Glysofor ELM KI – Specification

Product properties

Glysofor ELM-KI is a high-performance, low-conductivity heat transfer fluid based on high-purity monoethylene glycol, which has particularly low electrical conductivity and is manufactured using a special production process.

A selected combination of inhibitors provides outstanding corrosion protection for a wide range of metals and alloys commonly found in water circuits.

The inhibition is particularly effective for copper, brass, solder, steel, cast iron, and aluminum, regardless of the alloys present and also regardless of the weighting of the individual metal in the overall system.

Compared to MPG-based product variants, Glysofor ELM-KI is characterized by better overall thermodynamic properties, as it offers comparatively better thermal conductivity, lower viscosity, and better frost resistance.

This results in maximum efficiency, which contributes to higher system efficiency.

The product is used in applications where extremely low electrical conductivity is required. It is resistant to the formation of biofilms, decay, and microbiological decomposition over the long term.

Antifreeze and heat transfer fluid with extremely low electrical conductivity

Base: monoethylene glycol

Operating temperature range: -40 to +150 °C

Microbiologically stable

Biodegradable and environmentally friendly

Available as a concentrate or solution.

Area of application: Induction melting furnaces,
transformer cooling, capacitors,
converter cooling, welding systems, etc.

Glysofor ELM KI can be supplied as a concentrated pure product or as an aqueous solution.

The solutions are produced using ultrapure water with an electrical conductivity of < 0.1 µs/cm.

Glysofor ELM KI optimally prevents frost damage, deposits, sludge formation, and biofilms in water circuits.

Glysofor ELM KI is miscible with water, ethanol, butanol, butyl acetate, and acetone in any ratio.

The product is classified as WGK 1, the lowest water hazard class, both as a concentrate and when diluted with water.
For subsequent adjustment of solutions, we supply high-purity water with an electrical conductivity of < 0.1 µs/cm.

Electrical characteristics

Specific electrical resistance at 20 °C (M ohm cm)	min. 10
Specific electrical conductivity at 20 °C (µs/cm)	max. 0.1
Dielectric constant	approx. 40

Areas of application

Aqueous solutions of Glysofor ELM KI are used in water circuits where extremely low electrical conductivities are required.

Typical areas of application:

- Induction melting furnaces
- Transformer cooling
- X-ray tubes
- Capacitors
- Converter cooling
- Inverter cooling
- Circuit breakers and inverters
- Welding systems
- Manufacture of electrolytes
- High-voltage architectures (400 V – 800 V)
- Battery modules with cold plate cooling

Product data

Chemical name	1.2 Ethane diol
Appearance	Colorless liquid

Packaging	Canisters / drums / IBCs / tank trucks
ADR	Class 0, No.
WGK	1
Application concentration	20 to 100 vol.
Operating temperature range	-40 to +150 °C
Areas of application	Cooling and water circuits requiring extremely low electrical conductivity
Density (20 °C)	1.11 g/cm³
Freezing point of 50% solution	-38 °C
Boiling point conc. (1013 mbar)	approx. 196 °C
Vapor pressure (20 °C)	0.053 mbar
Specific heat (20 °C)	2.35 kJ/kg K
Thermal conductivity (20 °C)	0.25 W/m K
Dynamic viscosity (20 °C)	21.0 mPa s

Antifreeze

Glysofor ELM KI significantly lowers the freezing point of water, preventing freezing in water circuits and cooling systems. Water circuits can be temporarily shut down with Glysofor ELM KI even in frosty conditions, but remain operational at all times. Homogeneously mixed aqueous solutions do not separate when the system is shut down.

Glysofor ELM KI – active content (volume)	Frost protection down to °C
20	-9
25	-12
30	-16
35	-20
40	-25
45	-31
50	-38
55	-45
58	-51

Application in high-voltage electrical environments

Glysofor ELM KI has established itself as the preferred heat transfer medium for cooling applications in power electronics, particularly in frequency converters, rectifiers, and medium- and high-voltage applications.

The product is used in direct cooling, for example in power semiconductors such as IGBT modules, cold plates, and cooling plates.

Due to its very low electrical conductivity and its complex inhibition, which deliberately avoids ionic components, Glysofor ELM KI reliably reduces the risk of creepage and leakage currents, the destruction of IGBT modules, and electrochemical corrosion on all materials used in the cooling circuit.

Thanks to its electrically insulating properties, the heat transfer fluid helps prevent galvanic corrosion in the long term, thereby supporting the insulation concept of the entire system.

At the same time, Glysofor ELM KI facilitates compliance with relevant standard requirements, for example with regard to insulation coordination, leakage current limitation, and protection against electric shock in accordance with IEC and VDE specifications, depending on the respective system design.
Due to its special formulation, Glysofor ELM KI has a conductivity of < 0.1 µS/cm, making it suitable for use in the primary circuit.

Application in electromobility

Glysofor ELM-KI is the preferred coolant with very low electrical conductivity (< 100 µS/cm) for use in electric vehicles and high-voltage systems. In modern electric vehicles, precise and safe thermal management is crucial, as batteries, power electronics, and electric motors generate considerable amounts of heat during operation and charging.

Glysofor ELM-KI offers a high level of electrical safety, especially in cold plate battery cooling systems, where the coolant circulates in close proximity to high-voltage components. Its permanently low conductivity significantly reduces the risk of short circuits, electrochemical corrosion, and gas formation, even in the event of leaks.

Compared to conventional coolants, Glysofor ELM-KI supports efficient heat dissipation, stable operating temperatures, and thus consistent performance of battery and drive systems. This contributes significantly to the extended service life of critical components, energy efficiency, and operational safety of electric vehicles.

Glysofor ELM-KI meets the requirements of relevant international standards such as ASTM D8566 and GB/T 29743.2, making it ideal for use in future-oriented vehicle concepts and electrified platforms.

Advantages:

- High electrical safety even in the event of leaks
- Permanently stable, low electrical conductivity
- Reliable corrosion protection for aluminum and copper
- High thermal and chemical stability
- Easy integration into existing cooling and thermal management systems

Result:
Greater safety, longer battery life, and reliable performance in modern electric vehicles.

