an emergency exit (Fig. 6), located on one of the two sides of the rooftop sleeper, regardless of the access opening to the interior of the driver's cab.

If the rooftop sleeper is suitable for use while travelling (see section 3.3.9), it must have a second emergency exit.

An emergency exit must have an access opening of at least 0.25 m², and none of its sides must be less than 450 mm in length.

Taking into account the required minimum dimensions, a rectangular opening must be 450 mm × 570 mm, while a square cross section of an opening must be 500 mm × 500 mm.

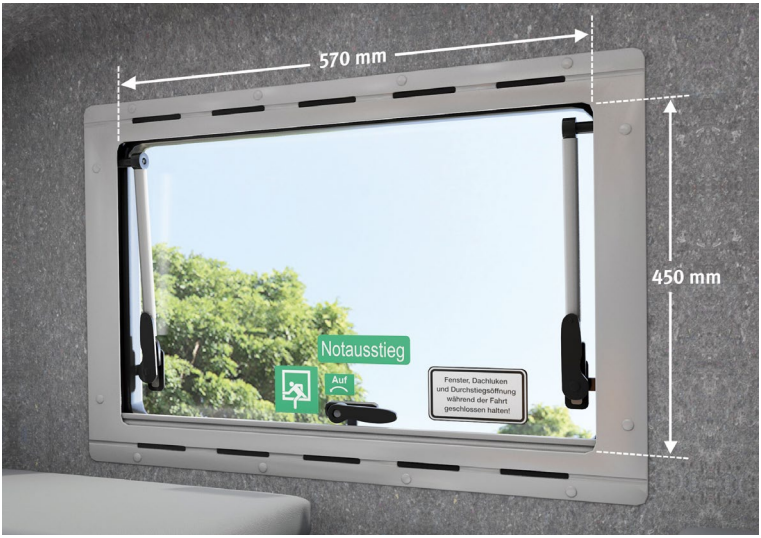

Fig. 6 Emergency exit in a rooftop sleeper

The necessary minimum dimensions are specified in DIN EN 1645-1, "Leisure accommodation vehicles – Caravans – Part 1: Habitation requirements relating to health and safety".

An emergency exit must be clearly visible from the inside and easy to open from the outside.

It must bear a luminescent label (Fig. 7) and a luminescent pictogram that shows the user how to open it.

Escape signs must have a diameter of at least 25 mm at a distance of 2 metres, as specified in Table 3 of ASR A1.3.

Fig. 7
"Emergency Exit" escape sign according to ASR A1.3

3.3.6 Heating, air conditioning and ventilation

The heating, air conditioning and ventilation must all be adjustable from within the rooftop sleeper. The direction of the airflow must also be adjustable.

Fig. 8 Safety ventilation of a rooftop sleeper

If a rooftop sleeper has an access opening that can be closed towards the interior of the driver's cab, it must be fitted with a safety ventilation (Fig. 8) that ensures the required minimum supply of fresh air, even while other ventilation options are not open.

Safety ventilation must have non-lockable ventilation openings of at least 3,000 m² in the upper area of the rooftop sleeper and of least 500 mm² in the lower area of the rooftop sleeper.

Non-lockable ventilation openings must be designed in such a way that no water can penetrate from outside.

See also DIN EN 721, "Leisure accommodation vehicles – Safety ventilation requirements"

3.3.7 Shelves

Rooftop sleepers must have adequate shelves or other storage space (Fig. 2) where items can be secured. Shelves and storage space must be designed in such a way that nothing can fall off.

3.3.8 No smoking

"No Smoking" signs (Fig. 9) must be attached both inside and outside a rooftop sleeper, ensuring that this ban is both clearly visible and permanently present.

For further details of prohibition signs, please refer to the Technical Workplace Regulations "Health and safety signage" (ASR A1.3) Annex 1 "Prohibition signs".

Fig. 9
"No Smoking" sign according to ASR A1.3

Prohibition signs must have a diameter of at least 50 mm at a distance of 2 metres, as specified in Table 3 of ASR A1.3.

3.3.9 Additional requirements while the vehicle is in motion

Staying in a rooftop sleeper while the vehicle is in motion is not prohibited if the rooftop sleeper is suitable for this purpose on account of its special design and fittings. If this is not the case, no such permission must be given – see also section 42 (4) and (5) of DGUV Vorschrift 70 and 71, "Vehicles".

