

Lashing equipment

Secure your load – and yourself!

Whether for professionals or for private persons: securing loads is a topic that nobody should take lightly. The consequences are just too serious if transported goods have not been secured, or secured incorrectly, and therefore slip or even fall over. The fact that the load and the vehicle can be damaged is the least serious of the risks. Even small unsecured objects can, perhaps when the brakes are applied hard, turn into dangerous missiles that endanger your life and that of others. Vehicles with inadequately secured loads are also therefore regularly taken off the road by the police and the trade associations. For this reason we would like to present here a few simply formulated basic principles about correct load securing. Take this chance of getting informed! Regardless of whether you simply transport a bicycle or a new fridge once in a while, whether you put tools and building materials into your delivery van every day, or even if you load entire trucks. We want you to drive safely!

Everybody is responsible. You too!

It is not just the driver or the person who loads the vehicle who is responsible for seeing that loads are properly secured. Superiors such as the loading foreman, the vehicle owner or even the company owner bear some of the liability.

And what is more, a driver is obliged to refuse to undertake a journey if the load is not adequately secured!

Laws and guidelines that you should know.

In Germany, the statutory regulations on securing loads are laid down in the Strassenverkehrs-zulassungsordnung (Road Traffic Approval Regulations, StVZO), the Straßenverkehrsordnung (Road Traffic Regulations, StVO), the associated administrative regulations and the Unfallverhütungsvorschrift (Accident Prevention Regulation, BGV D 29). The technical guidelines are specified in DIN EN 12 195 and DIN 75410 and in guidelines 2700 and following, from the VDI (Verein Deutscher Ingenieure, German Engineers Association).

We can train and advise you!

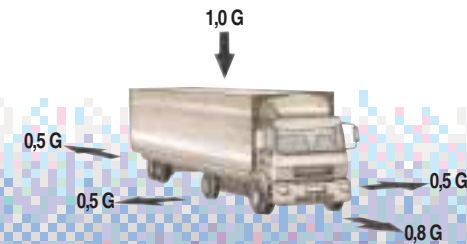
We would be happy to provide you with a summary of these statutory regulations, standards and guidelines. In addition to this we offer you regular training that will show you how best to implement these in practice.

Talk to us! We do not just want to be your supplier, but your partner, and to help you at any time with both words and deeds.

Well lashed is well protected!

Professional load securing is a science in itself. It is applied

wherever goods are transported: in road, rail, air and marine transport. We will use the example of loading a truck to show you the factors involved.



Better reliable than negligent

To begin with, it is obvious that loads must only be transported using suitable vehicles. Permissible total weight and axle loadings must be observed, just as much as the dimensions. It is also necessary for the weight of the loads to be distributed in such a way that the vehicle

remains both steerable and fully fit for road use. The centre of gravity, for instance, should be as low as possible, and be located near the middle between the front and back. You can find more information about this in the load distribution plan (VDI 2700 Sheet 4). Bear in mind that emergency braking or sudden evasive manoeuvres can be necessary on any journey, and be prepared for these!

Security through lashing systems

The load must then be secured, above all to prevent it from slipping. This is usually done with the aid of lashes, preferably with professional lashing systems that carry the GS mark. They make it possible for you to secure the load in accordance with regulations. It is, however, a precondition that the lashing is carried out correctly, and that you only use appropriate lashing materials of the same type.

Lashing equipment

Correct lashing: the 6 golden rules

To be quite safe, you should always obey the following rules when lashing:

1. Even heavy loads must also be lashed!

As unlikely as it might sound, the likelihood that your load will slip



does not depend on its weight or on the area of the surface on which it lies. A steel beam weighing a ton slips just as easily as a little paperclip.

2. Always secure a load in all directions!

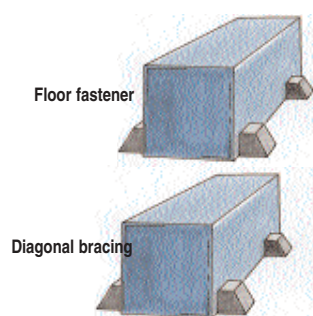
When driving, any object in or on the vehicle is subjected to a variety of forces. These "push" the load backwards when accelerating, forwards when braking, and to the right or left when turning corners. We'll show you how large these forces are on this truck:

3. Only lash objects that are already capable of resting without tipping up!

Steady "wobbly" loads with supporting angles and wooden blocks.

Observe the instructions in VDI 2700 here.

Always also ensure that the load is standing against the front



wall, or that it is butted solidly against it with the aid of blocks. Finally, fix the load in place by lashing.

4. Make sure that edges are properly protected!

Sharp edges can damage the lashing materials. Edge protection is therefore specified for sharp edges. An edge is considered to be sharp if the radius of the edge is smaller than the thickness of the lashing materials.

You should also use a PVC edge protector or a PVC protective



sleeve for rough surfaces. On pages 16 and 17 we offer you the appropriate edge protection for every lashing material.

5. Watch out for temperatures and chemicals!

Extreme temperatures and chemicals can attack and damage lashing materials. Not every lashing material is therefore usable in every application. Make sure that lashing material is suitable before you use it. If in doubt, ask the manufacturer – we are happy to answer your questions!

