Operating instructions for KIESLING Kühlfahrzeuge

Contents

Please respect the sign:

Danger warning, points out a dangerous situation that could result in death, serious injury or damage to property.

www.kiesling.de/en/pages/downloads

All manuals are provided on our website

kiesling.de/en/collections/ersatzteile

Spare parts can be ordered online.

Safety and operating instructions are also installed at the superstructure and the vehicle.
Illegible labels must be replaced immediately. Please contact our customer service if that case occurs.

These instructions are established based on DIN EN 82079 to guarantee save practice with Kiesling refrigerated vehicles / reefers.
Please address questions or helpful suggestions about this user guide to Kiesling Fahrzeugbau GmbH, editorial office, Eva Kiesling, mailing address: eva.kiesling@kiesling.de or contact our customer service: service@kiesling.de

Kiesling Fahrzeugbau GmbH
D-89160 Dornstadt-Tomerdingen; Lauteracher Weg 10 – www.kiesling.de

1.Validation of this manual, technical specification, further valid documents

Validation of this manual/operating instruction
This operating instruction is directed to the users, operators and drivers of KIESLING refrigerated vehicles. Those must make oneself familiar with the content of this document prior to the usage of the vehicle to assure the correct and safe operation and maintenance.

All operating instructions are provided on the website of Kiesling Fahrzeugbau GmbH https://www.kiesling.de/en/
The content is protected by copyright. The Kiesling GmbH reserves all rights of usage. The operating instructions must only be used for personal requirements. In case of retransmission of the vehicle, it must be taken care that the buyer has knowledge of the instructions.

Technical specification
The KIESLING – operation instructions are only generated and valid for the insulated superstructures that are delivered by Kiesling Fahrzeugbau GmbH. The identifications of the superstructure, the serial number and the date of manufacture are attached to the front side of the superstructure. The present reefer has been manufactured according to the rules of the HACCP and ATP/FRC. You can receive the certifications on request. Measures and weights are included in the certificate of acceptance and order confirmation. We exclude guarantee if the superstructure or elements have been altered improperly. We can only ensure guarantee if original spare parts have been used.

Further valid documents , please respect unconditional
To comply instructions for refrigerated transport, get information on

- Thermograph regulation
- 89/108/EWG or 92/1/EWG
- DIN EN 12830 and DIN EN 13486
- TLMV, DIN 8959 und EG-VO 178/2002
- EG 852/2004 and EG 37/2005

Continuing information to this issues the TÜV Süd, ATP/inspection authority.

Additional intruction manuals are to observe primarily if applicable, for instance

- Instruction manuals of the manufacturer of the chassis.
- Instruction manuals of the cooling unit
- Potentially the instruction manuals of the hydraulic platform
- Potentially the instruction manuals of the thermograph

Spare parts:
Labels in the driver's cab and in the motor compartment of power take-off refrigerator units point out the potential supply of proper spare parts at the Kiesling webshop https://www.kiesling.de/en/.

Label on windshield:
The label shown on the right, is attached to the inner windshield on the driver's side. It indicates the driver to respect the instruction manuals and tells him where to find them.

Attention:
Before departure, one must familiarize oneself with the measures of the vehicle, the weight of the vehicle and the payload.

2. Important details on loading and load balancing

Corresponding to the Road Traffic Offices and regulations in the respective countries,
(according to German STVO, StVZO, UVV) the truckload has to be **loaded and secured save to avoid accidents!**
Observe all valid legal regulations in the respective country (Germany: guideline VDI 2700)

Notice our chapter 4, for correct load securing.

Correct load balancing is essential.
Wrong or unfavorable loading of the superstructure, particularly unbalanced load spreading affects the drivability (for example curves, breaking) and can lead to accidents. One-sided pressure can lead to increased wearout of security-relevant parts. The producer of the chassis is responsible for correct configuration.

a. Load balancing - pay attention to image

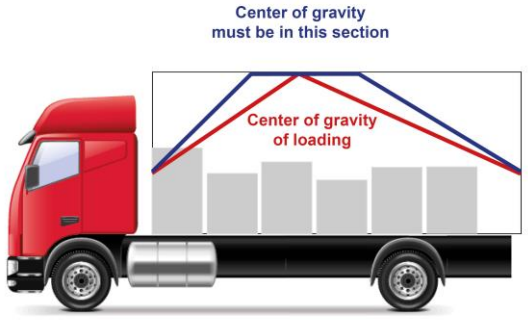
The registered payload as well as the admissible axle loads on front axle and rear axle must be respected.

The payload can be applied if the balance point of your loading is in the calculated range. If not so, the payload must be relevantly lesser.

We suggest:

∑ Axle loads > gross weight + 5-10 %,
that means, if the amount of the axle load is about 5 % higher than the gross weight, the section in which the center of gravity can be is bigger. That is beneficial particularly for the distribution traffic and the resulting alternating laoding.

Please respect the relevant regulations in the respective country (Germany: STVZO, STVO, UVV)



	load per axle front axle		load per axle rear axle		∑ load all axles		GW	Center of gravity
Example A	7000 kg	+	11000 kg	=	18000 kg	=	18000 kg	◀ not optimal
Example B	7500 kg	+	11500 kg	=	19000 kg	>	18000 kg	◀ optimum

