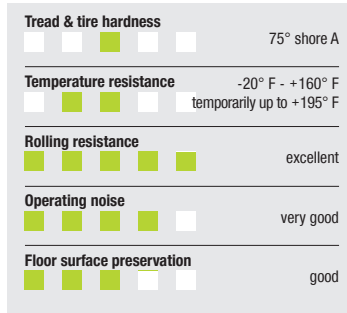


## Tread & Tire Hardness. Temperature Resistance. Starting and Rolling Resistance. Operating Noise. Floor Surface Preservation. Corrosion Resistance.



Infobox Blicke wheel series

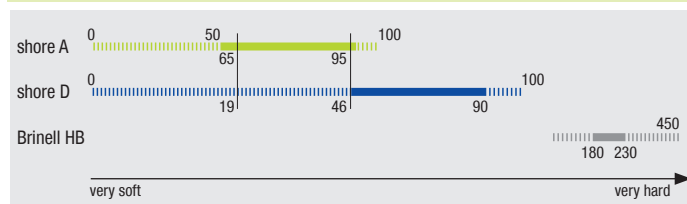
### Floor surface preservation

The situation is similar with floor surface preservation. A hard tread affects the surface more than a soft tread. Therefore a tread with five points in the category floor surface preservation indicates an exceptionally floor-preserving behavior.

Characterizing for floor surface preservation is the average floor pressure. For the different tread materials the following reference values can be used:

Pneumatic tires	~ 120 psi
Soft rubber	~ 120 psi
Super-elastic solid rubber	~ 220 psi
Elastic solid rubber	~ 260 psi
Solid rubber/polyurethane (approx. 75° shore A)	~ 510 psi
Polyurethane (approx. 92° shore A)	~ 1,160 psi
Thermoplastic polyurethane	~ 1,600 psi
Polypropylene/nylon	~ 5,800 psi
Cast nylon	~ 9,000 psi
Cast iron	~ 51,000 psi
Steel	~ 72,000 psi

### Hardness range for Blicke wheel series



Between the different hardness test methods there are no linear correlations. The presented values only serve as reference values and were determined empirically.

### Tread & tire hardness

On the product pages the tread & tire hardness is illustrated by an Infobox with a summary of the specification. The further to the right the mark is situated the harder the tread or tire. Therefore, the illustration allows a fast estimation of the tread & tire hardness. The specification of the tread & tire hardness allows a comparison between the different wheel series.

The specification of the hardness is made for

- elastomers and polyurethanes rated in shore A,
- hard synthetics rated in shore D and
- metals rated in Brinell hardness (HB)

### Temperature resistance

The temperature resistance is illustrated by an Infobox with a summary of the specification.

Marks on the left indicate that the wheels are suitable in particularly cold temperatures, marks on the right in particularly high temperatures. Besides the illustration the application ranges are indicated by concrete values. In the specified temperature application range the wheel characteristics such as tread & tire hardness, load capacity, starting and rolling resistance can change.

### Starting and rolling resistance

The starting resistance is the force which has to be overcome to accelerate a wheel from a passive state to translatory motion.

The force which is necessary to set a wheel in uniform motion is called rolling resistance. The starting and rolling resistance depend on the following factors:

- Wheel diameter
- Tread
- Tread hardness
- Resilience of the tread
- Wheel bearing
- Floor

The rolling resistance is caused by a permanent downward and upward deflection of the tread during the rolling motion (hysteresis).

The measurement of the rolling resistance is carried out on a test bench. The measured values are evaluated under ideal conditions:

- Even, free of dirt steel surface without obstacles
- Speed: 2.5 mph (4 km/h)
- Temperature: +68° F (+20° C)
- Load: 2/3 of the max. load capacity

Under these standardized constraints the rolling resistances of the different wheel series can be compared with each other.

Deviating conditions (floor condition, temperature, speed, etc.) must be considered when defining the equipment frame and can influence the rolling resistance values significantly.

The swivel resistance depends on the following factors:

- Tread
- Tread hardness
- Contact surface
- Offset
- Floor



Stainless steels have a well-known good corrosion behavior. The primary used material (1.4301/AISI 304) is a high-alloyed chromium-nickel steel.

Synthetics are characterized by a very high corrosion resistance. Mainly nylon and polypropylene materials are used.

### Operating noise

The more points shown on the scale, the less vibration and lower noise emission during the transport of the goods will be noticed.

The basic principle is: The larger the wheel and softer as well as thicker the tread, the smoother a vehicle can be moved. This means that a soft tread associates with lower, and a harder tread associates with higher noise emission. With low loads and a soft surface (i.e. carpet), hard wheels with low noise emission and high operational comfort can be used.

### Corrosion resistance

Steel surfaces of wheel and caster components are zinc-plated or provided with a protective lacquer coating.

The salt spray test in acc. to DIN EN ISO 9227 is one of the most common test methods used to check the corrosion protection of different substances. A salted solution is sprayed on the components, producing a corrosive attack and the time is measured (in hours) until white and red rust appears.

Surface protection	White rust	Red rust
Zinc-plated, blue	~48 h	~96 h
Zinc-plated, yellow	~144 h	~240 h
Zinc-nickel	~720 h	~720 h
Powder coating		~192 h

In case of small damages zinc-plated surfaces have the advantage that zinc starts to corrode before steel due to electrochemical processes. Therefore the bright spot does not rust. The zinc-plated components undergo an additional chemical treatment which is called passivation. A distinction is made between blue and yellow passivation as the yellow passivation provides a better protection against corrosion than blue passivation.

All of our products are in compliance with **RoHS** (directive 2011/65/EU), i.e. they are Cr6-free. Advantages of zinc-nickel plating, which can be additionally passivated and sealed, are high temperature resistance and prevention of white rust. Lacquered components lose their corrosion protection when the lacquer coating is damaged. The rust also damages intact layers which are located directly next to the affected area.

The cathodic dip painting is an electrochemical process which is used to coat complicated structures equally in a dipping bath. High temperature resistance and good surface quality are two benefits of this process.

With electrostatic powder coating the powder used for the coating is sprayed on the component and fired afterwards.