



Glysofor

Glysofor ELM - Specification

Product features

Glysofor ELM is a high-purity monoethylene glycol, which is available in any concentration.

The product is used for applications which require extremely low electrical conductivity.

Glysofor ELM can be delivered as a concentrated high-purity product or as an aqueous solution.

The solutions are manufactured using high-purity water with an electrical conductivity $< 0.1 \mu\text{s/cm}$.

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

Both as a concentrate and diluted with water, the product is classed in the lowest water hazard class WHC 1.

It exhibits longterm resistance to the formation of biofilms, rot, and microbiological decomposition.

Antifreeze concentrate and heat transfer medium with extremely low electrical conductivity

Basis: Monoethylene glycol

Operating temperature: -40 to $+150$ °C

Microbiologically stable

Biodegradable and environmentally friendly

Available as a concentrate or solution

Areas of application: Induction melting furnaces, transformer cooling systems, capacitors, inverter cooling, welding systems

Glysofor ELM can be mixed in any ratio with water, ethanol, butanol, butyl acetate, and acetone. We supply high-purity water with an electrical conductivity $< 0.1 \mu\text{s/cm}$ for you to make subsequent adjustments.

Specific electrical resistance at 20 °C (M ohm cm)	min. 10
Specific electrical conductivity at 20 °C ($\mu\text{s/cm}$)	max. 0,1
Permittivity	approx. 40

Typical application areas

Aqueous solutions of Glysofor ELM are used in water circuits which require extremely low electrical conductivity.

- Induction melting furnaces
- Transformer cooling systems
- X-ray tubes
- Capacitors
- Converter cooling systems
- Inverter cooling systems
- Circuit breakers
- Welding systems
- Producing electrolytes

Product data

Chemical name	1.2 Ethanediol
Appearance	Colorless liquid
Packaging	Canisters / barrels / IBCs / tank vehicles
ADR	KI 0 number
WHC	1
Applied concentration:	20 to 100 Vol.%
Operating temperature range:	-40 to +150 °C
Areas of application:	Cooling systems and water circuits which require extremely low electrical conductivity.
Density (20 °C)	1,11 g/cm ³
Freezing point 50% solution	-38 °C
Boiling point (1013 mbar). Conc.	approx. 196 °C
Vapour 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 significantly reduces the freezing point of water, thereby preventing freezing in water circuits and cooling systems. With Glysofor ELM, water circuits can be temporarily switched off, even during frost conditions, while however remaining ready for operation at any time. Homogeneous mixed aqueous solutions do not separate when the system is shut down.

