

Wheels and castors guide

Blickle wheel series info box

Tread and tyre hardness. Smooth operation and floor preservation.

Tread and tyre hardness
 65 Shore A

Smooth operation and floor preservation
 excellent

Rolling resistance
 very good

Wear resistance
 good

To make it easier for you to choose the correct product, we provide a Blickle info box for each wheel series on the relevant page. This provides an overview of the tread and tyre hardness of a wheel, its smooth operation and floor preservation, rolling resistance and wear resistance.

Tread and tyre hardness is rated on a scale from very soft to very hard, while the other categories are rated from satisfactory to outstanding.

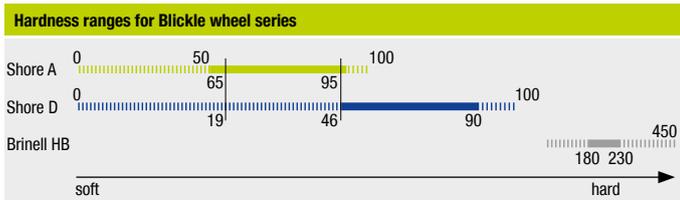
Blickle wheel series info box

Tread and tyre hardness

The tread & tyre hardness is indicated in the info box in images on the product pages. The further the marking is to the right, the harder the tread. Hardness for

There is no linear correlation between the various hardness testing methods. The values in the graphic were determined empirically and are provided for reference purposes.

- elastomers and polyurethanes is provided in Shore A,
- Shore D for solid plastics and
- using the Brinell scale for metals.



Material	Tread and tyre hardness	
Pneumatic tyre / soft rubber		50–60 Shore A
Elastic solid rubber		65 Shore A
Super-elastic solid rubber		70 Shore A
Standard solid rubber		80 Shore A
Thermoplastic polyurethane (TPU), soft		80 Shore A
Thermoplastic rubber-elastomer (TPE)		85 Shore A
Polyurethane 75 Shore A		75 Shore A
Polyurethane 92 Shore A		92 Shore A
Thermoplastic polyurethane (TPU), hard		92–98 Shore A
Polypropylene		60 Shore D
Nylon		70 Shore D
Cast nylon		80 Shore D
Cast iron / steel		180–230 HB

Smooth operation and floor preservation

The higher the score in this category, the quieter the wheel is and the easier it is on surfaces.

Floor preservation

Hard treads put more strain on a floor than softer treads. A tread with five points in the smooth operation and floor preservation category has exceptionally good floor preservation qualities.

Floor surface preservation is measured on the basis of average floor pressure. Reference values for each tread material are provided to the right.

Smooth operation

In principle, vehicles tend to be quieter when they have large wheels with soft thick treads. Hard treads result in higher levels of noise than soft treads. A high score in the smooth operation and floor preservation category would therefore lead to expect low levels of vibration and noise emission when transporting goods.

Hard wheels can also be used with low levels of noise and a high degree of operational comfort when transporting light loads on a soft surface (e.g. carpet).

Calculating average floor pressure

The average floor pressure is calculated by dividing the radial force [N] by the wheel contact surface [mm²].

Material	Smooth operation / floor preservation	Average floor pressure
Pneumatic tyre / soft rubber		0.8 N/mm ²
Elastic solid rubber		1.8 N/mm ²
Super-elastic solid rubber		1.5 N/mm ²
Standard solid rubber		3.5 N/mm ²
Thermoplastic polyurethane (TPU), soft		4.0 N/mm ²
Thermoplastic rubber-elastomer (TPE)		4.5 N/mm ²
Polyurethane 75 Shore A		3.5 N/mm ²
Polyurethane 92 Shore A		8.0 N/mm ²
Thermoplastic polyurethane (TPU), hard		11.0 N/mm ²
Polypropylene / nylon		40.0 N/mm ²
Cast nylon		60.0 N/mm ²
Cast iron / steel		>350 N/mm ²

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Starting, rolling and swivel resistance. Wear resistance.

Starting, rolling and swivel resistance

Starting resistance reflects the amount of force required to get the wheel in motion when it is at a standstill.

Rolling resistance refers to the amount of force required to keep the wheel moving in a uniform manner.

Starting and rolling resistance are affected by the following factors:

- wheel diameter
- tread geometry
- tread & tyre hardness
- rebound resilience of the tread
- wheel bearing
- surface

Rolling resistance occurs as a result of the constant compression and decompression of the tread while the wheel is rolling (hysteresis).

Rolling resistance is measured using a test bench. Measurements are taken under ideal conditions:

- level, smooth, steel surface free of dirt and obstacles
- speed: 4 km/h
- temperature: +20 °C
- load: ¾ of max. load capacity

These standardised conditions make it possible to compare the rolling resistances of different wheel series.

Different application conditions (surface quality, temperature, speed, etc.) must be taken into consideration when designing the running gear and can have a significant impact on rolling resistance.

Swivel resistance is the resistance required to align swivel castors in the direction of travel.

Swivel resistance is affected by the following factors:

1. Contact area of the wheel:
The contact area of the wheel rotates around its centre when the swivel castor turns. This causes friction. The resistance is dependent on the interaction between the surface and the wheel tread, in addition to the size of the contact area.
2. Resistance of the swivel head:
The structure and quality of the swivel head have an impact on its swivel resistance.
3. Offset of the swivel castor:
The swivel resistance of the swivel castor is influenced by the distance between the centre of the swivel head and the centre of the contact area.

Material	Rolling resistance	
Pneumatic tyre / soft rubber		good
Elastic solid rubber		very good
Super-elastic solid rubber		good
Standard solid rubber		satisfactory
Thermoplastic polyurethane (TPU), soft		very good
Thermoplastic rubber-elastomer (TPE)		very good
Polyurethane 75 Shore A (Softthane®)		very good
Polyurethane 75 Shore A (Besthane® Soft)		excellent
Polyurethane 92 Shore A (Extrathane®)		very good
Polyurethane 92 Shore A (Besthane®)		excellent
Thermoplastic polyurethane (TPU), hard		very good
Polypropylene / nylon		excellent
Cast nylon		excellent
Cast iron / steel		excellent

Wear resistance

The higher the point score in this category, the greater the wear resistance of the wheel.

In addition to other factors, the wear resistance incorporates the resistance to abrasion of elastomers or thermoplastic elastomers in accordance with ISO 4649. The resistance of other tread materials to abrasion was tested in accordance with ISO 4649.

Tread materials are assigned to different abrasion resistance categories in the graphic to the right.

Material	Wear resistance	
Pneumatic tyre / soft rubber		satisfactory
Elastic solid rubber		good
Super-elastic solid rubber		good
Standard solid rubber		adequate
Thermoplastic polyurethane (TPU), soft		good
Thermoplastic rubber-elastomer (TPE)		satisfactory
Polyurethane 75 Shore A		very good
Polyurethane 92 Shore A		excellent
Thermoplastic polyurethane (TPU), hard		very good
Polypropylene		satisfactory
Nylon		good
Cast nylon		very good
Cast iron / steel		excellent