b. Transport of hanging goods

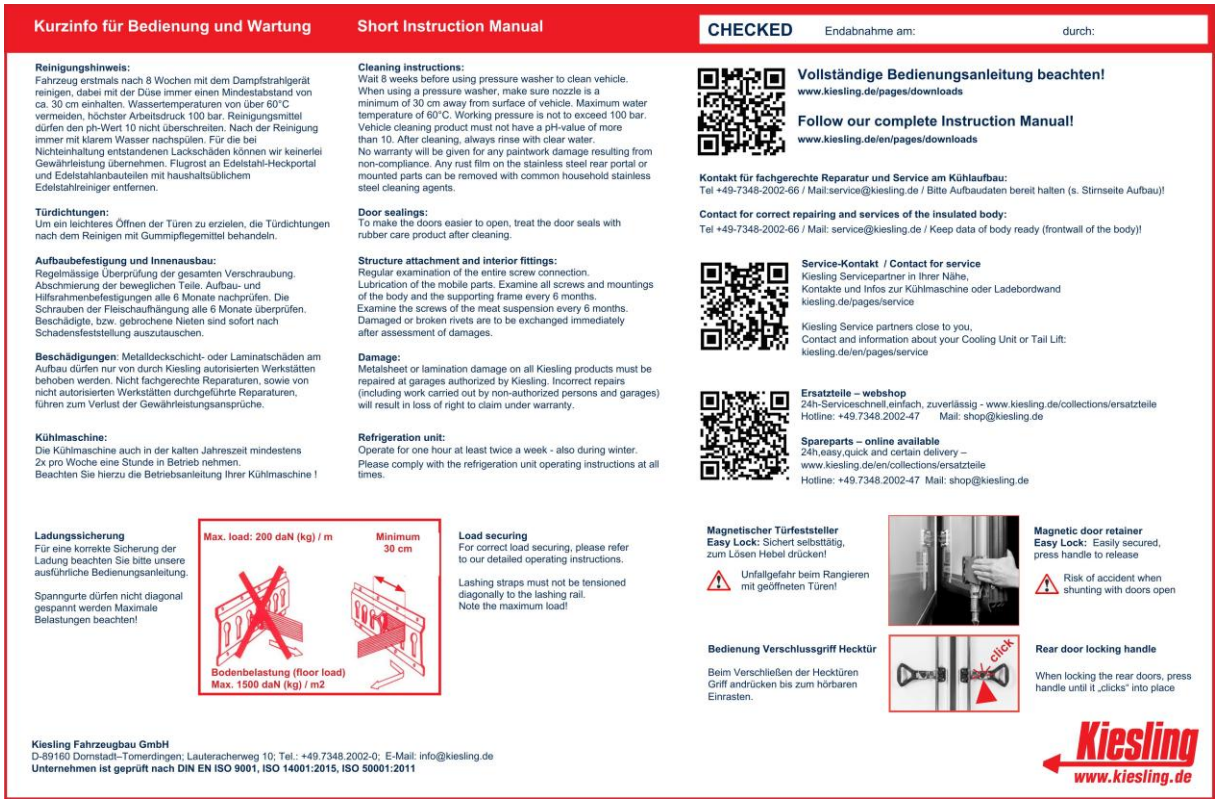
If transporting hanging meat on tubular tracks, the center of gravity of the load is very high, which can lead to rolling movements.
- Absolutely ensure even loading!
- Don't improperly overload!
- Adjust speed!

c. Uniform distribution of the load

Please always ensure that the load is evenly spreaded and balanced and observe the principles of load securing, which are also explained in chapter 4 of this operating manual.

3.1 Brief instructions: Cleaning, maintenance, care construction

The sticker attached to the right rear door wing of the body contains the most important care and maintenance instructions in brief. The complete operating instructions at www.kiesling.de must be observed!



Kurzinfo für Bedienung und Wartung

Reinigungshinweis:
Fahrzeug erstmals nach 8 Wochen mit dem Dampfstrahlgerät reinigen, dabei mit der Düse immer einen Mindestabstand von ca. 30 cm einhalten. Wassertemperaturen von über 60°C vermeiden, höchster Arbeitsdruck 100 bar. Reinigungsmittel dürfen den ph-Wert 10 nicht überschreiten. Nach der Reinigung immer mit klarem Wasser nachspülen. Für die bei Nichteinhaltung entstandenen Lackschäden können wir keinerlei Gewährleistung übernehmen. Flugrost an Edelstahl-Heckportal und Edelstahlanbauteilen mit haushaltsüblichem Edelstahlreiniger entfernen.

Türdichtungen:
Um ein leichteres Öffnen der Türen zu erzielen, die Türdichtungen nach dem Reinigen mit Gummipflegemittel behandeln.

Aufbaubefestigung und Innenausbau:
Regelmässige Überprüfung der gesamten Verschraubung. Abschmierung der beweglichen Teile. Aufbau- und Hilfsrahmenbefestigungen alle 6 Monate nachprüfen. Die Schrauben der Fleischaufhängung alle 6 Monate überprüfen. Beschädigte, bzw. gebrochene Nieten sind sofort nach Schadensfeststellung auszutauschen.

Beschädigungen: Metalldeckschicht- oder Laminatschäden am Aufbau dürfen nur von durch Kiesling autorisierten Werkstätten behoben werden. Nicht fachgerechte Reparaturen, sowie von nicht autorisierten Werkstätten durchgeführte Reparaturen, führen zum Verlust der Gewährleistungsansprüche.

Kühlmaschine:
Die Kühlmaschine auch in der kalten Jahreszeit mindestens 2x pro Woche eine Stunde in Betrieb nehmen.
Beachten Sie hierzu die Betriebsanleitung Ihrer Kühlmaschine !

Short Instruction Manual

Cleaning instructions:
Wait 8 weeks before using pressure washer to clean vehicle. When using a pressure washer, make sure nozzle is a minimum of 30 cm away from surface of vehicle. Maximum water temperature of 60°C. Working pressure is not to exceed 100 bar. Vehicle cleaning product must not have a pH-value of more than 10. After cleaning, always rinse with clear water. No warranty will be given for any paintwork damage resulting from non-compliance. Any rust film on the stainless steel rear portal or mounted parts can be removed with common household stainless steel cleaning agents.

Door sealings:
To make the doors easier to open, treat the door seals with rubber care product after cleaning.

Structure attachment and interior fittings:
Regular examination of the entire screw connection. Lubrication of the mobile parts. Examine all screws and mountings of the body and the supporting frame every 6 months. Examine the screws of the meat suspension every 6 months. Damaged or broken rivets are to be exchanged immediately after assessment of damages.

Damage:
Metalsheet or lamination damage on all Kiesling products must be repaired at garages authorized by Kiesling. Incorrect repairs (including work carried out by non-authorized persons and garages) will result in loss of right to claim under warranty.

Refrigeration unit:
Operate for one hour at least twice a week - also during winter. Please comply with the refrigeration unit operating instructions at all times.

CHECKED Endabnahme am: durch:

Vollständige Bedienungsanleitung beachten!
www.kiesling.de/pages/downloads

Follow our complete Instruction Manual!
www.kiesling.de/en/pages/downloads

Kontakt für fachgerechte Reparatur und Service am Kühlaufbau:
Tel +49-7348-2002-66 / Mail:service@kiesling.de / Bitte Aufbaudaten bereit halten (s. Stirnseite Aufbau)!

Contact for correct repairing and services of the insulated body:
Tel +49-7348-2002-66 / Mail: service@kiesling.de / Keep data of body ready (frontwall of the body)!