A rooftop sleeper is suitable for persons to stay in while the vehicle is in motion, provided that the following conditions are met:

- the rooftop sleeper must be designed and attached to the driver's cab in such a way that persons in the driver's cab are protected against injuries from accidents. The extent and consequences of injuries must be minimal.
- it must not have any glass surfaces on the front partition of the interior.
- any movable or detachable access facilities to the rooftop sleeper must not impair the driver's vision or the operation of the vehicle.
- it must provide sufficient survival space even in a rollover accident.

There must be documentation to show that sufficient space is available for survival. Such documentation can be provided, for example, by following the test method described in Annex 3, paragraph 7 or UN/ECE Regulation No. 29, "Uniform provisions concerning the approval of vehicles with regard to the protection of the occupants of the cab of a commercial vehicle". Survival space is deemed to be sufficient if, after testing, the rooftop sleeper shows no permanent deformations or ruptures in the outer shell. Cracks in the outer shell can be ignored. Hatches and windows may become detached in the test, but must not protrude into the interior. Documentation is also deemed sufficient if a driver's cab with a rooftop sleeper above the driver and the front seat passengers has an expert opinion for the purpose of an operating permit under traffic and transport regulations and if that opinion comprises a statement that survival space is adequate.

Strength of materials

The outer materials of a rooftop sleeper must be able to withstand external forces that occur during its use.

The strength of plastic and outer materials must be documented upon a test following the procedure in Annex 14 paragraph 5 of UN/ECE Regulation No. 43, "Uniform provisions concerning the approval of safety glazing materials and their installation on vehicles". Regarding exterior materials in sandwich construction, the criteria for a satisfactory result are specified in Appendix 14, paragraph 5.4 of UN/ECE No. 43 for the inner layer.

Emergency exits

Regardless of the access opening from the interior of the driver's cab and the emergency exit according to section 3.3.5, a rooftop sleeper where people are permitted to stay while the vehicle is in motion, must have a second emergency exit (Fig. 10) that meets the same requirements. The emergency exits must be arranged as follows:

- either one exit is on the right and another is on the left, **or**
- one exit is in the roof and another is on the left.

Fig. 10 Second emergency exit in a rooftop sleeper

3.4 Additional requirements on rest areas in coaches

3.4.1 Location of a rest area

Rest areas located below the passenger space (Fig. 11) must be arranged in such a way that they have a distance of at least 1.2 metres from the front or rear boundaries of the vehicle.

Fig. 11 Rest area underneath the passenger space

3.4.2 Dimensions

The following dimensions apply to berths in the rest area of a coach:

Table 3 Dimensions of berths in coaches

	Minimum (mm)	Recommended (mm)
Width of berth	≥ 600	≥ 700
Length of berth	≥ 1900	≥ 2000
Headroom above the upper edge of the mattress on a berth:		
• for a rest area arranged at right angles to the longitudinal axis of the vehicle	≥ 650	≥ 900
• for a rest area arranged parallel to the longitudinal axis of the vehicle	≥ 900	
The circumference of the cross-sectional area at right angles to the longitudinal axis of the rest area must be	≥ 2800	

If the headroom is restricted by the centre aisle of the passenger space, the headroom must be at least 450 mm, measured from the top edge of the mattress.

3.4.3 Access to rest area

A rest area must be accessible from the interior of the vehicle, and the access point must meet the following conditions:

- the access opening must be at least 450 mm × 570 mm (width × height),

  The following measurements are recommended for the access opening: 560 mm × 580 mm (width × height).

- the access point must not be obstructed by vehicle parts, e.g. steps or door supports,
- there must be suitable and sufficient space in front of the access opening (Fig. 12) allowing access into and exit out of the rest area,

  The following minimum dimensions are recommended for the area in front of the access opening: a = 550 mm, b = 550 mm and h = 1850 mm.