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

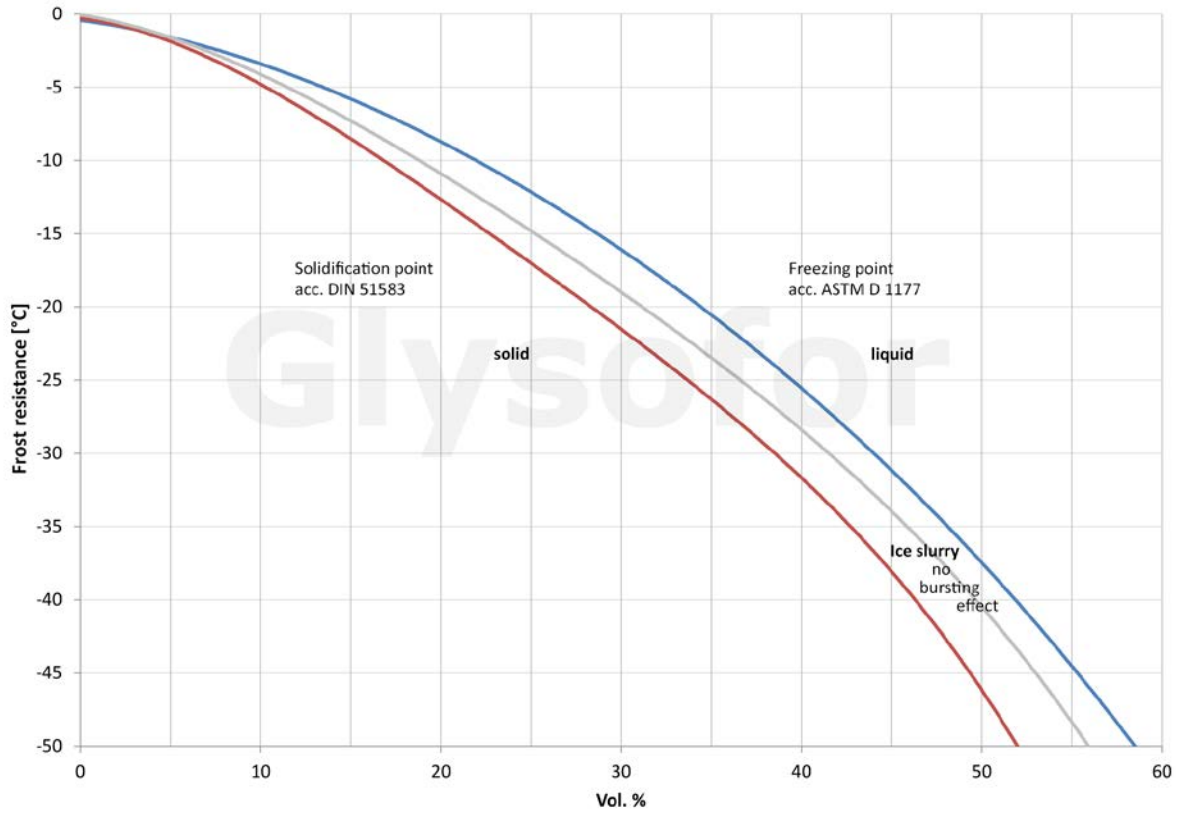
Application guidelines

Galvanised components are to be avoided, as zinc is generally volatile with Glysofor ELM and products which contain glycol. With regard to the extremely high purity Glysofor ELM should not be contaminated with other products or materials. The low conductivity can be obtained by ion exchange. Overheating must be strictly avoided, as this can lead to damage and the premature ageing of Glysofor EVO ELM.

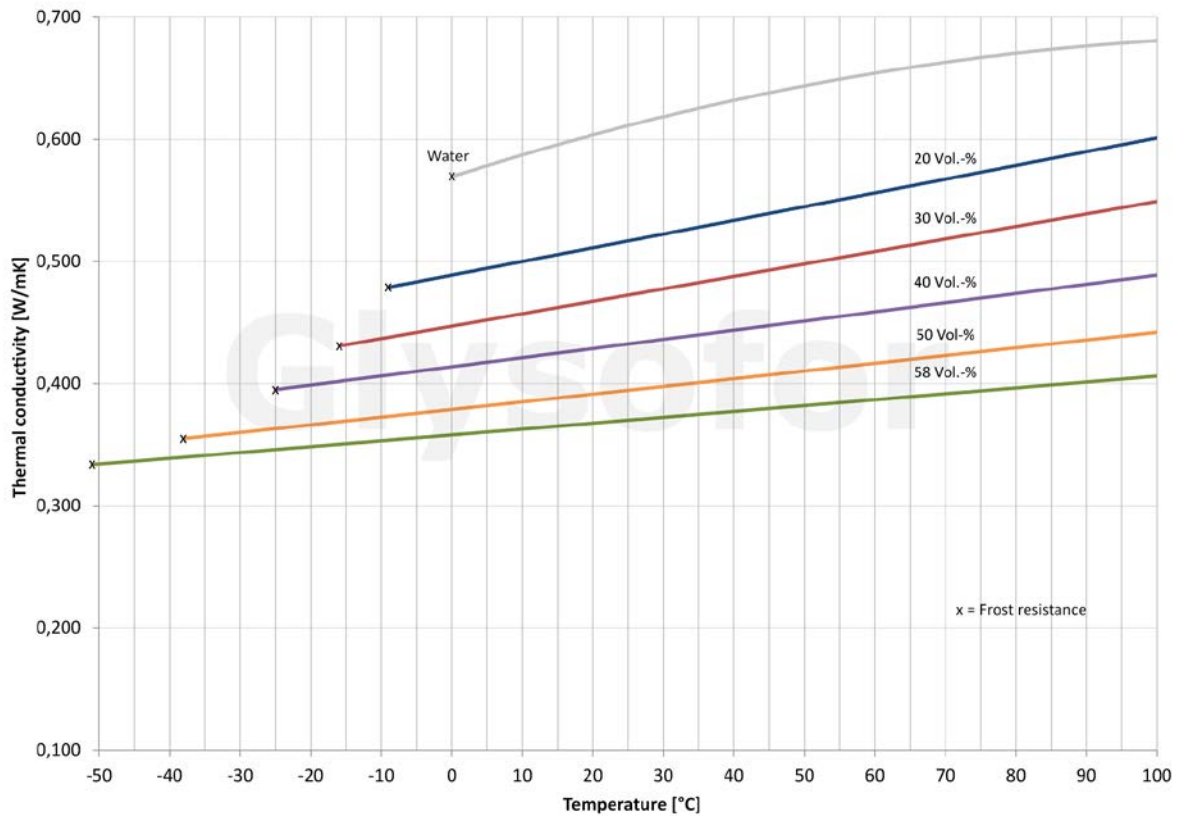
Concentrate [Vol.%]	Frost resistance [°C]	Temp. [°C]	Thermal conductivity [W/m K]	Spec. heat capacity [kJ/kg K]	Density [g/cm ³]	Kinemat. viscosity [mm ² /s]	Cub. Expansion coefficient [K ⁻¹]	Rel. Pressure drop factor [Factor]
20	-9	0	0,490	3,92	1,035	3,34	0,00021	1,28
		10	0,501	3,96	1,032	2,44	0,00028	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
		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
25	-12	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	2,78	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
		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
30	-16	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
		50	0,499	3,94	1,029	1,10	0,00053	0,98
35	-20	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
40	-25	30	0,458	3,76	1,047	2,00	0,00047	1,13
		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
45	-31	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	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
45	-31	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
		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
45	-31	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