Service-Kontakt / Contact for service
Kiesling Servicepartner in Ihrer Nähe,
Kontakte und Infos zur Kühlmaschine oder Ladebordwand
kiesling.de/pages/service

Kiesling Service partners close to you,
Contact and information about your Cooling Unit or Tail Lift:
kiesling.de/en/pages/service

Ersatzteile – webshop
24h-Serviceschnell,einfach, zuverlässig - www.kiesling.de/collections/ersatzteile
Hotline: +49.7348.2002-47 Mail: shop@kiesling.de

Spareparts – online available
24h,easy,quick and certain delivery –
www.kiesling.de/en/collections/ersatzteile
Hotline: +49.7348.2002-47 Mail: shop@kiesling.de

Ladungssicherung
Für eine korrekte Sicherung der Ladung beachten Sie bitte unsere ausführliche Bedienungsanleitung.

Spanngurte dürfen nicht diagonal gespannt werden Maximale Belastungen beachten!

Load securing
For correct load securing, please refer to our detailed operating instructions.

Lashing straps must not be tensioned diagonally to the lashing rail.
Note the maximum load!

Magnetischer Türfeststeller
Easy Lock: Sichert selbsttätig, zum Lösen Hebel drücken!
Unfallgefahr beim Rangieren mit geöffneten Türen!

Magnetic door retainer
Easy Lock: Easily secured, press handle to release
Risk of accident when shunting with doors open

Bedienung Verschlussgriff Hecktür
Beim Verschließen der Hecktüren Griff andrücken bis zum hörbaren Einrasten.

Rear door locking handle
When locking the rear doors, press handle until it „clicks" into place

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Unternehmen ist geprüft nach DIN EN ISO 9001, ISO 14001:2015, ISO 50001:2011

Kiesling www.kiesling.de

If the cooling unit is not used for a long period of time, we recommend switching it on regularly to prevent the battery from becoming deeply discharged (in diesel units) or to lubricate the seals in the cooling unit (power take-off unit).
Corresponding stickers are affixed in the cab.
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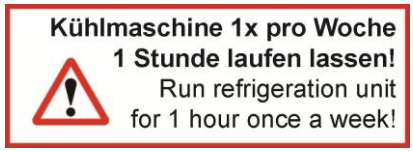
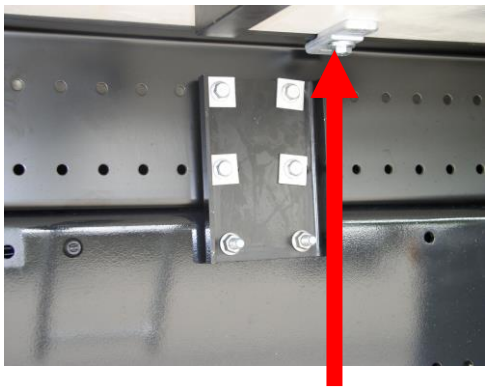


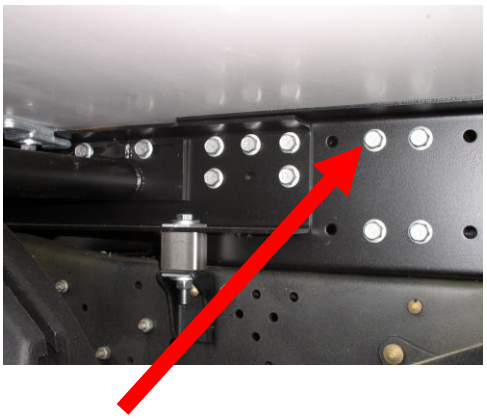
3.2 Maintenance body attachments and body/insulation

Body mounting and interior fittings:

Check and retighten the body and subframe mountings every 6 months, observing the tightening torques. It is essential that the entire bolted connection is checked at regular intervals.Loose bolts must be replaced immediately with original Kiesling bolts.



Tightening torque
M 14 / 205 Nm
M 12/ 130 Nm



Tightening torque
M 12 / 130 Nm

Check the screws of the meat hanger every 6 months.
Damaged or broken rivets must be replaced immediately after the damage is determined.

Damage to insulation, metal top layer or laminate:

Open areas must be closed immediately to prevent moisture from entering the insulation.

Damage to the metal surface layer or laminate on Kiesling products may only be repaired by an authorised Kiesling repair workshop or a Kiesling Service Partner.
Improper repairs, as well as repairs carried out by unauthorised workshops, will result in the loss of warranty claims..

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3.3 Cleaning Instruction for Refrigerated Bodies

Our materials are continuously tested and they dispose a high endurance when handled with the right care. The reefer box body has to be cleaned regulary.
To avoid damages, the following cleaning instructions have to be respected.

- Wait 8 weeks before using pressure washer to clean vehicle
- Nozzle is a minimum of 30 cm away from surface of vehicle
- Working pressure is not to exceed 100 bar
- Maximum water temperature of 60° C, otherwise danger of liquify clue in the body
- Vehicle cleaning product must not have a pH-value of more than 10,
- use e. g. :

Attention: This detergent is made from concentrate and has to be diluted with water 1:20.
There is a danger of corrosion if exceeded!

- After cleaning, always rinse with clear water.
- Dry the body inside with air pressure or leave the doors open, as a protection against mildew.

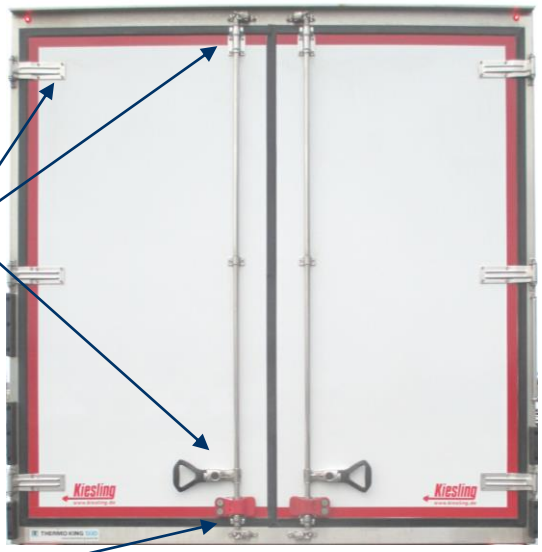
No guarantee will be given for any paintwork damage resulting from non-compliance.