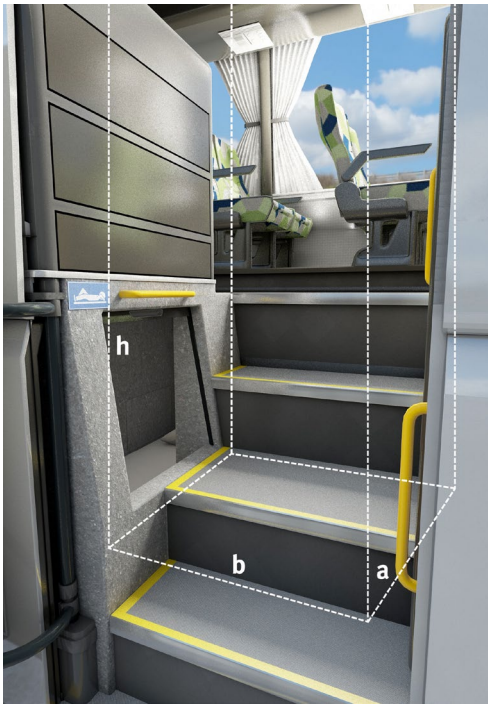

Fig. 12
Dimensions for the area in front of the access opening

- the access point must allow unobstructed access at all times,
- it must have suitable and conveniently located grab handles that facilitate access to the rest area,

Grab rails must be at least 150 mm long, and their distance from structural components must be at least 50 mm, while their diameter must be no less than 16 mm and no more than 38 mm.

- it must be separated from the passenger space by a partition that can be safely and easily opened and closed both from the inside and from the outside, and it must keep its open position without shutting by itself,
- it must bear a clearly visible sign on the outside, indicating "Person in rest area of vehicle" (Fig. 14).

Movable vehicle parts, e.g. doors, must not create crushing or shearing points in the area of the steps leading through to the rest area.

3.4.4 Emergency exits

A rest area arranged **in parallel to the longitudinal axis of the vehicle** must have an emergency exit to the outside, in addition to access to the interior.

A rest area arranged **at right angles to the longitudinal axis of the vehicle** (Fig. 13) must have two emergency exits to the outside, one on either side of the vehicle, in addition to access to the interior.

Fig. 13
Emergency exit with window

An emergency exit must have an opening with a cross-section of at least 0.25 m², and one of the sides is at least 450 mm. This area must not be obstructed by vehicle components.

A square cross-section means that the opening must be 500 mm × 500 mm. If the side has the minimum length of 450 mm, the opening must be 570 mm × 450 mm.

An emergency exit must be from the inside
- easily visible, owing to appropriate labelling and
- easy to open from the outside at all times.
  This also means, for example, it must be possible to open the emergency exits from the inside at times when the central locking system is enabled.

Furthermore, the emergency exits must be marked by luminescent signs (Fig. 7) as well as a warning that they must not be opened while the vehicle is in motion. There must be luminescent pictograms showing how to open the emergency exits.

In the event of an emergency, it must be possible for rescue workers to open the emergency exits from outside the vehicle. There must be signs (Fig. 14) on each emergency exit, indicating to rescue workers that there may be people in the rest areas.

The info sign must have a blue background with a white pictogram. The dimensions must be ≥ 52 mm in height and ≥ 105 mm in width.

Fig. 14
Info sign: "Person in rest area of vehicle"

3.4.5 Outside view

Rest areas must have at least one window providing a view to the outside, and the windows must be fitted with privacy screens.

3.4.6 Heating, air conditioning and ventilation

The heating, air conditioning and ventilation must all be adjustable from within the rest area. The direction of the airflow must also be adjustable.

Rest areas must be equipped with a safety ventilation that ensures the required minimum supply of healthy breathing air, even while other ventilation options are inactive. The cross-section of the safety ventilation system must be dimensioned in such a way that it does not exceed a CO_2 concentration of 1,000 ppm.

See ASR A3.6, "Ventilation", No. 4.2.

3.4.7 Light switches

There must be light switches for separate interior lighting, and they must be luminescent, as specified in section 3.1.8.

Light switches must be within easy reach when entering or leaving the rest area and also while lying down.

3.4.8 Shelves

Rest areas must have adequate shelves or other storage space. Shelves and other storage space must be designed in such a way that objects can be secured against falling off or out.

3.4.9 No smoking

A "No Smoking" sign (Fig. 9) must be attached, ensuring that this ban is both clearly visible and permanently present in the rest area.

For further details of prohibition signs, please refer to the Technical Workplace Regulations "Health and safety signage" (ASR A1.3) Annex 1 "Prohibition signs".

3.4.10 Additional requirements while the vehicle is in motion

A rest area in a coach can be considered suitable for persons to stay in while the vehicle is in motion if it meets the following conditions

- it is arranged at right angles to the longitudinal axis of the vehicle.
- emergency exits cannot be blocked by vehicle components, such as doors or hatches swinging outwards.
- should the coach be overturned, it is still possible to open and use the emergency exit on the opposite side.
- the rest area is equipped with an intercom system between anyone in the rest area and the driver.