Application in welding technology

Glysofor ELM KI is a liquid coolant for technical cooling systems with high thermal loads and increased requirements for media purity. It is particularly suitable for cooling liquid-cooled welding torch systems at high currents and long duty cycles, where gas-cooled systems reach their limits.

Thanks to its very low electrical conductivity, which is well below the recommended limits specified by equipment manufacturers, Glysofor ELM KI significantly reduces the risk of electrochemical corrosion. Copper, brass, solder, steel, iron, and aluminum components are reliably protected, while electrocorrosion, deposits, and blockages in the cooling system are significantly minimized.

Glysofor ELM KI ensures efficient heat dissipation, stable temperatures, and long-term protection of the welding torch, cooling circuit, pump, tank, cooler, and power source. It is designed for continuous operation in circulating cooling devices and liquid-cooled welding systems and represents a safe, long-lasting alternative to water.

Application guidelines

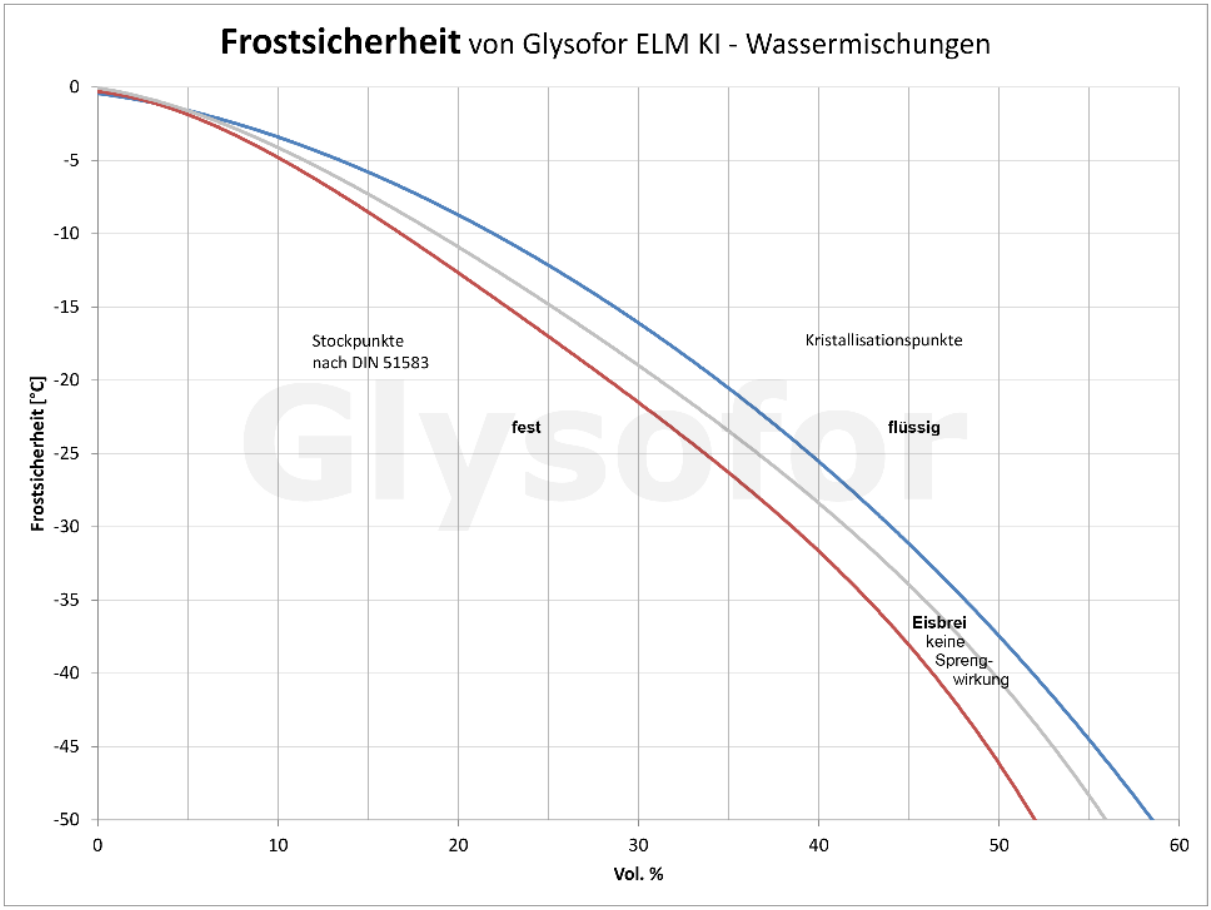
Galvanized components should be avoided, as zinc is generally incompatible with glycol and glycol-containing products
. This property therefore also affects all glycolic antifreeze agents, as there is no possibility of inhibiting zinc across all manufacturers. If galvanization is damaged during system operation, the underlying steel would in turn be protected by the inhibitor package contained in the product. If the zinc layer does peel off, this will occur in the form of very fine particles. The zinc particles are neutral in terms of the corrosion situation in the system and can be filtered out depending on the extent and requirements. Due to its extremely high purity, Glysofor ELM KI must not be contaminated with other products or substances. To maintain continuous purity during plant operation, it is possible to maintain low conductivity through ion exchange. Overheating and temperatures above the boiling point must be avoided at all costs, as this can lead to damage and premature aging.

