Environmental factors
Corrosion resistance. Temperature resistance. Electrical conductivity. Chemical resistance.

Corrosion resistance

The surfaces of wheel and castor components have different corrosion resistance levels depending on the surface coating.

Salt spray testing in accordance with DIN EN ISO 9227 is one of the most common test procedures for assessing the corrosion protection of different materials. The parts are corroded using a sprayed salt solution, and the amount of time until the formation of white rust and red rust is measured (in hours).

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

The advantage of zinc-plated components is that they retain their corrosion protection despite minor damage. Zinc-plated parts are put through an additional chemical treatment called passivation. Yellow passivation provides greater protection against corrosion than blue passivation.
A zinc-nickel coating prevents the formation of white rust and can resist high temperatures. It can also be passivated and sealed.
Electrostatic powder coating involves spraying the powder used for the coating onto the component and then heating it.

Corrosion-resistant stainless steel is well known for its corrosion resistance. The most commonly used material (1.4301 / AISI 304) is a high-alloyed chromium-nickel steel.
Stainless steel ball bearings are made from material 1.4034 / AISI 420.

Temperature resistance

The functionality of a wheel or castor is also dependent on temperature-related factors.
The relevant temperature for the tread is a combination of the ambient temperature and the heat generated by friction. The amount of friction depends on the material, shape and load of the tread, as well as the length and surface properties of the distance travelled.

Friction resistance increases slightly at low temperatures. Furthermore, factors like cold and heat can reduce the load capacity and stability of plastics.
The load capacity and service life of treads decrease considerably with higher temperatures. High static loads and high temperatures also increase the risk of the wheel flattening. For this reason, Blickle developed special treads and wheel materials that can be used at high temperatures. For more information, please refer to heat-resistant wheels and castors on page 440–470.
The rigidity and hardness of many elastomer treads (particularly rubber and many polyurethane elastomers) increase significantly at low temperatures, while losing a significant amount of their elasticity. However, Blickle does provide special polyurethane elastomers that remain elastic and flexible in temperatures down to -30 °C.

Electrical conductivity

The electrical conductivity of wheels and castors provides protection against electrostatic discharges caused by transport equipment or the transported goods.

A wheel or castor is considered electrically conductive if its ohmic resistance does not exceed 10^4 Ω (product code suffix: -EL or -ELS).
A wheel or castor is considered antistatic if its ohmic resistance is between 10^5 and 10^7 Ω (product code suffix: -AS).

The coating can be removed from coated components like rims or wheel centres at the point where the assembly is fixed to the transport equipment to ensure that they are conductive. Conductivity should be tested by the operator at regular intervals as it can be impacted by dirt on the tread or other environmental factors.

Chemical resistance

Special attention must be given to the chemical resistance of a wheel or castor if they are likely to come into contact with aggressive substances. The table to the right provides reference values that you can use to compare the chemical resistance of different materials to chemical substances.
Please note that chemical resistance depends not only on the nature of the aggressive substance but also on how concentrated it is, the duration of contact and other conditions like temperature and air humidity.

Mixtures of different chemicals can have completely different effects to those listed in the table. The information provided is by no means legally binding. Please contact us if you are uncertain about anything or have any questions.

Wheels and castors guide

Environmental factors
Chemical resistance

+ resistant
0 resistant under certain conditions
x not resistant
L pitting, stress cracks
- no information