There must be a prohibition sign (Fig. 15), indicating that no one is permitted to stay in the rest area unless these safety features are in place. The sign must be clearly visible and permanently present near the access opening leading to the rest area.

Fig. 15
Prohibition sign: "Do not stay in rest area while vehicle is in motion"

4 Operation

4.1 General points

The following general points must be observed:

- berths must only be used for their intended purpose.
  In particular, the vehicle manufacturer or the manufacturer of the rooftop sleeper must permit the use of the berths while the vehicle is in motion – see manufacturer's instruction manual. All applicable national and international road traffic regulations must be observed.
- any items placed on berths must be secured in such a way that they do not pose hazards to people.
- all steps and grab handles provided for reaching and leaving the berths must be used for their intended purpose.
- emergency exits must be kept closed while the vehicle is in motion.
- it is important to ensure that areas containing berths are cleaned in a way that meets hygiene requirements. The same applies to mattress covers.

4.2 Driver's cabs with berths

Movable berths must be securely locked in an elevated position.

While the vehicle is in motion, safety devices must be used, preventing persons from falling off the berths.

Before commencing a journey, movable access facilities to berths must be either stowed away or placed in the direction of travelling.

4.3 Rooftop sleepers

Staying in a rooftop sleeper while the vehicle is in motion is permitted if the sleeper is suitable for this purpose on account of its additional design and fittings – see section 3.3.9. Otherwise, no one must be permitted to stay in the rooftop sleeper while the vehicle is in motion. This must be indicated by the sign “Do not stay in rooftop sleeper while vehicle is in motion” (Fig. 5).

A rooftop sleeper must not be used if it forms part of a semitrailer tractor towing a semitrailer containing a refrigeration unit attached to the front wall and if that unit has a combustion engine that has not been disabled (i.e. switched off).

If a vehicle is configured in this way, it cannot be ruled out that exhaust gas from the combustion engine might leak into the rooftop sleeper.

Windows, roof hatches and access openings must be kept closed while the vehicle is in motion.

A “No Smoking” sign (Fig. 9) must be displayed, indicating that there is a complete ban on smoking in the rooftop sleeper.

Before commencing a journey, movable or detachable access facilities to rooftop sleepers must be either stowed away or placed in the direction of travelling. However, notwithstanding this requirement, such access facilities must be in place and usable if persons are staying in the sleeper while the vehicle is in motion.

4.4 Rest areas in coaches

While the vehicle is in motion, staying in the rest area is permitted if additional design features and fittings are in place (see section 3.4.10), ensuring that the rest area is adequately safe. Otherwise, no one must be permitted to stay in the rest area while the vehicle is in motion. This must be indicated by the sign “Do not stay in rest area while vehicle is in motion” (Fig. 15).

While the rest area in a coach is in use, care must be taken when parking to ensure that emergency exits are not obstructed in any way, e.g. by other parked vehicles.

Emergency exits must not be opened while the vehicle is in motion.

A “No Smoking” sign (Fig. 9) must be displayed, indicating that there is a complete ban on smoking in the rest area.

5 Inspection

Berths in driver's cabs, rooftop sleepers and rest areas must be inspected in vehicles as part of the "Inspection of vehicles for operational safety". Further details can be found in DGUV Vorschrift 70 and 71, "Vehicles", in conjunction with DGUV Grundsatz 314-003, "Inspection of vehicles for operational safety", test points

- A 15 Driver's cab, berths, rooftop sleepers and
- B 15 Rest areas.

6 Provisional regulations

For rooftop sleepers that were put on the market before the publication of this DGUV Regel, section 3.3.5 must be considered fulfilled if the emergency exits have an opening of at least 0.2 m² and if none of the sides are shorter than 350 mm.

For rest areas in coaches that were put on the market before the publication of this DGUV Regel,

- section 3.4.3 must be considered fulfilled if the access opening has dimensions of at least 550 mm × 450 mm;
- section 3.4.4 must be considered fulfilled if the emergency exits have openings of at least 0.2 m^2 and none of the sides are shorter than 350 mm.