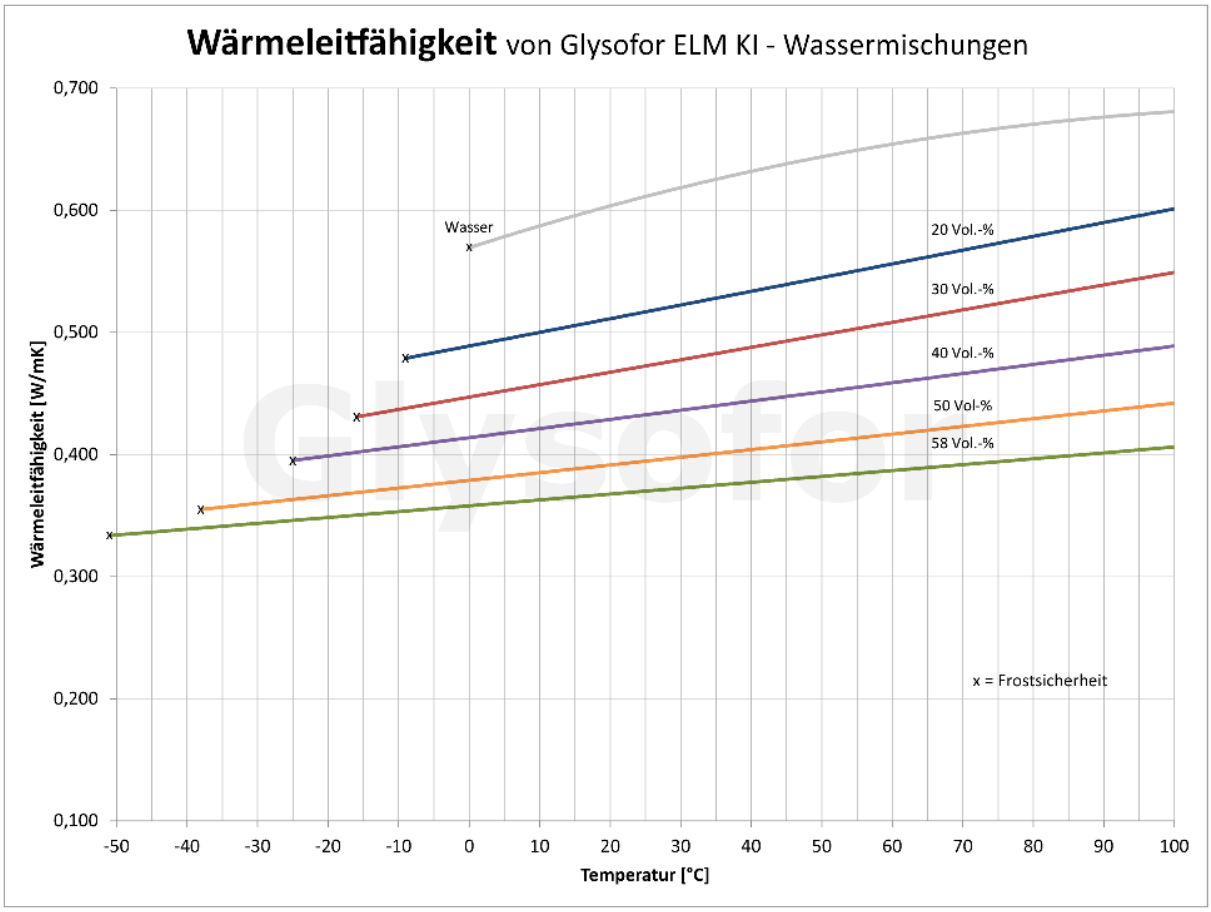
Technical data

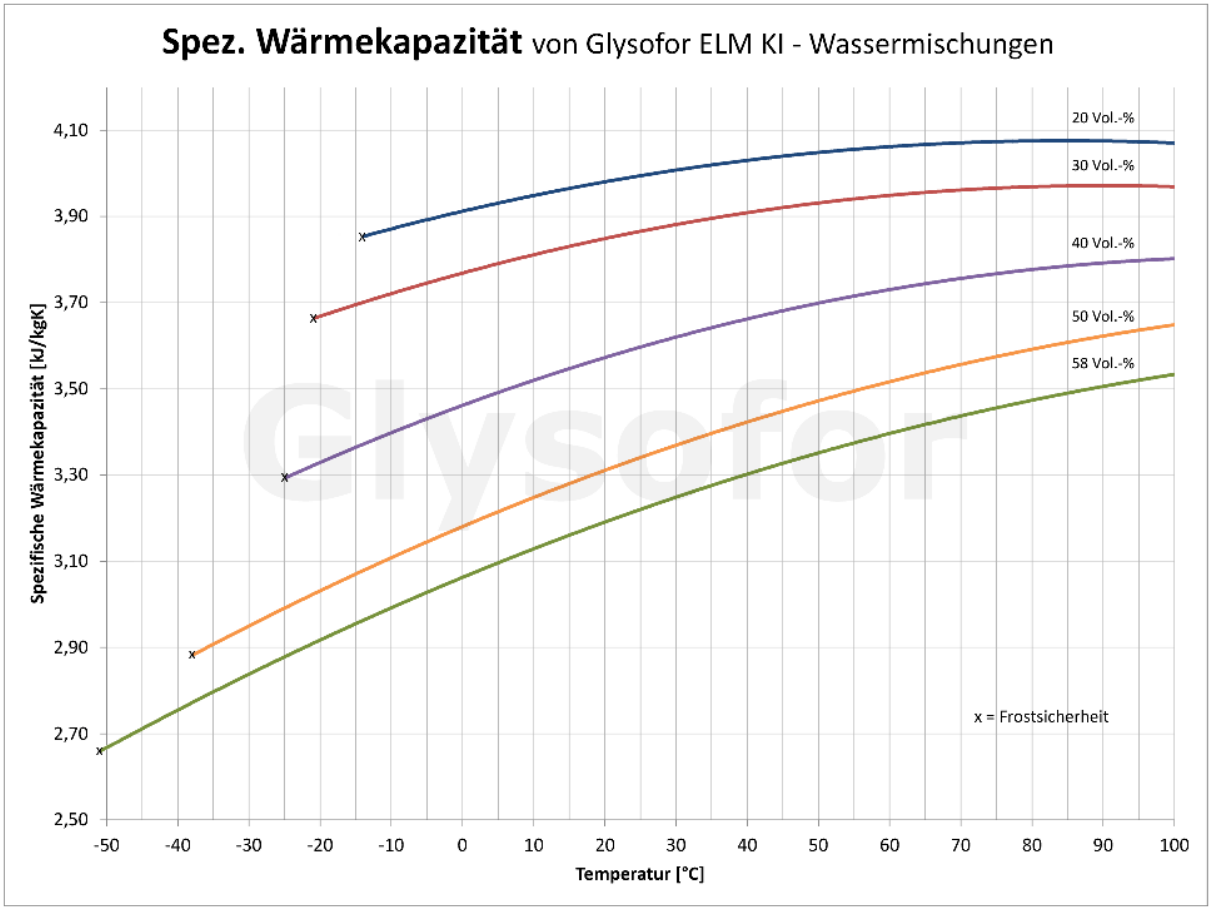
Concentration [Vol.	Frost protection [°C]	Temperature [°C]	Thermal conductivity [W/m K]	Specific heat [kJ/kg K]	Density [g/cm³]	Kinematic viscosity [mm² /s]	Cubic coefficient of thermal expansion [K⁻¹]	Relative pressure loss [factor]
		0	0.490	3.92	1.035	3.34	0.00021	1.28
		10	0.501	3.96	1.032	2.44	0.00028	1.16
		20	0.512	3.99	1.029	1.82	0.00034	1.07
		30	0.523	4.02	1.025	1.40	0.00039	1.00
		40	0.535	4.04	1.021	1.11	0.00045	0.95
20	-9	50	0.546	4.06	1.016	0.90	0.00050	0.90
		60	0.557	4.07	1.010	0.75	0.00055	0.87
		70	0.568	4.08	1.005	0.64	0.00059	0.84
		80	0.580	4.08	0.998	0.57	0.00063	0.81
		90	0.591	4.09	0.992	0.51	0.00067	0.78
		100	0.602	4.08	0.985	0.47	0.00071	0.76
		-10	0.458	3.82	1.046	5.51	0.00022	1.49
		0	0.469	3.86	1.044	3.86	0.00027	1.34
		10	0.479	3.90	1.040	2.38	0.00033	1.22
		20	0.490	3.93	1.037	2.06	0.00038	1.13
		30	0.501	3.96	1.032	1.57	0.00043	1.05
		40	0.511	3.99	1.028	1.23	0.00047	1.00
25	-12	50	0.522	4.01	1.022	0.99	0.00052	0.94
		60	0.533	4.02	1.017	0.82	0.00056	0.90
		70	0.544	4.04	1.011	0.70	0.00061	0.87
		80	0.554	4.04	1.004	0.62	0.00065	0.83
		90	0.565	4.04	0.998	0.56	0.00069	0.80
		100	0.576	4.04	0.990	0.51	0.00072	0.77
		-10	0.438	3.73	1.056	6.43	0.00028	1.58
		0	0.448	3.78	1.052	4.45	0.00033	1.39
		10	0.458	3.82	1.049	3.17	0.00037	1.28
		20	0.468	3.86	1.044	2.33	0.00041	1.18
		30	0.479	3.89	1.040	1.76	0.00045	1.10
		40	0.489	3.92	1.035	1.37	0.00049	1.04
30	-16	50	0.499	3.94	1.029	1.10	0.00053	0.98
		60	0.509	3.96	1.024	0.90	0.00057	0.93
		70	0.519	3.97	1.017	0.77	0.00061	0.89
		80	0.530	3.98	1.011	0.67	0.00064	0.85
