

Wheel and Caster Guide

Load Capacity / Wheel and Caster Types

Load capacity

In order to determine the required load capacity of a wheel or caster, the dead weight of the transport unit, the maximum additional load and the number of wheels and casters to be used must be known. By using four or more wheels or casters, the load bearing of the individual wheels or casters can vary. The required load capacity can be defined as follows:

$$T = \frac{E+Z}{n} \times S$$

T = Required load capacity of the wheel or caster
 E = Dead weight of the transport unit
 Z = Maximum additional load
 n = Number of wheels or casters used
 S = Safety factor

The safety factor S reflects the deviation from the standard application conditions (even floor, walking speed, load must act equally on all wheels or casters, straight travelling, ambient temperatures between +60° F and +82° F). The safety factor is influenced by the speed and the ratio between wheel Ø and height of the obstacles. A distinction is drawn between four categories:

- Indoor manual transport (height of the obstacles < 5 % of the wheel Ø): Safety factor: 1.0 to 1.5
- Outdoor manual transport (height of the obstacles > 5 % of the wheel Ø): Safety factor: 1.5 to 2.2
- Indoor power driven transport (height of the obstacles < 5 % of the wheel Ø): Safety factor: 1.4 to 2.0
- Outdoor power driven transport: Safety factor: 2.0 to 3.0

Safety factors do not consider abrasion of the tread.

Speeds higher than 2.5 mph (4 km/h) with a reduced load capacity are possible for wheels and casters with ball bearings fitted.

If a wheel or a rigid caster is mainly exposed to static loads, a load capacity increase up to 25 % can be assumed. With long endurance times under high loads, the danger of tread flattening must be considered.

The load capacity is stated in kg or lbs. All load capacities given in lbs are in accordance to the ANSI ICWM:2012 norm. All load capacities given in kg are in accordance to DIN EN 12530, 12532 and 12533.



Blickle light duty wheels and casters

Light duty wheels and casters and compact casters are mainly used with appliances and equipment for internal applications. They are designed for travelling speeds of up to 1.9 mph (3 km/h). The maximum load capacity is 615 lbs (280 kg) for light duty wheels and casters and 3,850 lbs (1,750 kg) for compact casters. They fulfil all requirements for high maneuverability of the respective appliances as well as for maximum smooth rolling performance at low rolling resistances. Typical application areas are medical equipment, display bases, equipment for large-scale catering establishments, etc.

Blickle light duty wheels and casters and compact casters are tested in regards of load capacity on a rotating bench

in North America in acc. to ANSI ICWM:2012:

The most significant test characteristics are as follows:

- Speed: 2.0 mph minimum
- Obstacle height is 3 % of the wheel diameter to a maximum height of 3/16"
- The minimum run time of each cycle is 2 min
- Test duration: Minimum run distance is 1.5 miles

in Europe in acc. to DIN EN 12530:

The most significant test characteristics are as follows:

- Speed: 2.0 mph (3 km/h)
- Temperature: +60° F to +82° F
- Hard, horizontal surface with obstacles of 3 % of the wheel diameter
- Test duration: Number of obstacles crossed corresponds ten times the wheel diameter (in mm)
- Break time: Max. 3 min after each 3 min running time



Blickle wheels and casters for transport equipment

Wheels and casters for transport equipment are used in the industrial sector, both indoor and outdoor. They are designed for travelling speeds of up to 2.5 mph (4 km/h). The maximum load capacities amount to 1,980 lbs (980 kg). Transport equipment wheels and casters are insensitive to environmental influences, largely maintenance-free and run trouble-free over a long period of time. Typical application areas cover many types of equipment including pallets, working platforms, and waste containers.

Blickle wheels and casters for transport equipment are tested in regards of load capacity on a rotating bench

in North America in acc. to ANSI ICWM:2012:

The most significant test characteristics are as follows:

- Speed: 2.0 mph minimum
- Obstacle is 2" wide steel with a chamfer 45° by one-half the obstacle height on the running edges
- The obstacle height is 1/16" (wheel diameter 0"-3"), 1/8" (wheel diameter > 3"-12"), and 3/16" (wheel diameter > 12")
- The minimum run time of each cycle is 2 min
- Test duration for: Minimum run distance is 4 miles. Number of obstacles crossed for top plate casters is 5,000 (wheel diameter 0"-12") and 7,500 (wheel diameter > 12")

in Europe in acc. to DIN EN 12532:

The most significant test characteristics are as follows:

- Speed: 2.5 mph (4 km/h)
- Temperature: +60° F to +82° F
- Hard, horizontal surface with obstacles of the following heights: 5 % of the wheel diameter for wheels with soft tread (hardness < 90° shore A) 2.5 % of the wheel diameter for wheels with hard tread (hardness ≥ 90° shore A)
- Test duration: 15,000 x wheel circumference (in mm), at least 500 obstacles crossed
- Break time: Max. 1 min after each 3 min running time



Blickle heavy duty wheels and casters

Heavy duty wheels and casters are used in application areas with heavy loads and/or higher travelling speeds. They have a much sturdier design. To move extremely heavy loads, two-wheel casters are also used (twin wheel casters). For vibration free transport spring-loaded casters are particularly suitable. Typical application areas are storage and industrial trucks, assembly and transport systems, etc.

Blickle heavy duty wheels and casters are tested in regards of load capacity on a rotating bench:

in North America in acc. to ANSI ICWM:2012:

The most significant test characteristics are as follows:

- Speed: 2.0 mph minimum
- Obstacle is 2" wide steel with a chamfer 45° by one-half the obstacle height on the running edges
- The obstacle height is 1/16" (wheel diameter 0"-3"), 1/8" (wheel diameter > 3"-12"), and 3/16" (wheel diameter > 12")
- The minimum run time of each cycle is 2 min
- Test duration for: Minimum run distance is 4 miles. Number of obstacles crossed for top plate casters is 5,000 (wheel diameter 0"-12") and 7,500 (wheel diameter > 12")

in Europe at 2.5 mph (4 km/h) in acc. to DIN EN 12532 and at higher speeds to 12533:

The most significant test characteristics in acc. to DIN EN 12532/12533 are as follows:

- DIN EN 12532: Speed: 2.5 mph (4 km/h)
- DIN EN 12533: Speed: 3.7 mph (6 km/h), 6.2 mph (10 km/h), 10 mph (16 km/h), 15.5 mph (25 km/h) (norm: max. 10 mph (16 km/h))
- Temperature: +60° F to +82° F
- Hard, horizontal surface with obstacles of the following height: 5 % of the wheel diameter (in mm) for wheels with soft tread (hardness < 90° shore A) 2.5 % of the wheel diameter (in mm) for wheels with hard tread (hardness ≥ 90° shore A)
- DIN EN 12532: Test duration: 15,000 x wheel circumference (in mm), at least 500 obstacles crossed
- DIN EN 12533: Test duration: Number of obstacles crossed corresponds five times the wheel diameter (in mm)
- Break time: Max. 1 min after each 3 min running time