Concentrate [Vol.%]	Frost resistance [°C]	Temp. [°C]	Thermal conductivity [W/m K]	Spec. heat capacity [kJ/kg K]	Density [g/cm ³]	Kinemat. viscosity [mm ² /s]	Cub. Expansion coefficient [K ⁻¹]	Rel. Pressure drop factor [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

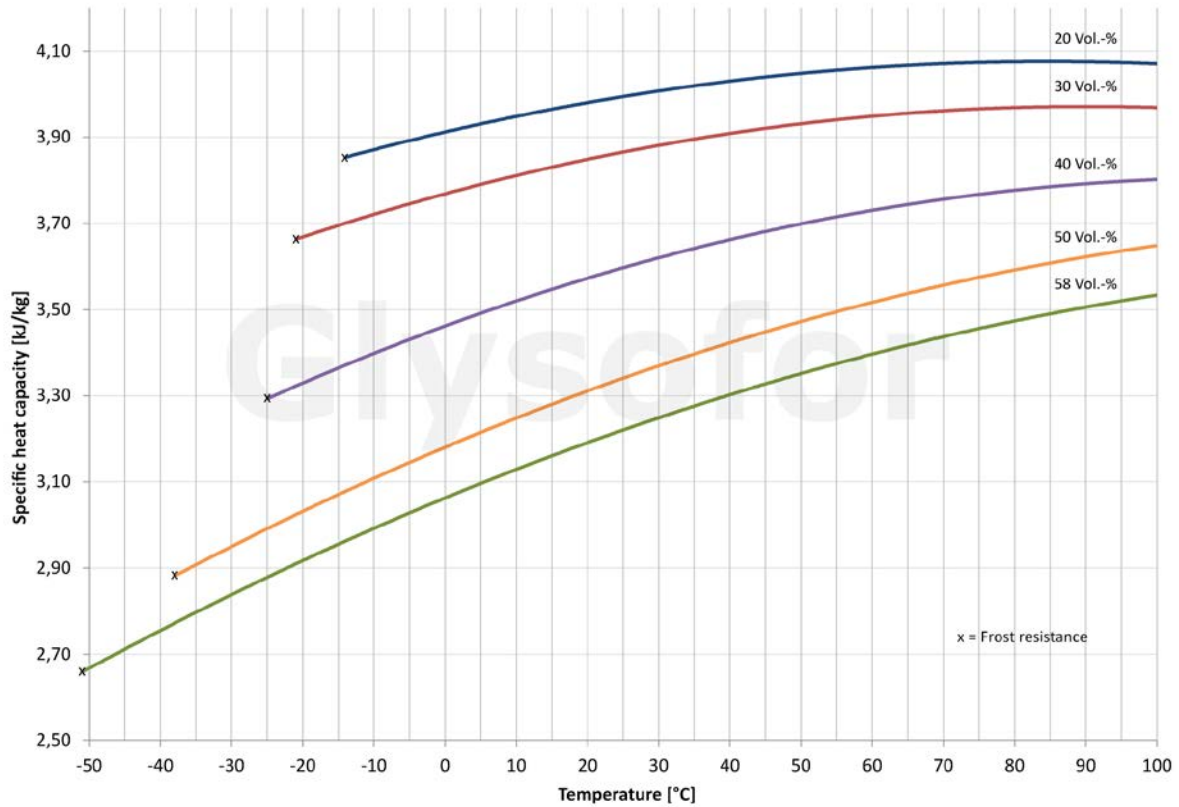
Frost resistance of Glysofor ELM - water mixtures