		90	0.540	3.98	1.004	0.61	0.00068	0.82
		100	0.550	3.98	0.997	0.56	0.00071	0.79
		-20	0.414	3.52	1.068	12.49	0.00030	1.84
		-10	0.423	3.58	1.064	8.18	0.00034	1.62
		0	0.431	3.64	1.061	5.48	0.00037	1.44
		10	0.440	3.69	1.056	3.79	0.00041	1.32
		20	0.449	3.73	1.052	2.71	0.00044	1.22
		30	0.458	3.76	1.047	2.00	0.00047	1.13
35	-20	40	0.466	3.81	1.042	1.53	0.00050	1.06
		50	0.475	3.84	1.036	1.20	0.00053	1.00
		60	0.484	3.86	1.030	0.98	0.00056	0.95
		70	0.493	3.88	1.024	0.83	0.00059	0.91
		80	0.501	3.89	1.018	0.72	0.00062	0.87
		90	0.510	3.90	1.012	0.65	0.00065	0.83
		100	0.519	3.91	1.005	0.60	0.00067	0.80
		-20	0.400	3.34	1.077	17.09	0.00036	1.91
		-10	0.407	3.41	1.073	10.59	0.00038	1.67
		0	0.415	3.47	1.068	6.84	0.00041	1.49
		10	0.422	3.53	1.064	4.57	0.00044	1.37
		20	0.430	3.58	1.059	3.18	0.00046	1.27
		30	0.437	3.63	1.054	2.30	0.00048	1.17
40	-25	40	0.445	3.67	1.049	1.72	0.00051	1.09
		50	0.452	3.71	1.043	1.33	0.00056	1.03
		60	0.460	3.74	1.037	1.07	0.00058	0.98
		70	0.467	3.77	1.031	0.90	0.00062	0.93
		80	0.475	3.79	1.025	0.78	0.00065	0.89
		90	0.482	3.80	1.019	0.71	0.00068	0.85
		100	0.490	3.81	1.013	0.66	0.00072	0.82
		-30	0.376	3.09	1.090	38.99	0.00039	
		-20	0.383	3.18	1.085	21.09	0.00041	1.98
		-10	0.390	3.25	1.081	12.29	0.00043	1.73
		0	0.397	3.32	1.076	7.74	0.00044	1.55
		10	0.404	3.39	1.071	5.15	0.00046	1.41
		20	0.411	3.45	1.066	3.61	0.00048	1.31
45	-31	30	0.417	3.50	1.060	2.63	0.00050	1.21
		40	0.424	3.55	1.055	1.99	0.00053	1.13
		50	0.431	3.60	1.049	1.55	0.00055	1.06
		60	0.438	3.64	1.043	1.25	0.00058	1.01
		70	0.445	3.67	1.037	1.04	0.00060	0.96
		80	0.452	3.70	1.030	0.90	0.00063	0.92
		90	0.459	3.72	1.024	0.79	0.00065	0.88