	Concentration in %	Rubber	TPE	Nylon	Polypropylene (PP Copo)	Polyurethane (ester) TPU / Extrathane / Softhane / Vulkollan	Polyurethane (ether) Besthane / Besthane Soft	Stainless steel (V2A, 1.4301, AISI 304)
1-Propanol		+	0	+	+	0	0	+
Acetaldehyde	40	0	+	0	+	0	+	0(L)
Acetic acid (ethanoic acid)	30	x	0	x	x	x	x	+
Acetone		+	0	+	+	0	x	+
Acrylic acid > 30 °C		-	+	x	+	x	x	-
Alkyl alcohol		+	+	0	+	0	0	+
Alkylbenzenes		x	0	+	0	-	-	+
Aluminum acetate, aqueous		+	+	+	+	x	0	+
Amines, aliphatic		0	0	+	+	x	x	+
Ammonia, aqueous	20	+	+	+	+	x	x	+
Ammonium carbonate, aqueous		+	+	-	+	x	x	+
Ammonium chloride		+	+	-	+	x	x	0(L)
Ammonium hydroxide, aqueous	10	-	+	-	+	x	x	+
Ammonium nitrate, aqueous		0	+	+	+	0	+	+
Ammonium salts		-	-	-	+	-	-	-
Ammonium sulfate, aqueous		0	+	+	+	+	+	+
Amyl acetate, aqueous		0	+	+	0	x	x	+
Aniline (aminobenzene)		x	0	0	+	x	x	+
Beer		+	+	+	+	+	+	+
Benzine		x	x	+	0	+	+	+
Benzol		x	x	+	x	x	x	+
Bitumen		x	0	+	+	+	+	+
Bleaching lye (sodium hypochlorite)	10	x	+	x	0	x	0	0(L)
Borax (sodium tetraborate)		+	+	+	+	+	+	+
Boric acid, aqueous	10	+	+	0	+	0	+	+
Bromine		x	0	x	x	x	x	x
Butter		x	+	+	+	+	+	+
Calcium salts, aqueous		+	+	x	+	0	0	+
Carbolineum		x	-	+	+	x	x	-
Carbon monoxide, dry		0	+	+	0	x	x	+
Carbon tetrachloride		x	x	+	x	x	x	+
Castor oil		+	+	+	+	+	+	+
Caustic potash, aqueous (potassium hydroxide)		0	+	+	+	0	+	+
Caustic soda (sodium hydroxide)		+	+	+	+	x	x	+
Chlorine, hydrogen chloride		x	0	x	x	x	x	x
Chromic acid, aqueous	10	x	0	0	+	x	0	+
Citric acid, aqueous	10	+	+	+	+	+	+	+
Copper chloride, aqueous		+	+	0	+	0	+	x
Copper salts, aqueous	10	-	+	x	+	0	+	-
Cottonseed oil		x	x	+	+	+	+	+
Cresols		x	x	x	0	x	x	+
Crude oil		x	x	+	+	+	+	+
Cyclohexanol (Hexalin, Anol)		0	0	+	0	0	x	+
Cyclohexanone		0	0	+	0	0	x	+
Descaler, aqueous	10	-	-	+	+	0	+	+
Detergent solution, 80°C		+	+	+	0	x	0	+
Dichlorobenzene		x	x	+	0	x	x	+
Dichloroethene		x	0	-	-	x	x	-
Diethylene glycol		+	+	0	+	0	0	+
Dimethyl ether		0	0	+	x	+	+	+
Dimethylaniline		x	0	0	x	x	x	+
Dimethylformamide		0	+	+	+	x	0	+
Ethanol		+	0	0	+	+	+	+
Ether (Diethylether)		x	0	+	x	+	+	+
Ethyl acetate (acidic ether)		0	0	+	0	x	x	0
Ethylene (ethene)		x	+	0	+	+	+	x
Fatty acids (oleic acids)		x	0	+	+	0	+	+
Flue gas		0	-	-	-	x	x	+
Formaldehyde (methanal)	30	+	+	+	+	0	0	+
Formamide, pure (methanamide)		+	0	+	+	x	x	+
Formic acid	10	0	+	x	+	x	x	+
Furfural (furfurol)		x	x	0	x	x	x	+

+ resistant
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x not resistant
L pitting, stress cracks
- no information

