

Leaflet on load securing

- **DIN EN 12195 Load securing during transport (aids)**
- **DIN EN 12640 Load securing during transport (means of transport)**
- **DIN EN 12642 Load securing during transport (means of transport)**

1. General

The term load securing is used to describe the securing of cargo, for example in road traffic, against the physical forces occurring during transport. Insufficient or incorrectly applied load securing as well as missing load securing often leads to a load shift and can therefore become a dangerous situation for people and the environment. Different loads must be secured with individually adapted load securing measures.

When transporting goods, damage to load being transported as well as hazards to other road users, vehicles and traffic routes must be avoided.

2. Legal regulations

The load must be secured in such a way that it does not endanger or bother anyone and cannot fall down. (Art. 30 para. 2 Road Traffic Act)

The driver must ensure that he is not handicapped by the load or in any other way (Art. 31 para. 3 Road Traffic Act).

Components, tools or pieces of cargo which could become dangerous in the event of collision, due to spikes, cuts or edges, must be fitted with protective devices. (Art. 58 para. 1 Ordinance on the Rules of Transport)

3. Load securing aids

- Lashing straps
- Edge protection material
- Anti-slip mats
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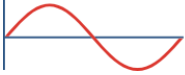
In the event of defective or worn tools on the side of the carrier, correct tools can be handed over by MTE, but these will be charged to the carrier.

In this context, a MTE transport request must contain the following text in the future:

- **Important!** Please comply with the requirements of DIN EN 12642. We reserve the right to check the load securing of the goods collected from us. If your load securing material is faulty or defective, we can provide you with an adequate replacement against invoice. Follow-up costs for delayed deliveries due to non-compliance with these or other legal regulations (e.g. SVG, VRV) can be charged to you.

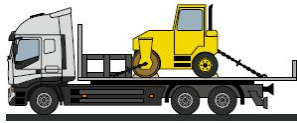
4. Load securing procedure

- Form-fit load securing [4.1]
- Tie-down lashing [4.2]
- Direct lashing [4.3]
- Combined load securing [4.4]

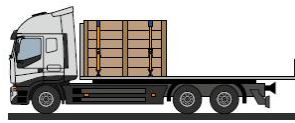


4.1 Form-fit load securing

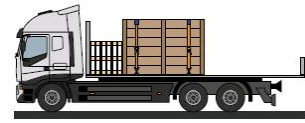
Form-fit load securing means that all parts of the load are stowed without gaps on all sides.



Wedges and other constructions



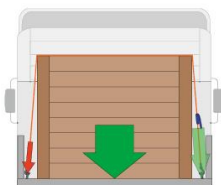
Form fit to the front wall_01



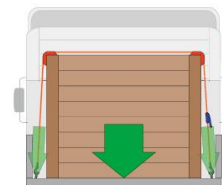
Form fit to the front wall_02

4.2 Tie-down lashing

The basic principle of tie-down lashing is by applying an additional tie-down lashing force downwards, the friction force is increased until the required securing force is achieved.

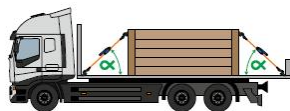


Effective force without edge gliders



Effective force with edge glider

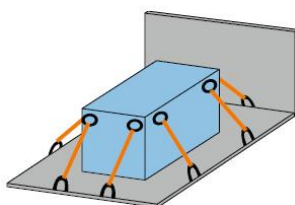
Effective pre tensioning force of the lashing means as a function of the angle α



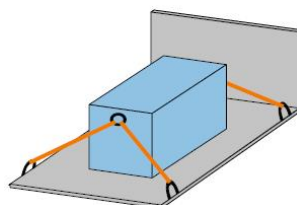
Angle α	Effective pre tensioning force
90°	100%
80°	98%
70°	94%
60°	87%
50°	77%
40°	64%
30°	50%
20°	34%
10°	17%

4.3 Direct lashing

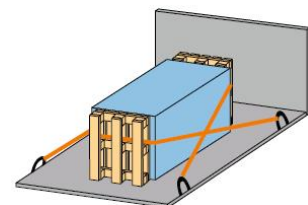
In direct lashing, the forces acting on the load are absorbed directly by the lashing means. Depending on the material combination, the frictional force between the load and the loading area takes on a greater or lesser proportion of the total applied securing forces.



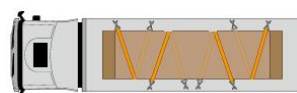
Slant lashing



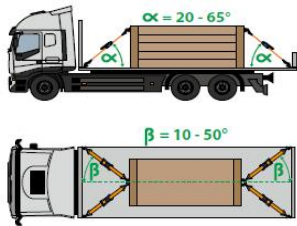
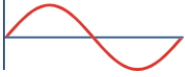
Diagonal lashing



Head sling lashing



Strapping lashing

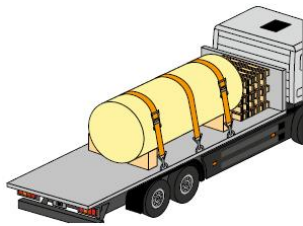


Forces as a function of angle α and β

		Angle β			
		10°	30°	40°	50°
Angle α	20°	93%	81%	72%	60%
	30°	85%	75%	66%	56%
	45°	70%	61%	54%	45%
	65°	42%	37%	32%	27%

4.4 Combined load securing

With combined load securing, the various lashing methods are combined with each other.



Formfitting with tie-down lashing



Direct lashing with tie-down lashing