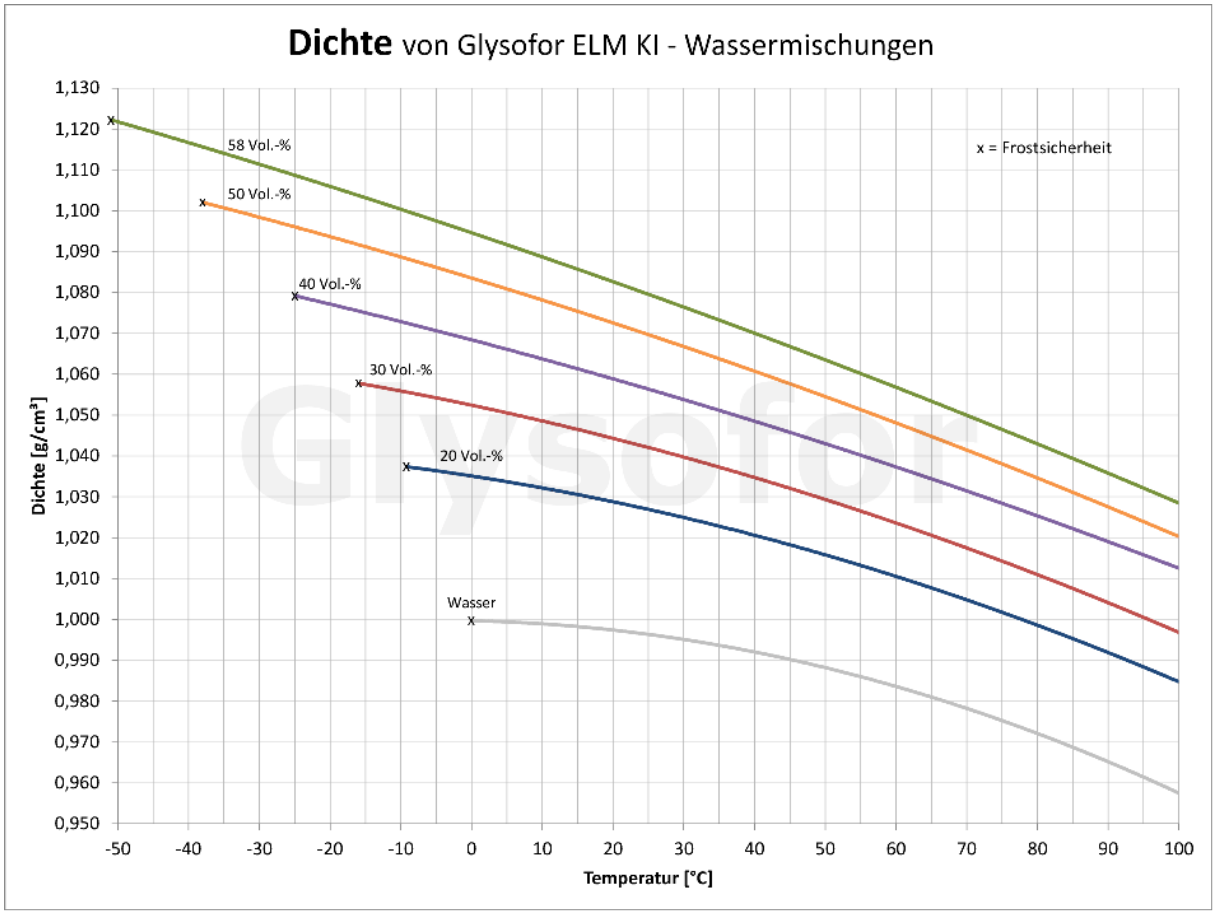
		100	0.466	3.74	1.017	0.73	0.00068	0.84