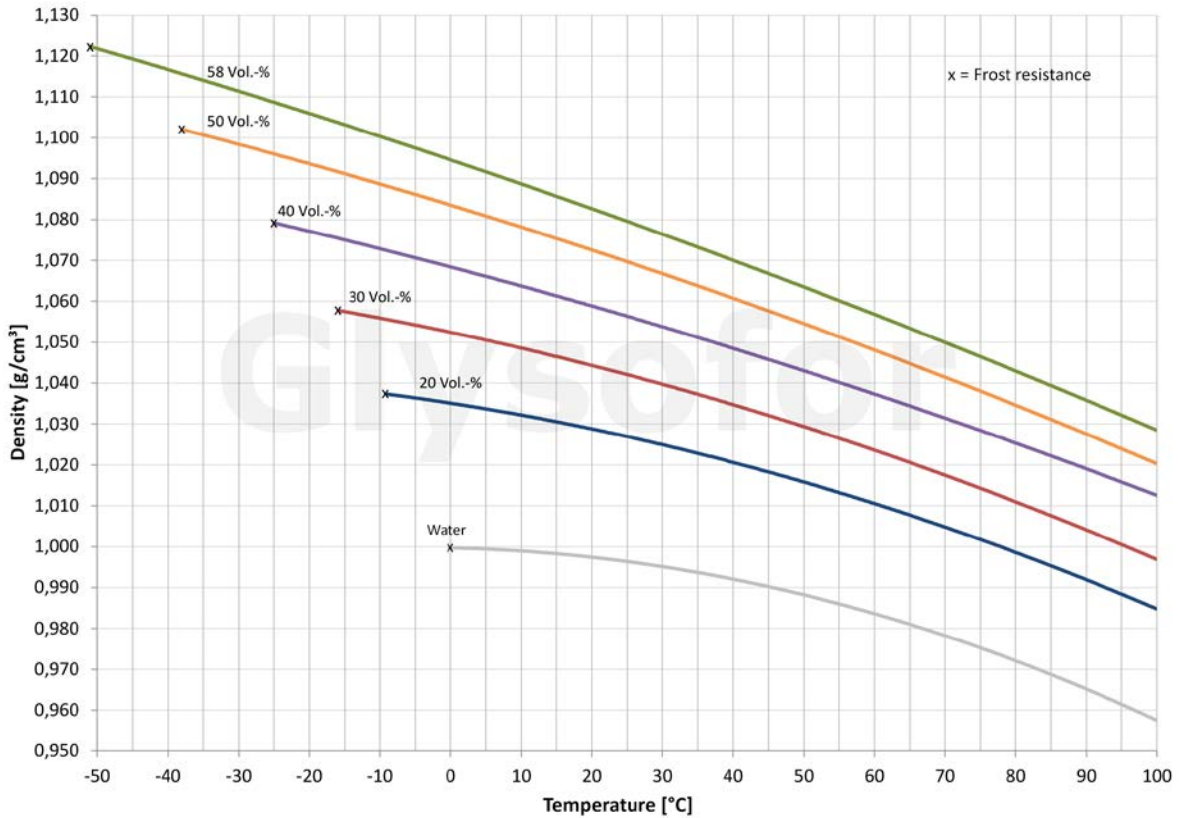
Thermal conductivity of Glysofor ELM - water mixtures



