Coupling selection / calculation

Choice of coupling

Tractor   Bearing type

1.   Flange bearing

2.1   Lift bearing

2.2   Insert pin bearing

1. Hole pattern at the rear of the tractor:
Coupling with flange bearing and the corresponding hole pattern (see table).

2. Coupling holder on the tractor

2.1 Coupling with lift bearing

2.2 Coupling with insert pin bearing

Calculation

| **T** | **1. Tractor weight** | **In the absence of the D-value:** |

The admissible total vehicle combination weight (currently 40 t) minus the admissible total weight of tractor is the towed load..

| **S** | **2. Vertical load** | **Static vertical load** |

- Vertical load from the central axle trailer at the coupling point.
- The maximum possible static vertical load depends on the size of the coupling and amounts to 10 % of the total weight of the trailer or 1000 kg (which ever is less). Higher values are possible.
- The static vertical load should be at least 4% of the trailer weight in order to avoid a damaging negative vertical load.
- The level of the vertical load also depends on the speed.
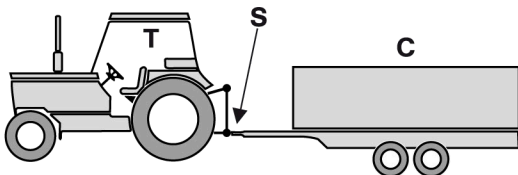
Central axle trailer (C):
Use admissible in principle:
- Size of the central axle trailer depends on the characteristics of the drawbar eye and the tractor unit.
- See table for restrictions
- For speeds >40 km/h the maximum vertical load is 2 t for all coupling devices (EU regulations)

| **D** | **3. D-value** | **D-value** (not in all couplings) |

Theoretical horizontal force between towing vehicle and trailer, comparative mathematical value of forces between two moving masses.

The D-value can only be calculated from the admissible total weight of **both** masses (towing vehicle **and** trailer).

Calculation of the D-value in (kN):

$$D = g \cdot \frac{T \cdot R}{T + R}$$

T: total weight of the towing vehicle in t
R: total weight of the turntable trailer in t
g: gravitational acceleration (9,81 m/s^2)

The calculated D-value can be **equal to or less** than the D-value of the coupling (type plate) or the weakest link in the overall rig.

Where use of the coupling is permitted for the trailer:

$$D = g \cdot \frac{R_1 \cdot R_2}{R_1 + R_2}$$

R_1: total weight of the trailer on which the coupling is mounted in t;
$R_1 \geqq R_2$