Any rust film on the stainless steel rear portal or mounted parts can be removed with common household stainless steel cleaning agents.

3.4 Information on the care of stainless steel fittings

Hinges and closures

are made of corrosion-resistant Stainless steel. The surfaces are high gloss polished



Easy Lock®
Magnetic door-stay

Magnets

Easy Lock®
Magnetic door-stay

lateral stop plates made of stainless steel

Hinges and latches, magnetic handle and Easy Lock® stop plate
are made of corrosion-resistant stainless steel, but can still corrode under certain conditions or corrosive loads, e.g:
- Extremely high humidity with salt content (near the sea) or de-icing salt spray or cement film
- particularly aggressive air pollution in heavily polluted industrial regions or in the vicinity of busy roads (acid rain)
- Contact with chlorinated water
- Use of tools or auxiliary means with which steel was previously worked
- Contact with building chemistry

Attention: do not use caustic cleaning agents.

Remedy / preventive measure against corrosion or flash rust

- Cleaning by washing with a mild detergent and cleaning agent or with a commercially available stainless steel cleaner We recommend our Art.No. 625C.KI.0022, Stainless Steel Care Spray

- Stainless steel fittings such as hinges, latches and door-stay brackets should be lubricated regularly

flash rust, which occurs especially at edges and depressions but also on smooth surfaces such as GFK walls or metal cover layers, can also be removed with a stainless steel cleaner.

3.5 Easy Lock – magnetic door retainer

Attention: Risk of accident when manoeuvring with doors open.
Reduce speed to a maximum of walking speed!

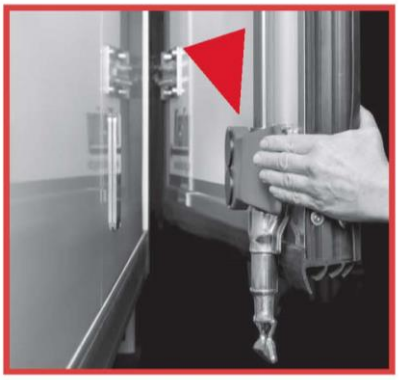
Attention: Do not keep your finger between the handle and the door when pressing the lever, danger of crushing when releasing the magnet from the stop plate.

Cleaning: see cleaning instructions under 3.4 Maintenance of stainless steel fittings

Operating instructions for unlocking the magnetism can be found on the sticker "Short information for operation and maintenance" on the inside right-hand side of the door and must be strictly observed!

Magnetischer Türfeststeller Easy Lock:

Sichert selbsttätig, zum Lösen Hebel drücken!



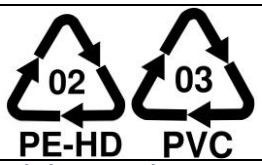
Magnetic door retainer Easy Lock:

Easily secured, press handle to release

3.6 Recycelbar: Metalldeckschicht-Aufbau / Recyclable: metal sheet body

Kiesling Metalldeckschicht-Aufbauten sind recycelbar gemäß Directive 2005/64/EC Annex 1, geprüft und zertifiziert vom TÜV Deutschland. Die folgenden Materialien wurden bei der Herstellung verwendet:

Kiesling metal sheet bodies are recyclable bodies in dependence on the Directive 2005/64/EC Annex 1, approved and certified by TÜV Germany. The following materials are used for the building of the body:

Verwendet für	*Eigenschaften*	Material	Recycling-Code	*Mainly used in*	*Characteristics*
Innere und äußere Eckwinkel, Boden und Rammschutz	Nicht magnetisch, silberfarbenes Metall	**Aluminium**		Inner and outer angle profile, floor panel, protection base plates	Metal with silver colour. Non magnetic metal.
Innen- und Außendeckschicht des Aufbaus	Deckschichten sind weiß beschichtet, Magnetisch	**Stahl / Steel**		Used in the inner and outer bodyshells, bottom crossbars	Inner and outer bodyshells are white coated, crossbars are black coated. Magnetic metal.
Heckportal	Silberfarbiges Metall, Nicht magnetisch	**Edelstahl / Stainless Steel**		Back portal	Metal with silver colour. Non magnetic metal.
Bodenplatte, Stirnwandverstärkung	Mehrschichtholz in Bodenplatte, normale Holzprofile in Stirnwand	**Holz / Wood**		Floor panel, frontwall	Wood in floor panel is multi-layer-wood, wood in front wall are normal wood beams
Stirnwand, Seitenwände, Dach, Boden und Türen	Gelbliche Farbe, Schaummaterial mit feinen Poren	**Polyurethane**	**Must be send back to Manufacturer Kiesling to be recycled at Puren**	Fronmt wall, side walls, roof, botto, doors	Yellow coloured, porous foam material
	Graues Plastik Material	**Plastic Material**		Tubes in side and rear doors	Normal grey coloured material
Türdichtungen	Flexibler schwarzer Gummi	**Gummi/ Gum**	**Wiederverwertbarer EPDM Recyclable EPDM**	Door seals	Flexible, black coloured material
Innenleuchten und Verkabelung	Lampen aus verschiedenen Materialien, Kabel aus Kupfer und Plastik	**Elektronik / Electronics**	**Wiederverwertbarer Elektronikteile / Recyclable electronics**	Roof lamps and their cables	Lamps consist of different material like plastics, aluminium; cables consist of copper and plastics
Verbindungen Stirnwand/Seitenwände/Dach/Boden/Türen	Ausgehärtet, Rabe ähnelt Klebefilm-	**Klebstoff / Glues (less than 5%)**	**Nur thermisch verwertbar/ only thermic recyclable**	Connections of front wall, side walls, roof, bottom, doors	Hardened compound, different colour, looks like plastic film

Erstellt: P.Kiesling **Gepr.:** P. Kiesling **Freigegeben:** P. Kiesling

4. 1 Load securing / Load securing basics / allsafe

6.0 Load restraint

Introduction to load restraint

Who is responsible?

The shipping agent, the vehicle owner and the driver. The shipping agent (shipping either for himself or for third parties) is responsible for roadworthy loads. The owner (the person who owns the vehicle and has control of it) is responsible for the suitability of the vehicle.
The driver is the person who knowingly operates or controls a vehicle and is responsible for roadworthy stowage of the load and making sure load platform, bodywork and any load securing equipment are in sound and serviceable condition. Everybody has responsibilities.