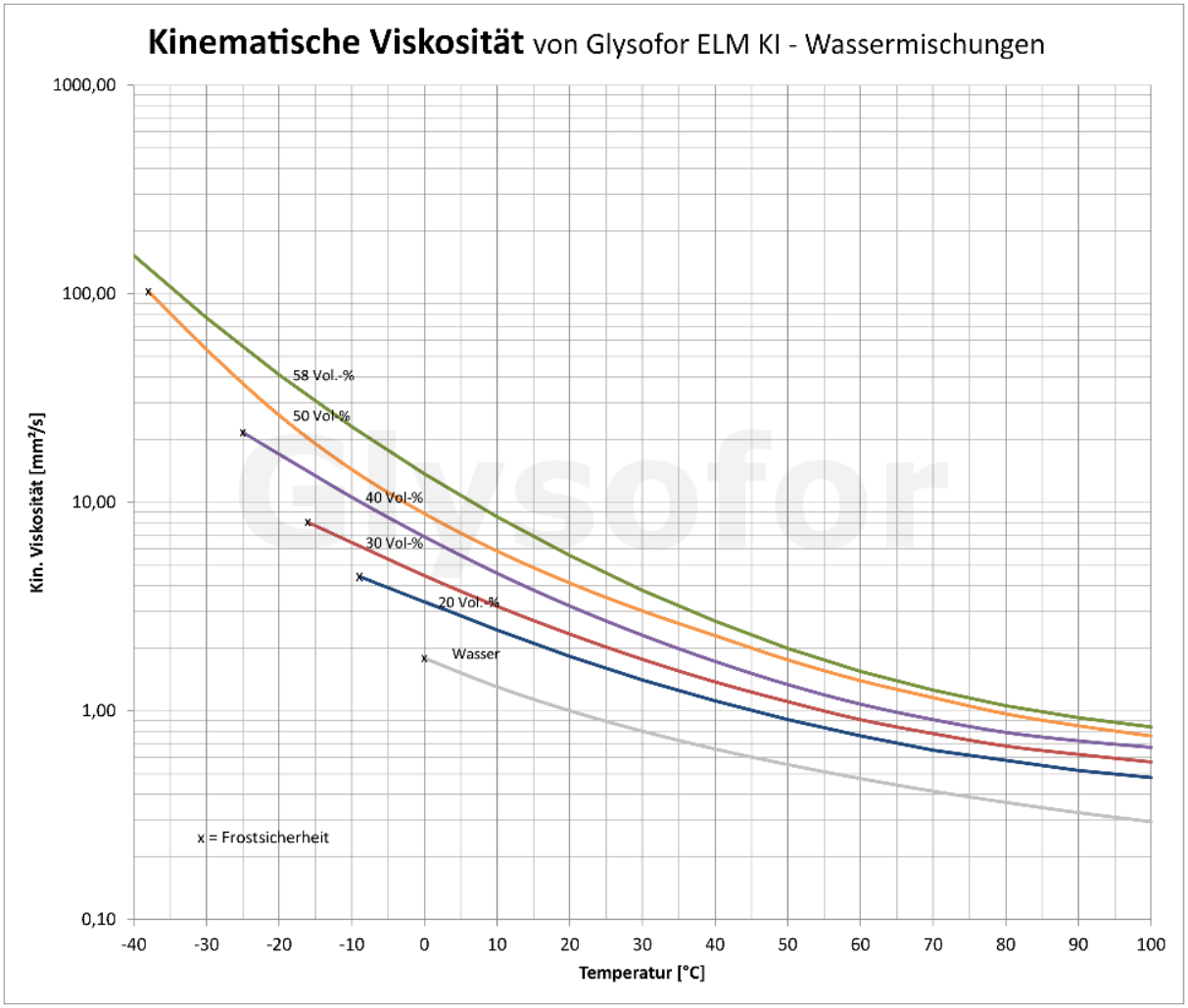
Concentration [Vol. %]	Frost protection [°C]	Temperature [°C]	Thermal conductivity [W/m K]	Specific heat [kJ/kg K]	Density [g/cm³]	Kinematic viscosity [mm² /s]	Cubic coefficient of thermal expansion [K⁻¹]	Relative pressure loss [factor]
50	-38	-30	0.361	2.96	1.099	54.19	0.00045	
		-20	0.367	3.04	1.094	26.19	0.00045	2.05
		-10	0.374	3.12	1.088	14.39	0.00046	1.79
		0	0.380	3.19	1.083	8.83	0.00048	1.60
		10	0.386	3.26	1.078	5.84	0.00049	1.45
		20	0.392	3.32	1.072	4.10	0.00051	1.34
		30	0.399	3.38	1.067	3.01	0.00053	1.25
		40	0.405	3.43	1.061	2.29	0.00056	1.16
		50	0.411	3.48	1.055	1.75	0.00058	1.09
		60	0.418	3.53	1.048	1.39	0.00061	1.04
		70	0.424	3.57	1.042	1.15	0.00064	0.99
		80	0.430	3.60	1.035	0.96	0.00068	0.94
		90	0.437	3.63	1.027	0.84	0.00072	0.90
		100	0.443	3.66	1.020	0.75	0.00073	0.86
55	-45	-40	0.345	2.80	1.112	149.99	0.00047	
		-30	0.350	2.88	1.107	68.29	0.00048	
		-20	0.356	2.96	1.101	34.69	0.00048	2.20
		-10	0.361	3.04	1.096	19.29	0.00049	1.92
		0	0.367	3.11	1.090	11.59	0.00050	1.70
		10	0.372	3.18	1.085	7.36	0.00052	1.54
		20	0.377	3.24	1.079	4.95	0.00054	1.41
		30	0.383	3.30	1.073	3.48	0.00055	1.31
		40	0.388	3.35	1.067	2.54	0.00058	1.21
		50	0.393	3.40	1.060	1.93	0.00060	1.13
		60	0.399	3.45	1.054	1.52	0.00063	1.07
		70	0.404	3.49	1.047	1.24	0.00066	1.01
		80	0.410	3.52	1.040	1.04	0.00069	0.96
		90	0.415	3.55	1.033	0.90	0.00072	0.92
		100	0.420	3.58	1.025	0.80	0.00074	0.87
58	-51	-50	0.335	2.68	1.122		0.00048	
		-40	0.340	2.76	1.117	152.99	0.00049	
		-30	0.345	2.85	1.111	76.99	0.00049	
		-20	0.349	2.93	1.106	40.99	0.00050	2.34
		-10	0.354	3.00	1.100	23.09	0.00051	2.04
		0	0.359	3.07	1.094	13.69	0.00052	1.79
		10	0.364	3.14	1.089	8.53	0.00053	1.63
		20	0.369	3.20	1.083	5.56	0.00055	1.48
		30	0.373	3.26	1.076	3.78	0.00057	1.36
		40	0.378	3.31	1.070	2.69	0.00059	1.26
		50	0.383	3.36	1.064	1.99	0.00061	1.17
		60	0.388	3.41	1.057	1.54	0.00063	1.09
		70	0.393	3.45	1.050	1.25	0.00066	1.03
		80	0.398	3.48	1.043	1.05	0.00069	0.98
		90	0.402	3.52	1.036	0.92	0.00072	0.93
		100	0.407	3.54	1.028	0.83	0.00075	0.89