	Concentration in %	Rubber	TPE	Nylon	Polypropylene (PP Copo)	Polyurethane (ester) TPU / Extrathane / Softhane / Vulkollan	Polyurethane (ether) Besthane / Besthane Soft	Stainless steel (V2A, 1.4301, AISI 304)
Glycol (ethylene glycol)		+	+	0	+	0	0	+
Hexan		x	0	+	0	+	+	+
Hydraulic fluid		x	x	+	0	x	x	+
Hydrochloric acid, aqueous	30	0	+	x	+	x	0	x
Iodine tincture		+	+	x	+	x	x	0(L)
Iron chloride, aqueous	10	0	+	x	+	0	+	x
Iron sulfate (iron vitriol)	10	+	+	0	+	0	+	+
Isopropyl chloride		x	0	+	0	x	x	-
Isopropyl ether (diisopropyl ether)		0	0	x	x	+	+	+
Lactic acid		x	+	x	+	x	x	0
Magnesium salts, aqueous	10	+	+	+	+	0	+	0(L)
Malic acid		0	+	+	+	x	0	+
Mercury chloride, aqueous		+	+	x	+	+	+	0(L)
Methyl alcohol (methanol)		0	+	0	+	+	0	+
Methyl ethyl ketone (butanone)		x	0	+	0	x	x	+
Methylene chloride (dichloromethane)		x	x	x	x	x	x	+
Milk		+	+	+	+	0	+	+
Mineral oils		x	x	+	0	+	+	+
Monobromobenzene (bromobenzene)		x	x	+	0	x	x	+
Mortar, cement, chalk		+	+	+	+	0	0	+
Mustard		-	-	+	+	+	+	0(L)
Naphthalene (mineral naphtha)		x	0	+	0	0	0	+
Nickel chloride, aqueous	10	+	+	0	+	0	+	0(L)
Nickel sulfate, aqueous	10	0	+	0	+	0	+	+
Oleic acid (oleinic acid, fatty acid)		x	0	+	+	0	+	+
Oxalic acid, aqueous	10	0	+	0	+	x	x	0
Ozone, atmospheric concentration		x	0	x	0	+	+	-
Palmitic acid (hexadecanoic acid)		x	0	+	0	0	+	+
Phenylbenzene (biphenyl, dibenzol)		x	x	-	-	x	x	+
Phosphoric acid, aqueous	10	0	+	x	+	0	+	+
Plant oils		x	x	+	0	+	+	+
Potassium chloride, aqueous (sylvin)	10	0	+	+	+	+	+	+
Potassium hydroxide, aqueous (caustic potash, potash lye)		0	+	+	+	0	+	+
Potassium sulfate		+	+	+	+	+	+	+
Propane		x	0	+	+	+	+	+
Road salt (solutions)		+	+	+	+	0	+	0(L)
Skydrol		x	x	+	+	x	x	+
Sodium carbonate, aqueous (soda)	10	+	+	+	+	x	x	+
Sodium chloride, aqueous (table salt)	10	0	+	+	+	0	+	0(L)
Sodium hydroxide, aqueous (caustic soda)	10	+	+	+	+	x	x	+
Sodium phosphate, aqueous	10	+	+	+	+	+	+	+
Sodium silicate, aqueous	10	+	+	+	+	x	0	+
Sodium sulfate, aqueous (Glauber salt)	10	0	+	+	+	0	+	+
Sodium sulfide, aqueous	10	0	+	+	+	0	0	+
Sodium thiosulfate, aqueous (antichlor)	10	0	+	+	+	0	+	0(L)
Stearic acid, aqueous		x	+	+	0	x	+	+
Sulfuric acid		0	+	x	+	x	x	+
Tannic acid	10	+	+	+	+	0	+	+
Tartaric acid, aqueous	10	+	+	0	+	0	+	+
Toluene (methylbenzene)		x	x	+	x	x	x	+
Trichloroethylene		x	x	0	0	x	x	+
Turpentine		x	x	+	x	x	x	+
Uric acid, aqueous	10	+	+	+	+	0	-	0(L)
Urine		+	+	+	+	0	+	0(L)
Vaseline		x	0	+	0	+	+	+
Wastewater		-	+	+	+	0	0	-
Water (seawater)		+	+	+	+	0	0	0(L)
Water up to 80°C		0	+	+	0	x	+	+
Water, cold		+	+	+	+	+	+	+
Xylene		x	x	+	x	x	x	+
Zinc chloride, aqueous	10	+	+	0	+	x	x	x