Duties of shipper, vehicle owner and driver:

§ 22 of the German Road Traffic Act states: the load, including load restraint equipment, should be stowed and secured that it cannot slide, roll-over in any direction, wander because of vibration, fall off vehicle or make the vehicle tip over or produce avoidable noise, even during heavy braking or dangerous maneuvers. Generally accepted technical rules should be followed. § 37 (4) of the German Accident Prevention Regulations states that the load should be secured to hinder cargo from falling over and to prevent avoidable noises.

§ 412 of the German Commercial Code: Unless circumstances or common usage dictates otherwise, the dispatcher must load, stow, secure and unload the goods safely. The carrier is responsible for safe loading. § 823 of the German Civil Code define compensation. § 831 of the German Civil Code contains definitions of liability.

§ 30 of the German Road Traffic Licensing Regulations governs the requirements relating to the condition of vehicles; § 31 of the same legislation stipulates that responsibility for vehicle operation lies with the owner and driver. The vehicles must be safe to operate, for example, show no technical defects and all load restraint required for the intended journey must be available. The vehicle must also be roadworthy, which includes the vehicle operator being trained accordingly to secure the load adequately (§ 30 + § 31).

Areas of responsibility

Shipper	Owner	Driver
responsible for:		
roadworthy load § 22 StVO § 412 HGB § 823, 831 BGB	Sound and suitable vehicles § 30 StVZO § 31 StVZO	Load to be stowed safely § 22 StVO § 23 StVO

EN 12 195 Part 1 – Calculation of securing forces

Vehicles over 3.5 t total weight, use various securing methods such as blocking, lashing or a combination thereof for securing loads in road vehicles which are defined in part 1.

Information about the blocking force „BC in daN" of shoring elements is important for the calculation (BC = blocking capacity).

Recognized technical rules – VDI 2700 ff

In addition to EN 12 195-1, VDI Guideline 2700 ff provides a summary of physical principles and specific examples for load restraint.

The guidelines make many references to the relevant statutory rules and standards. The list of specific examples of load restraint is being extended continuously. The training requirements for people responsible for the load restraint is also described.

The VDI guidelines are definitive in legal disputes in Germany.

EN 12 195 Part 2 – Lashing straps

- EN 12195-2 regulates the labeling and handling of lashing straps.
- All lashing straps must be marked with a legible label.
- If label is no longer attached or if it is no longer legible, the strap can not be used.
- Straps can not be used if they show clear signs of damage, e.g. tears, cuts stitching breakage or corrosion
- It is not permitted to knot the straps.
- The driver must carry at least one set of instructions for use (supplied with the product) and be able to provide these upon request.
- There is no general expiration date for lashing straps.

Standards for securing loads

ISO 27955	ISO 27956	EN 12 640	EN 12 641	EN 12 642	EN 283/284	EN 12 195	EN 12 195	additionally: VDI 2700 ff
Lashing points	Lashing points	Lashing points	Trailers	Trailers	Trailers	Load restraint		
Passenger vehicle, wagon, light commercial vehicle	Light commercial vehicle	Flatbed trucks - > 3.5t	Tarpaulin		Swap bodies	Section 1: Calculating securing forces	Section 2: Lashing strap made from synthetic fibers	Recognized regulations for securing loads

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6.0 Load restraint

Securing loads using positive locking with Faktor 4

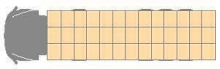


Fig. 1: Positive locking in all directions

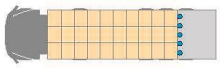


Fig. 2: Positive locking in all directions

Fig. 3: Positive locking in all directions

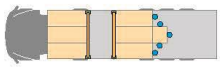


Fig. 4: Positive locking forwards, to the back and laterally

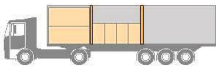


Fig. 5:

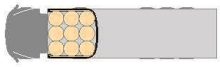


Fig. 6: Forward lashing

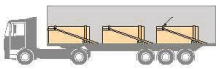


Fig. 7: Load secured using positive locking with head nooses

Load restraint by means of positive locking is where the load is tightly packed towards a part of the vehicle such as the headboard. As a result, there is no room for movement.

The simplest case is shown in Figure 1, where the load space is completely filled with stable load units.

Figure 2 shows positive locking to the front and side using the vehicle body and to the back using shoring poles.

Figure 3 shows positive locking with shoring poles to the front and to the back. This is especially desirable when large blocking forces are needed. There is no force exerted on the front wall in the direction of movement.

Figure 4 illustrates positive locking to the back using shoring poles (horizontal and vertical). The gap allows further positive locking to the front using horizontal shoring poles.

Positive locking can also be achieved with different load heights with-help of shoring poles as shown in Figure 5.

Shoring poles are usually used to secure loads with positive locking. Figures 6 and 7 show positive locking using lashing straps.

The spring lashing shown in Figure 7 can also be used to build an artificial front wall, for example with an upright pallet in front of the load, which is then strapped to the back.

The symbols used below, along with the graphics are part of the EN 12195.

F_Z = Weight
m = Mass
$F_{x,y}$ = Mass force forward, rearward or laterally
$c_{x,y}$ = lateral, forwards or rearward acceleration
μ = Friction value
F_S = Securing force
F_F = Friction
BC = Blocking force shoring beams
X = Number of shoring beams

Simplified formula for calculating securing force

Rearward inertia

$F_{x,y} = c_{x,y} \cdot F_Z$
$F_{x,y} = 0.5 \cdot 4000\ daN = 2000\ daN$

Friction force

$F_F = \mu \cdot F_Z$
$F_F = 0.25 \cdot 4000\ daN = 1000\ daN$

Required securing force

$F_S = F - F_R$
$F_S = 2\,000\ daN - 1\,000\ daN = 1\,000\ daN$

$$X = \frac{F_S}{BC} = \frac{1\,000\ daN}{1\,000\ daN} = 1 \text{ shoring beam BC } 1\,000\ daN$$

$$X = \frac{F_S}{BC} = \frac{1\,000\ daN}{500\ daN} = 2 \text{ shoring beams BC } 500\ daN$$

Calculation

In addition to the specified friction (FF = FZ · μ), the blocking capacity BC of the load restraint counteracts the inert mass. The system is balanced, i.e. the cargo does not slide, if:
$BC > (c_{x,y} - \mu)\ m \cdot g$

How to determine possible load weights

Using the blocking force of the shoring poles and beams (information on sticker), the following load weights can be secured for vehicles with maximum permissible weight (MPW) > 3.5 t: The load should be secured laterally and towards the rear with 0.5 g. With a load of 4.0 tons and a friction value of μ = 0.25, the following sample calculation is the result (gravity is rounded to 10 for simplification): with BC 1000 daN, a 4000 kg load can be secured towards the rear and laterally.