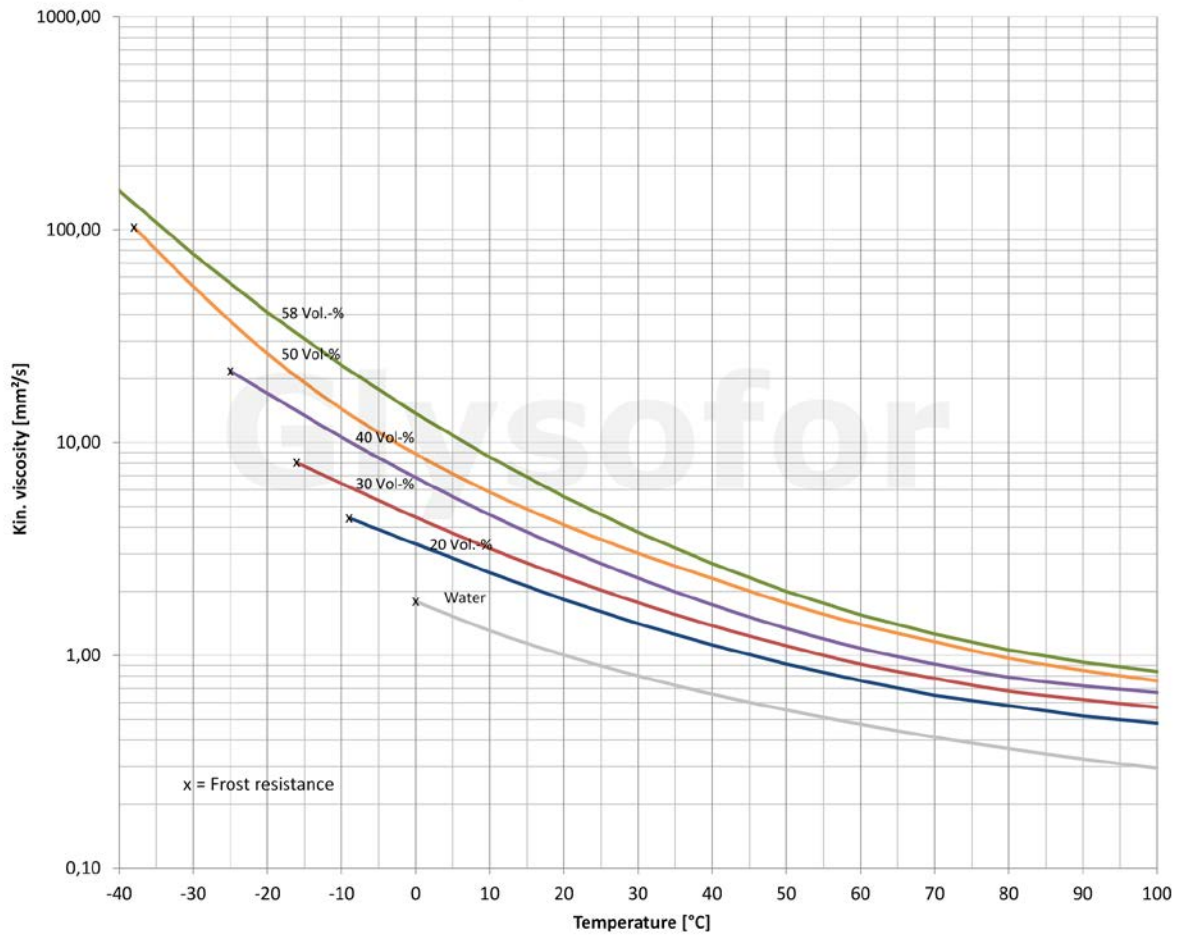
Spec. heat capacity of Glysofor ELM - water mixtures



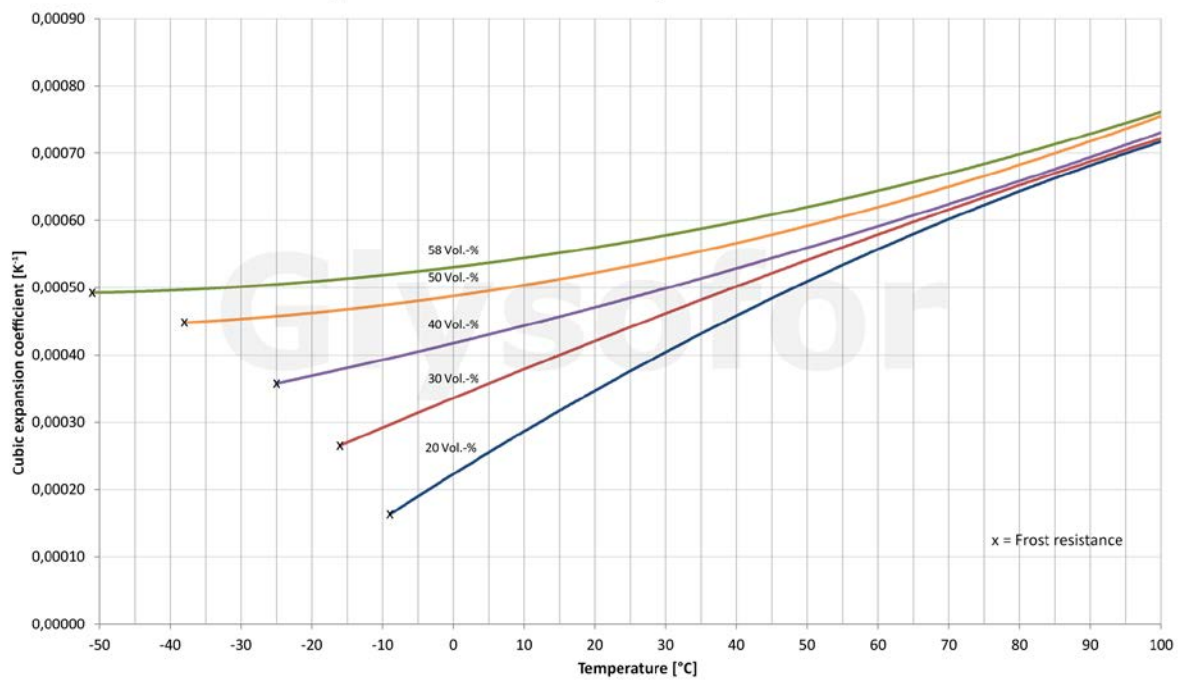
Density of Glysofor ELM - water mixtures



