Calculation of tractor load limit

Connection of machines to the front or rear hydraulic arms must not exceed the allowed total load of the tractor, individual axles and tractor tyres. Therefore make sure before buying the aggregation that these assumptions are fulfilled using the following calculation:

The following data must be known for the calculation:

- \( T_L \) (kg) - instantaneous mass
- \( T_v \) (kg) - instantaneous front axle load
- \( T_H \) (kg) - instantaneous rear axle load
- \( G_H \) (kg) - total machine weight suspended in the rear / rear load
- \( G_V \) (kg) - total machine weight suspended in the front / front load
- \( a \) (m) - distance between the gravity centre of the front carried machine / front load and load through the centre of the front axle
- \( b \) (m) - tractor wheelbase
- \( c \) (m) - distance between the centre of the rear axle and the centre of fixing holes of lower hydraulic arms
- \( d \) (m) - distance between the centre of fixing holes of lower hydraulic arms and the gravity centre of the machine suspended in the rear / rear load

1. see instructions for use of the tractor
2. see instructions for use of the machine
3. machine measurement
Rear carried machine or front and rear carried combination

1. Calculation of the minimum front axle load $G_{V\min}$
The calculated value of the minimum front axle load should be recorded in the table.

$$G_{V\min} = \frac{G_n \cdot (c+d) - T_r \cdot b + 0.2 \cdot T_r \cdot b}{a + b}$$

Front carried machine

2. Calculation of the minimum rear axle load $G_{H\min}$
The calculated value of the minimum rear axle load should be recorded in the table.

$$G_{H\min} = \frac{G_n \cdot a - T_r \cdot b + 0.45 \cdot T_r \cdot b}{b + c + d}$$

3. Calculation of the real front axle load $T_{V\text{tat}}$
If the necessary front axle load cannot be reached with the front attached machine ($G_v$), the weight of the front carried machine must be increased to the minimum allowed load.

The real values and allowed values specified in the instructions for use of the tractor designed for the front axle should be recorded in the table.

$$T_{V\text{tat}} = \frac{G_n \cdot (a + b) + T_r \cdot b - G_n \cdot (c + d)}{b}$$

4. Calculation of the real total load $G_{\text{tat}}$
If the necessary rear axle load cannot be reached with the rear attached machine ($G_h$), the weight of the rear carried machine must be increased to the minimum allowed load.

The real values and allowed values specified in the instructions for use of the tractor designed for the total load should be recorded in the table.

$$G_{\text{tat}} = G_v + T_{V\text{tat}} + G_h$$

5. Calculation of the real rear axle load $T_{h\text{tat}}$
The real values and allowed values specified in the instructions for use of the tractor valid for the rear axle load should be recorded in the table.

$$T_{h\text{tat}} = G_{\text{tat}} - T_{V\text{tat}}$$

6. Load-bearing capacity of tyres
The calculation of the double value (two tyres) of the allowed tyre load (see, e.g., documents for tyre manufacturers) should be recorded in the table.
Allowed load of the tractor and axles

<table>
<thead>
<tr>
<th>Tractor model</th>
<th>Proxima CL (40 km/h)</th>
<th>Proxima GP (40 km/h)</th>
<th>Proxima HS (40 km/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Real value according to the calculation</td>
<td>Allowed value according to the manufacturer</td>
<td>Real value according to the calculation</td>
</tr>
<tr>
<td>Total tractor weight</td>
<td>5,500 kg</td>
<td>6,000 kg</td>
<td>6,000 kg</td>
</tr>
<tr>
<td>Front axle load</td>
<td>2,600 kg</td>
<td>2,600 kg</td>
<td>2,600 kg</td>
</tr>
<tr>
<td>Rear axle load</td>
<td>5,000 kg</td>
<td>5,000 kg</td>
<td>5,000 kg</td>
</tr>
</tbody>
</table>

The real value according to the calculation must be lower or equal to the allowed value specified by the tractor manufacturer.

The driveability of the front axle must be preserved under all load conditions, i.e., min. 20% of the real tractor weight must lie on the front axle.

During aggregation with side moving machines, side ditch trimmers and similar types of aggregation, there is an unequal distribution of the load on the right and on the left side of the tractor axle. It is necessary to ensure that the load on one side of the axle does not exceed ½ of the allowed load of the rear axle of the tractor.

\[ G_{H\text{ max}} \] - allowed load of the rear axle