Faktor 4 shoring elements are labeled with BC (blocking force in daN) in accordance with EN 12 195-1.

Put simply, by using the formula "BC times 4= load weight" most common loads are sufficiently secured towards the sides and the back with our Faktor 4 products.

„BC times 2 = Load weight" secures loads sufficiently towards the front.

Source: allsafe

6.0 Load restraint

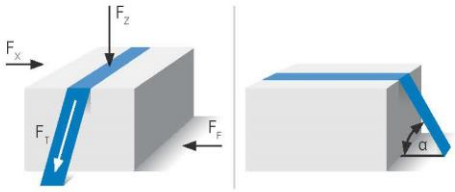
Load restraint using force locking

The symbols, units and terms used are in compliance with DIN EN 12195:

F_{XY} = Mass force of load towards the front, back and sides
F_Z = Weight (normal force)
F_T = Tension force lashing device
F_F = Friction force
c_{XY} = Front, rear or lateral acceleration
μ = Friction coefficient
sin α = Angle
STF = Standard tension force lashing strap
mGVM = Gross vehicle mass

Friction force F_F can be increased for example by top-over lashing. The load is balanced, meaning the load can not slide if the following applies:

Sum $F_F > F_{XY}$ with sum $F_F = (F_Z + F_T) \cdot \mu$.



Simple calculation of necessary tension force for load securing with top-over-lashing at a 90° angle:

$$\text{Standard tension force FT} = \frac{F_Z \cdot (c_{XY} - \mu)}{\mu}$$

Calculation for number of straps required:

$$\text{Number of straps} = \frac{F_T}{2 \cdot STF}$$

Example: mGVM 20.000 kg, friction coefficient μ = 0.25, load weight 4000 kg, restraint in direction of travel, over-lashing at 90° angle, standard tension force STF = 500 daN:
$F_T = 4000 \cdot (0.8 - 0.25) : 0.25 = 8800$ daN
Number of straps needed = 8800 daN / (2 · 500 daN) = 9

Calculation of necessary tension force for load restraint with top-over lashing at <90° angle (α):

$$\text{Number of straps required} = \frac{F_Z \cdot (c_{XY} - \mu)}{F_T \cdot 2 \cdot \mu \cdot \sin \alpha}$$

Example: Friction coefficient μ = 0.25, load weight 4000 kg, restraint in direction of travel, over-lashing at 60° angle:

$$11 \text{ Straps} = \frac{4000 \cdot (0.8 - 0.25)}{500 \cdot 2 \cdot 0{,}25 \cdot \sin 60°}$$

The friction coefficient between load and vehicle floor surface can be increased with force locking. The friction force can be increased with top-over-lashing or equipment that increases friction (e.g. friction mats). With stable loads this should be increased until the load is no longer able to slide, taking accelerating factors into account.

The standard tension force, not the lashing capacity of the strap, is relevant for the calculation of the number of straps needed!

To calculate the number of straps required, information about the strap itself and the load is required.

This information can be found on the label.

A standard tension force STF of 500 daN is displayed on the label of the „Ergo long-lever ratchet strap". To achieve this 500 daN standard tension force (STF) in the ratchet, a manual force (SHF) of 50 daN has to be applied.


560 246-10
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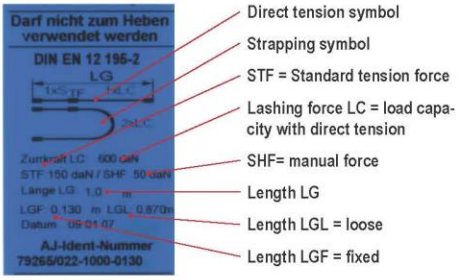
Zurrgurte aus Chemiefasern
EN 12195-2
Praktische Hinweise zur Benutzung und Pflege von Zurrgurten

In addition to practical instructions, indications of the need to replace components can be found. Potential damage which can occur to the strap can be taken from the label. The strap can be used as long as it does not show signs of the potential damages listed.

To calculate the number of straps required, information about the strap itself and the load is required. This information is always on the label.



Label (blue label)

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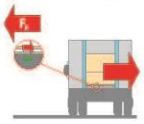
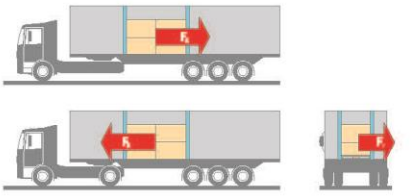
Physical principles

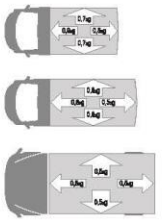
Weight = Mass x Gravity
F_z = m x g
1 daN ~ 1 kg x 9.81 m/s



Friction = Weight x Friction coefficient
F_F = F_Z x μ



Inertia = Mass x Acceleration coefficient x Gravity
F_{XY} = m x c_{xy} x g

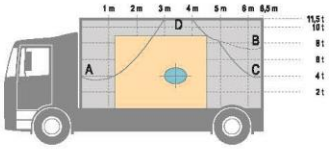


MPW > 2.0 t

MPW 2.0 - 3.5 t

MPW > 3.5 t

Acceleration value c_{xy} depending on MPW



Limited by:
A = permissible front axle load
B = permissible rear axle load
C = safe steerability
D = maximum permissible weight

Weight

The load applies a downward force on the load space of weight F_z. Forces like weight are measured in Newton (N). The weight of mass of 1 kg is approximately 9,81 N which for practical purposes can be rounded off to 10 N or 1 decaNewton (daN).

The weight of 1 kg of mass is 1 daN.

Friction

Friction hinders movement of the load and helps to secure it by working against the force of inertia. Friction forces depend on the mutual cargo and truck bed surface. The rougher the surface is, the higher the friction.

Friction can be calculated by multiplying the weight F_z by μ which stands for friction coefficient.

Longitudinal and transverse force of load in relation to the maximum permissible weight (MPW)

Acceleration tends to cause the load to slide backwards.

As a result of the retarding force when braking, the load tends to slide forwards. This vehicle movement is in the direction of the longitudinal axis (x-axis).