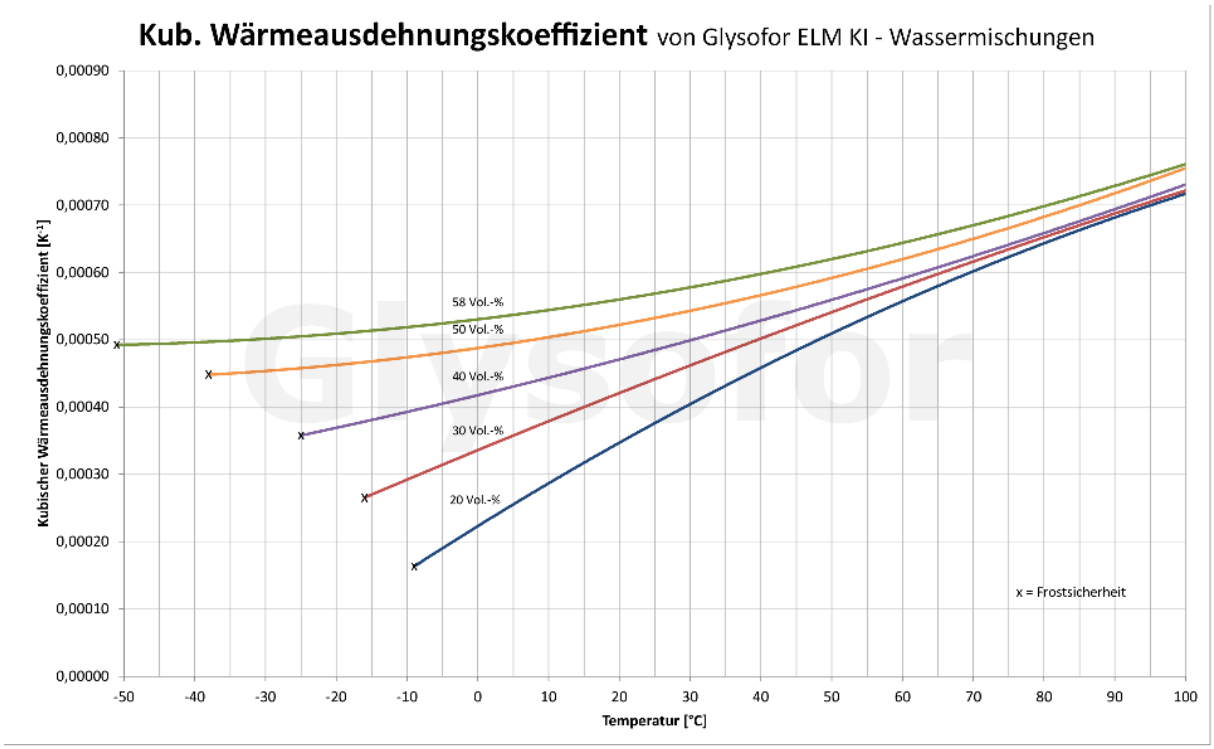

Frostsicherheit von Glysofor ELM KI - Wassermischungen
Frostsicherheit [°C]
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
0
10
20
30
40
50
60
Vol. %
Stockpunkte
nach DIN 51583
Kristallisationspunkte
fest
flüssig
Eisbrei
keine
Spreng-
wirkung

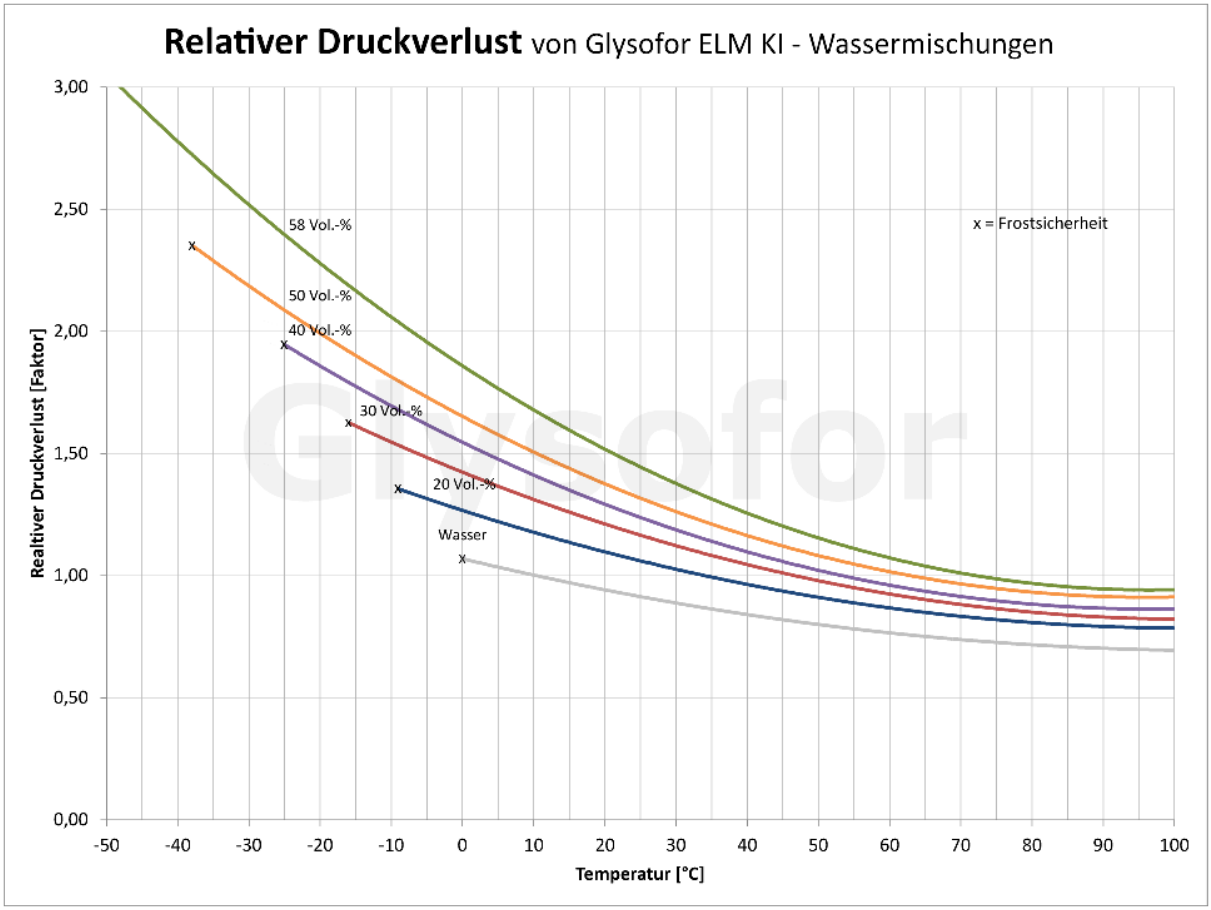

Wärmeleitfähigkeit von Glysofor ELM KI - Wassermischungen
Wärmeleitfähigkeit [W/mK]
0,700
0,600
0,500
0,400
0,300
0,200
0,100
-50
-40
-30
-20
-10
0
10
20
30
40
50
60
70
80
90
100
Temperatur [°C]
Wasser
20 Vol.-%
30 Vol.-%
40 Vol.-%
50 Vol-%
58 Vol.-%
x = Frostsicherheit