7 References

Laws, regulations and technical rules

Available from:
Bookshops and online:
z. B. www.gesetze-im-internet.de, www.bgl-ev.de, www.baua.de

- German Industrial Safety Regulation (BetrSichV)
- German Ordinance on Workplaces (ArbStättV)
- German Ordinance on Noise and Vibration Protection (LärmVibrationsArbSchV) – a regulation protecting employees from noise and vibration hazards
- German Road Traffic Licensing Regulations (StVZO)
- Regulation (EC) No 561/2006 of the European Parliament and of the Council on the Harmonisation of Certain Social Legislation Relating to Road Transport
- Technische Regeln für Arbeitsstätten „Sicherheits- und Gesundheitsschutzkennzeichnung“ (ASR A1.3) – Technical Workplace Regulations: “Safety and Health Signage”
- Technische Regeln für Arbeitsstätten „Raumtemperatur“ (ASR A3.5) – Technical Workplace Regulations: “Room temperature”
- Technische Regeln für Arbeitsstätten „Lüftung“ (ASR A3.6) – Technical Workplace Regulations: “Ventilation”

Regulations and principles for occupational safety and at work

Available from:
the German social accident insurance institution responsible for your industry or www.dguv.de/publikationen

- DGUV Vorschrift 1 „Grundsätze der Prävention“ (DGUV Regulation 1, “Principles of prevention”)
- DGUV Vorschrift 70 and 71 „Fahrzeuge“ (DGUV Regulation 70 and 71, “Vehicles”)
- DGUV Grundsatz 314-003 „Prüfung von Fahrzeugen auf Betriebssicherheit“ (DGUV Principle 314-003 “Inspection of vehicles for operational safety”)

Standards and VDE specifications

Available from:
Beuth-Verlag GmbH,
Burggrafenstraße 16, 10787 Berlin, Germany
www.beuth.de resp.
VDE-Verlag,
Bismarckstraße 33, 10625 Berlin, Germany
www.vde-verlag.de

- **DIN VDE 0100-717:2010-10**
  „Errichten von Niederspannungsanlagen – Teil 7-717: Anforderungen für Betriebsstätten, Räume und Anlagen besonderer Art – Ortsveränderliche oder transportable Baueinheiten“ (“Low-voltage electrical installations – Part 7-717: Requirements for special installations or locations – mobile or transportable units”)

- **DIN VDE 0100-721:2019-10**
  „Errichten von Niederspannungsanlagen – Teil 7-721: Anforderungen für Betriebsstätten, Räume und Anlagen besonderer Art – Elektrische Anlagen in Caravans und Motorcaravans“ (“Low-voltage electrical installations – Part 7-721: Requirements for special installations or locations – Electrical installations in caravans and motor caravans”)
- **DIN EN 131-2:2017-04**
  „Leitern – Teil 2: Anforderungen, Prüfung, Kennzeichnung“ (“Ladders – Part 2: Requirements, testing and marking”)
- **DIN EN 721:2019-12**
  „Bewohnbare Freizeitfahrzeuge – Anforderungen an die Sicherheitslüftung“ (“Leisure accommodation vehicles – Safety ventilation requirements”)
- **DIN EN 1645-1:2018-06**
  „Bewohnbare Freizeitfahrzeuge – Caravans – Teil 1: Anforderungen an den Wohnbereich hinsichtlich Gesundheit und Sicherheit“ (“Leisure accommodation vehicles – Caravans – Part 1: Habitation requirements relating to health and safety”)
- **DIN EN 1646-1:2018-04**
  „Bewohnbare Freizeitfahrzeuge – Motorcaravans – Teil 1: Anforderungen an den Wohnbereich hinsichtlich Gesundheit und Sicherheit“ (“Leisure accommodation vehicles – Motor caravans – Part 1: Habitation requirements relating to health and safety”)
- **DIN 70006-1:2000-08**
  „Sicherheits- und Hinweiszeichen für Fahrzeuge – Teil 1: Sicherheits- und Hinweiszeichen für Nutzkraftwagen“ (“Safety and information signs for vehicles - Part 1: Safety and information signs for commercial vehicles”)

UN/ECE regulations

Available from:
op.europa.eu

- **Regulation No. 21 of the United Nations Economic Commission for Europe (UN/ECE): 2020-05-29**
  "Uniform provisions concerning the approval of vehicles with regard to their interior fittings"
- **Regulation No. 29 of the United Nations Economic Commission for Europe (UN/ECE): 2020-05-29**
  "Uniform provisions concerning the approval of vehicles with regard to the protection of the occupants of the cab of a commercial vehicle"
- **Regulation No. 43 of the United Nations Economic Commission for Europe (UN/ECE): 2016-09-01**
  "Uniform provisions concerning the approval of safety glazing materials and their installation on vehicles"

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