6. Always use lashing material properly!

Never exceed the permitted lashing capacity quoted on the label (LC), and make sure that the lashing material is always lying entirely flat. Never twist, knot or extend the lashing materials!

Information:

What does "LC" stand for?
Lashing Capacity = Permitted tractive effort.
What does "daN" stand for?

Putting it simply, daN (deka-Newton) refers to the force that a specific lashing material can provide for securing loads. The Newton (named after the physicist Isaac Newton) is the unit with which force is measured. The prefix "deka" refers to 10 of a given unit (e.g. 1 dekagram=10 grams). In the study of load securing, deka-Newton are used because 10 Newton (1 deka-Newton) correspond approximately to the weight of a 1 kg mass.

Lashing methods: How to thoroughly secure your load

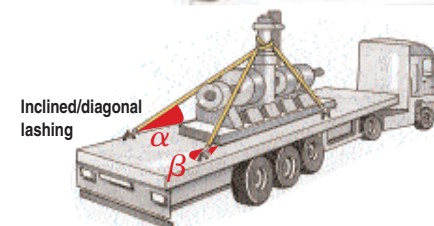
There are a number of ways of lashing your load. Which of these lashing methods is suitable depends on whether you have suitable lashing points and where they are.

First check how strongly the corners are (cardboard boxes, for instance, can suffer indentations) and reinforce the edges if necessary!

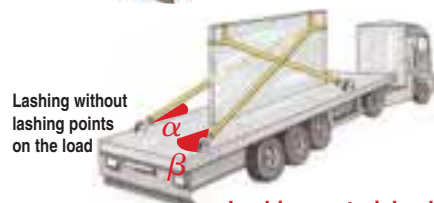
In inclined or diagonal lashing, the load is directly tied to the vehicle. In this case it is the lashing materials that take up the tension caused by acceleration, braking, and turning corners.



Lashing down



Inclined/diagonal lashing



Lashing without lashing points on the load

Lashing material calculation: you can count on it!

How many lashes you need, and how strong they have to be to securely fasten the load depends on three factors:

In lashing down, the load is "pressed" onto the carrying surface. The aim is to increase the friction between the load and the floor to a level such that it will no longer slip.

1. The material of the load and the material of which the carrying surface is made. Metal slides on metal, for instance, more easily than concrete on wood, because the sliding friction coefficient is smaller. The VDI table shows you the figures for individual cases. Guidelines valid across Europe for different pairs of materials are specified there.

Important: The journey is significantly safer if anti-slip mats are used. The use of suitable mats is in fact the only way to achieve the value of 0.6, and we offer you these mats as an indispensable accessory (see page 16).

2. The weight of the load. A steel beam may indeed slip as easily as a cardboard box – but much more force is needed to hold it in place.

3. The angle of the lashes that hold the load. In lashing down, you must here consider the angle α (alpha). For inclined and diagonal lashing, you must measure two angles: angle α (alpha) and β (beta).

You can find the angle with the aid of an angle gauge. Or you can place our lashing calculator against it. When you know these three values, you can calculate how much force is needed to secure the load by means of a mathematical formula. This tells you how many lashes with what lashing capacity (daN) you need to use. Or you can simply make use of our service department!

Threefold simplicity: our service for you!

As a practical aid, we offer you three ways of avoiding these tiresome calculations!

1. You can look in our lashing capacity tables. There you will see what you need without needing to do much calculation.

2. You can look in the internet. Enter your values at www.zurmittelberechnung.de, and learn with one click what lashing materials, and how many, are needed in an individual case.

3. You ask us for our new lashing material slide rule, the ZMR. It shows you with a few movements what you need, and when! You will find it on page 16.

Important: All lashing materials must be equally tensioned when lashing down, otherwise the load can be too strong on one side! When performing inclined lashing, the load can be lashed both longitudinally and cross-wise, but the lashing materials must again here be evenly tightened. We recommend the use of a tension measuring unit to check this. This allows you to see how far a lash has been tightened.

You'll find the tension measuring unit on page 16.



Bundling

Step-by-step safety: use our checklist

This checklist shows you once again how you best proceed with lashing:

1. Where are the lashing (fastening) points?

2. What sliding friction coefficient applies to the load and the supporting surface?

3. What does the load weigh?

4. How large is the lashing angle?

5. Is the load's centre of gravity correctly located? In other words, is it as low as possible and halfway between the front and back?

6. Has sufficient edge protection been provided?

7. Can the lashing material withstand the temperatures and chemical exposure?

8. Are the lashes evenly tensioned?

Tip:

If the vehicle does not have any lashing points it is also possible to pass a one-piece strap under the vehicle. The same method can also be used to bundle loose items such as pipes or slaps. But do not forget that such bundles also need to be fixed by lashing!

Coefficient of sliding friction for various pairs of materials

| | dry | wet | greasy |
|---------------|-----------|------------|----------|
| Anti-slip mat | 0.60 | 0.60 | |
| Wood/wood | 0.20-0.50 | 0.20-0.250 | 0.5-0.15 |
| Metal/wood | 0.20-0.50 | 0.20-0.250 | 0.2-0.10 |
| Metal/metal | 0.10-0.25 | 0.10-0.200 | 0.1-0.10 |
| Concrete/wood | 0.30-0.60 | 0.30-0.500 | 10-0.20 |