Centrifugal forces on the vehicle and its load occur when driving around bends. This vehicle movement exerts a force in the direction of the transverse axis (y-axis).

Centrifugal forces try to tilt the vehicle and push the cargo to the outside of the curve. Movement of the load while driving around a bend can cause the vehicle to topple over.

Based on the driving dynamics of vehicles with different total masses, different longitudinal and diagonal acceleration takes place in practice, see illustration.

Starting from a standstill position, the load acts with an inertia force directed towards the rear of the vehicle equal to 0,5 times the weight of the load. When braking, the inertial force directed towards the vehicle may equal 0,8 times the weight of the load. When cornering, the lateral inertia force may reach 0,5 times the weight of the load.

These longitudinal and transverse accelerations exert longitudinal force F_x or lateral force F_y on the load.

Mass x Acceleration coefficient x gravity = Inertia

Load distribution

Guideline VDI 2700 sheet 4 requires the load to be stowed so that the center of gravity of the entire load is along the longitudinal centerline of the vehicle if possible. Even weight and load distribution for partial loads is also desirable.

Positive locking is not usually achieved with heavy weights as you cannot load from the front bulkhead to the rear due to the vehicle's axle loads.This produces gaps in the cargo and suitable load restraint equipment must therefore be used. Shoring elements can secure against large forces, especially in the direction of travel.

LOAD RESTRAINT

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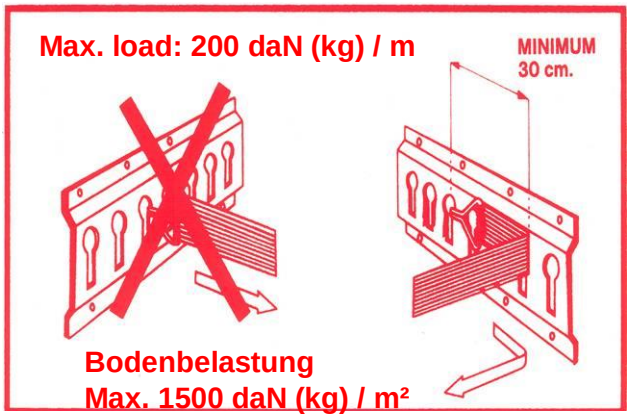
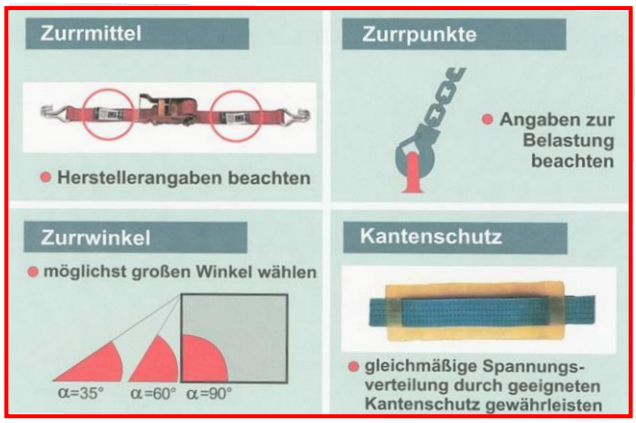
4.2 Anchor rail, tension belt, barrier rod, clamping bar

Tension straps in anchor channel

When using tension belts, ensure that they are not tightened diagonally.
Observe maximum loads!





Clamping bar and barrier rods

Attention: Vertical load securing can damage the ceiling, therefore use a maximum of 6 clamping beams/barriers per body!

Clamping bar

Only clamp the clamping bar **vertically**, not horizontally!

Attention: Clamping bars act via frictional connection, offer only a low holding force (140 daN) and can slip, especially on icy surfaces. (see. 4.1)

Clamping bars or barrier rods

Form-fit load securing (locking bars with pins/hole rails) is preferable to non-positive load securing (clamping bars) - has significantly higher holding force (approx. 1000 daN).

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5.1 Dividing wall

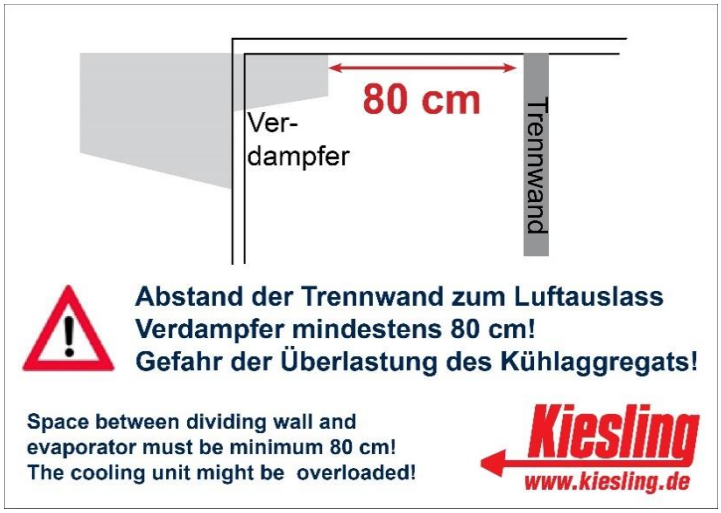
Please note the sticker attached to dividing wall.

5.2 Distance between partition wall and evaporator

Partition wall in use - Maintain distance to evaporator

Attention!
The specified distance between the transverse partition wall when closed and the air outlet of the cooling unit must be maintained without fail. If the air outlet is not kept free, the cooling unit may be overstrained.

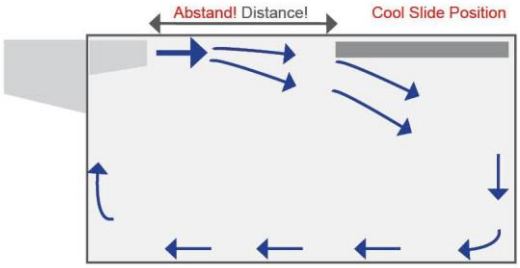
Note the sticker (attached to the front wall in the body in case of built-in partitions)



Partition wall resting position / storing of partition walls / Cool Slide / Cool Flap when not in use

If dividing walls are not required for a ride, they can be swung up to the ceiling and the vehicle can thus be used as a single chamber vehicle.