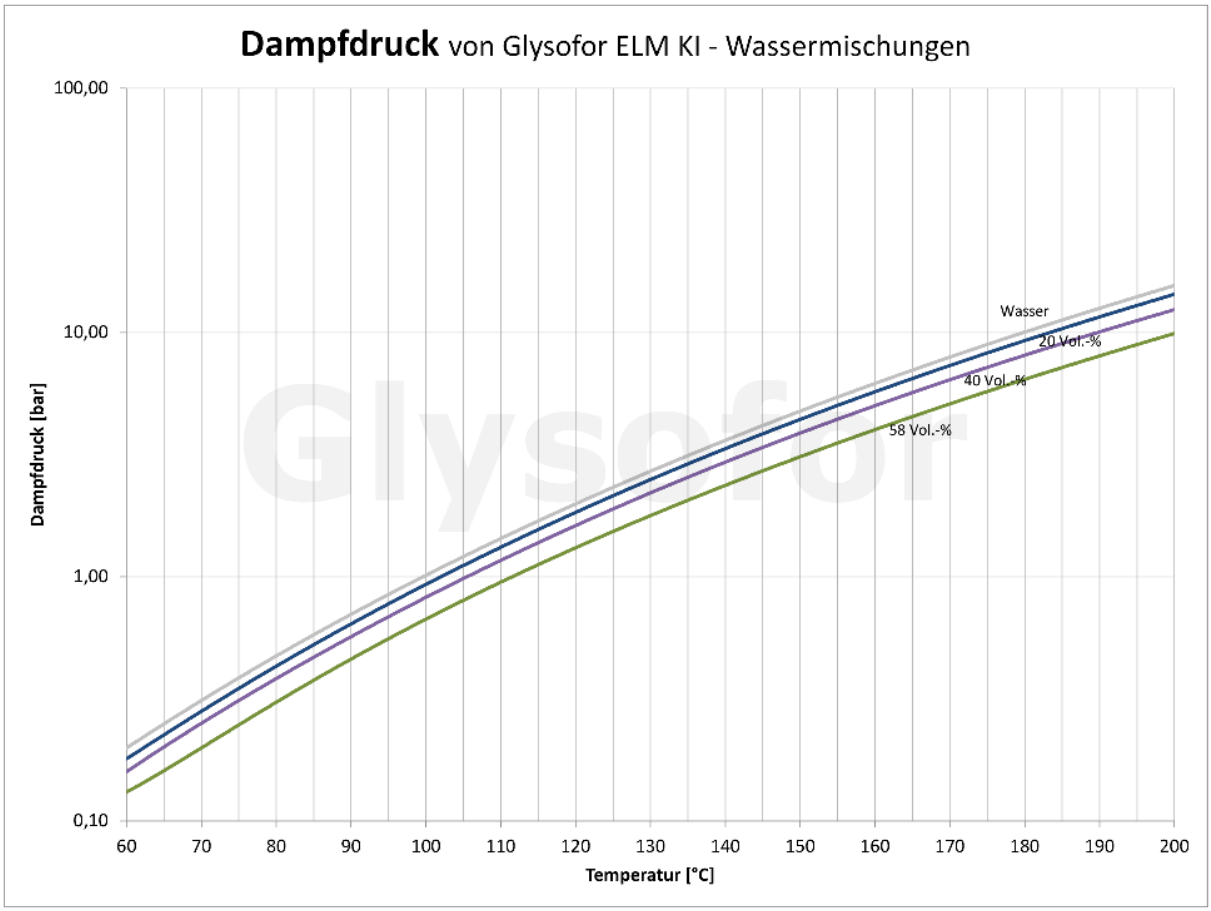

Spez. Wärmekapazität von Glysofor ELM KI - Wassermischungen
Spezifische Wärmekapazität [kJ/kgK]
4,10
3,90
3,70
3,50
3,30
3,10
2,90
2,70
2,50
-50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100
Temperatur [°C]
20 Vol.-%
30 Vol.-%
40 Vol.-%
50 Vol.-%
58 Vol.-%
x = Frostsicherheit
Glysofor


Dichte von Glysofor ELM KI - Wassermischungen
Dichte [g/cm³]
1,130
1,120
1,110
1,100
1,090
1,080
1,070
1,060
1,050
1,040
1,030
1,020
1,010
1,000
0,990
0,980
0,970
0,960
0,950
-50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100
Temperatur [°C]
58 Vol.-%
50 Vol.-%
40 Vol.-%
30 Vol.-%
20 Vol.-%
Wasser
x = Frostsicherheit
Glysofor


Kinematische Viskosität von Glysofor ELM KI - Wassermischungen
1000,00
100,00
10,00
1,00
0,10
Kin. Viskosität [mm²/s]
58 Vol.-%
50 Vol.-%
40 Vol.-%
30 Vol.-%
20 Vol.-%
Wasser
x = Frostsicherheit
-40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100
Temperatur [°C]


Kub. Wärmeausdehnungskoeffizient von Glysofor ELM KI - Wassermischungen
0,00090
0,00080
0,00070
0,00060
0,00050
0,00040
0,00030
0,00020
0,00010
0,00000
Kubischer Wärmeausdehnungskoeffizient [K⁻¹]
58 Vol.-%
50 Vol.-%
40 Vol.-%
30 Vol.-%
20 Vol.-%
x = Frostsicherheit
-50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100
Temperatur [°C]


Relativer Druckverlust von Glysofor ELM KI - Wassermischungen
Realtiver Druckverlust [Faktor]
3,00
2,50
2,00
1,50
1,00
0,50
0,00
-50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100
Temperatur [°C]
58 Vol.-%
50 Vol.-%
40 Vol.-%
30 Vol.-%
20 Vol.-%
Wasser
x = Frostsicherheit
Glysofor


Dampfdruck von Glysofor ELM KI - Wassermischungen
Dampfdruck [bar]
100,00
10,00
1,00
0,10
60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Temperatur [°C]
Wasser
20 Vol.-%
40 Vol.-%
58 Vol.-%
Glysofor

Packaging sizes

- 10 kg canister
- 25 kg canister
- 30 kg canister
- 220 kg drum
- 1,000 kg IBC
- 24,000 kg tanker truck

The product is not a dangerous good within the meaning of national/international transport regulations.
The delivery containers are made of pure PE and can be recycled after use. The product should always be stored in a closed container. Due to its extremely high purity, the product should not be decanted or contaminated with other substances.

The information refers to the professional and proper use of our products, taking into account the technical standards and regulations of the area of application. It is for informational purposes only and does not release you from the obligation to carry out a proper incoming goods inspection. The information is based on our current state of knowledge and does not imply any guarantee of specific properties. No general and legally binding statement regarding specific properties in a specific application can be derived from the above data. The information is intended to describe our products in terms of their properties and to provide application assistance. Any third-party property rights and suitability for a specific application must be observed and checked by the user.

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