Care must be taken to ensure optimum air distribution,
that the partition wall / Cool Slide / Cool Flap is not in use durin
when not in use, it should be placed as far back in the rear as p
The air flow is not interrupted by this
and the air can circulate optimally (see sketch)



Please note the sticker attached to the body
(attached to the corresponding parking position of the partition wall/cool slide)

5.3 Operation and control: Fan for intermediate wall

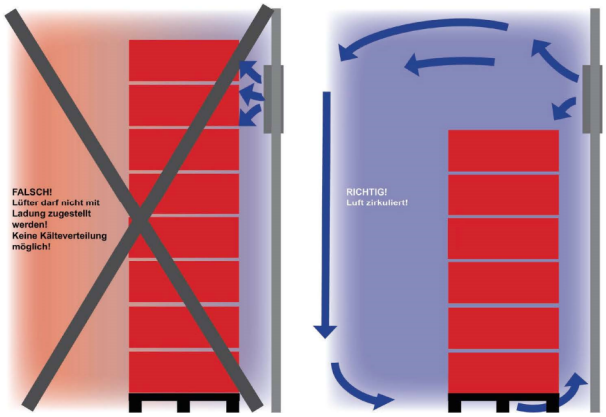
The intermediate wall fan is used to redistribute the cold air that is blown out of the chiller evaporator. The temperature of an uncooled chamber can be influenced in this way.

By installing a thermostat, the temperature change can be controlled to a certain extent.
Excess cold from the cooled/deep-cooled chamber is directed into an uncooled chamber.

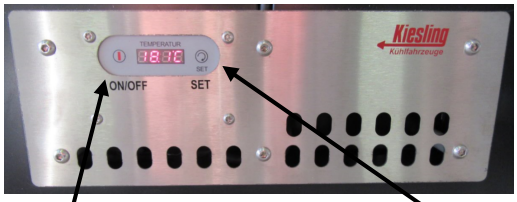
The fan for intermediate wall cannot assume the function of a second evaporator!

Please note:
Only an optimum, uniform transport temperature throughout the entire cargo area ensures the quality of refrigerated and frozen goods.

- For optimum circulation, the ventilator must not be blocked by goods
- Fans can freeze up.
  Frozen fans can cause the fan motor to burn out.
- Before loading/starting the journey, check the function of the fan, if necessary, the fans should be moved manually.
- Have the fan checked during refrigeration unit maintenance.



Control of intermediate wall fan



On / Off switch
(On / Off)

SET = Setting the temperature

The temperature can be preselected by pressing the "SET" switch.
Selection in one direction only,
steps of 0.1°. Preselected temperature remains stored.
Temperature range from -20°C - +20°C

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5.5 Cool Slide® and cold curtain operation

Cool Slide® operation:

Note the sticker on the Cool Slide dividing wall.
Further functional and operating instructions at www.kiesling.de/filme

The Cool Slide® wall is only suitable for use with packaged goods.

Further alternative cold retention systems are installed in Kiesling cooling superstructures, for example:

Cold curtain:
PVC cold curtains are used exclusively to reduce the entry of warm air during door openings. The cold curtain must be opened for unloading and immediately closed again afterwards.
Only the loss of cold can be reduced.

PVC cold curtains are only suitable for use with packed goods.

5.6 Instructions Cool Swing

Required tools: rod for double deck beams.
Further functional and operating instructions on www.kiesling.de/filme

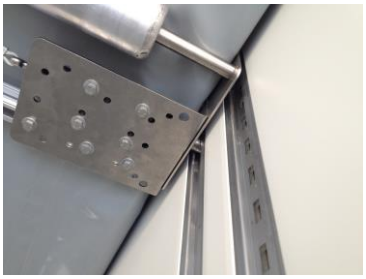
Basic position of the partition wall

Unlock the locking pin by pulling the cord

Attach the knot of the release cord to the provided holder

Hook the rod onto the perforated strip and pull the partition wall to the desired position.

DO NOT move the partition wall using the release cord. Danger of breakage!



To fix the partition loosen the unlocking cord and make sure that the bolts snap into the side of the loading beam rail.

Hook rod into eyelet

Pull out the partition wall with the rod to the rear until the dividing wall can be gripped by hand.

Pull out the partition wall by hand as far as it will go until the partition wall folds down automatically.

Put the partition wall in vertical position

Press the folds of the partition against the wall at the corners to ensure absolute tightness.

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6.1 Electrical - connection - plug for power take-off cooling machine

This electrical plug is intended for possible mains operation of the refrigeration machine. An electrician can use this plug to configure an electrical connection. The following information is required:

- Suitable cable length
- Connection possibility
(5-pin socket with 32 A or 16 A)

Attention: Cooling machines are partly without automatic phase correction.

In this case the correct polarity must be applied to three-phase motors. This can be tested by holding a sheet of paper in front of the condenser and sucking it in (see picture).
Wrong polarity:
The direction of rotation of the three-phase motor is reversed, i.e. the condenser blows out, but this does not cause any lasting damage to the refrigeration machine.

Place sheet on capacitor unit

Blade is sucked in - correct polarity

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6.4 Emergency release

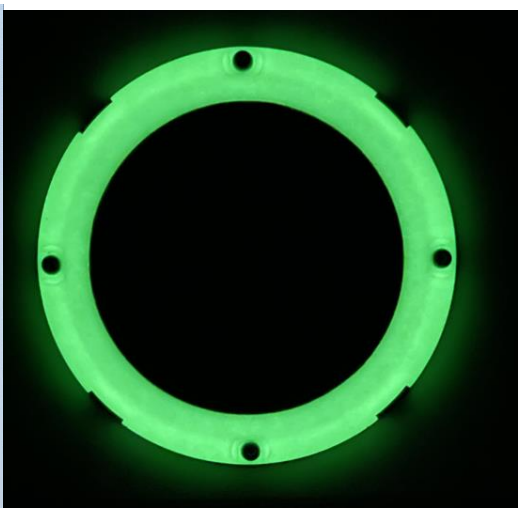
The vehicle may be equipped with an emergency release to allow a person accidentally trapped in the load compartment to open the door from the inside.

Emergency release only releases the espagnolette lock, not the lock!
Opening the emergency release is therefore not possible when the door is locked.

Identification marking:

The emergency release is identified by a circular sticker that glows in the dark, making it easier for any trapped person to find the emergency release.

Emergency release with open door



Emergency release in darkness

Brightness of the sticker:
photoluminescent effect, rechargeable at will.

Decay time according to manufacturer's specifications (DIN 67510) : approx. 340 min, luminosity decays slowly.