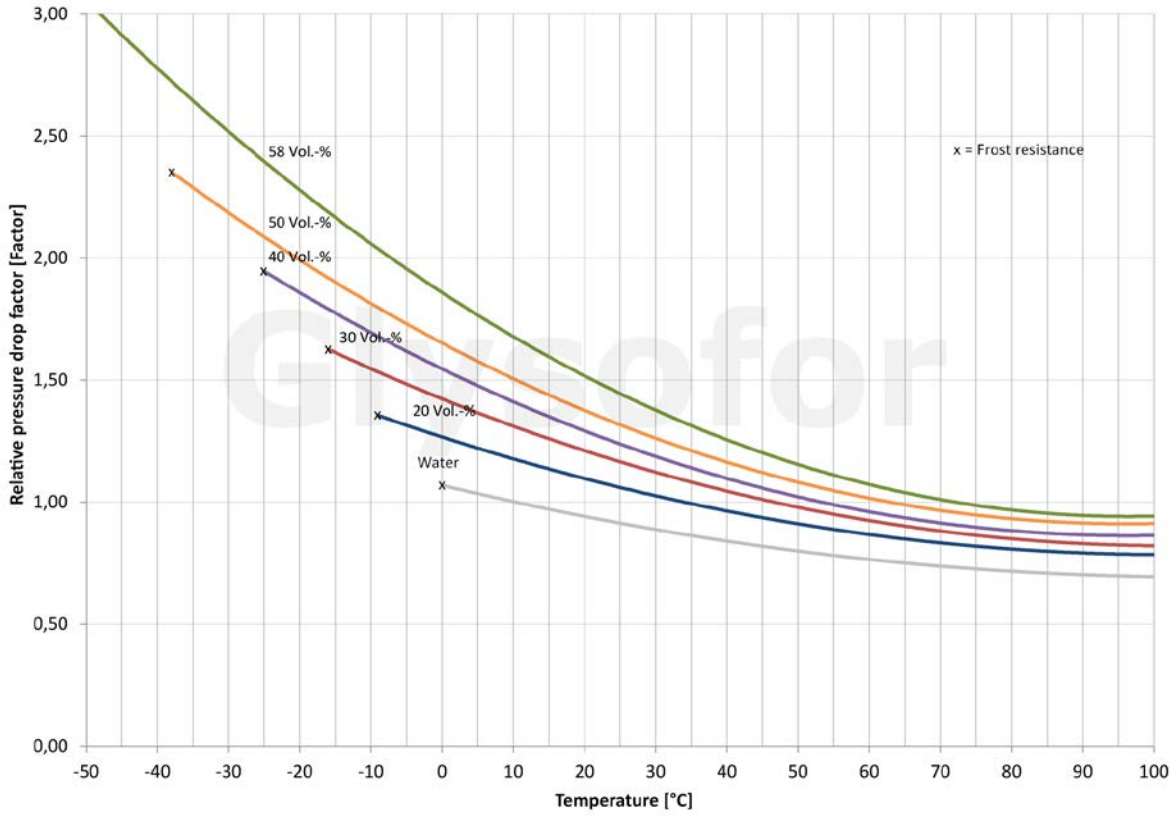
Kinematic viscosity of Glysofor ELM - water mixtures



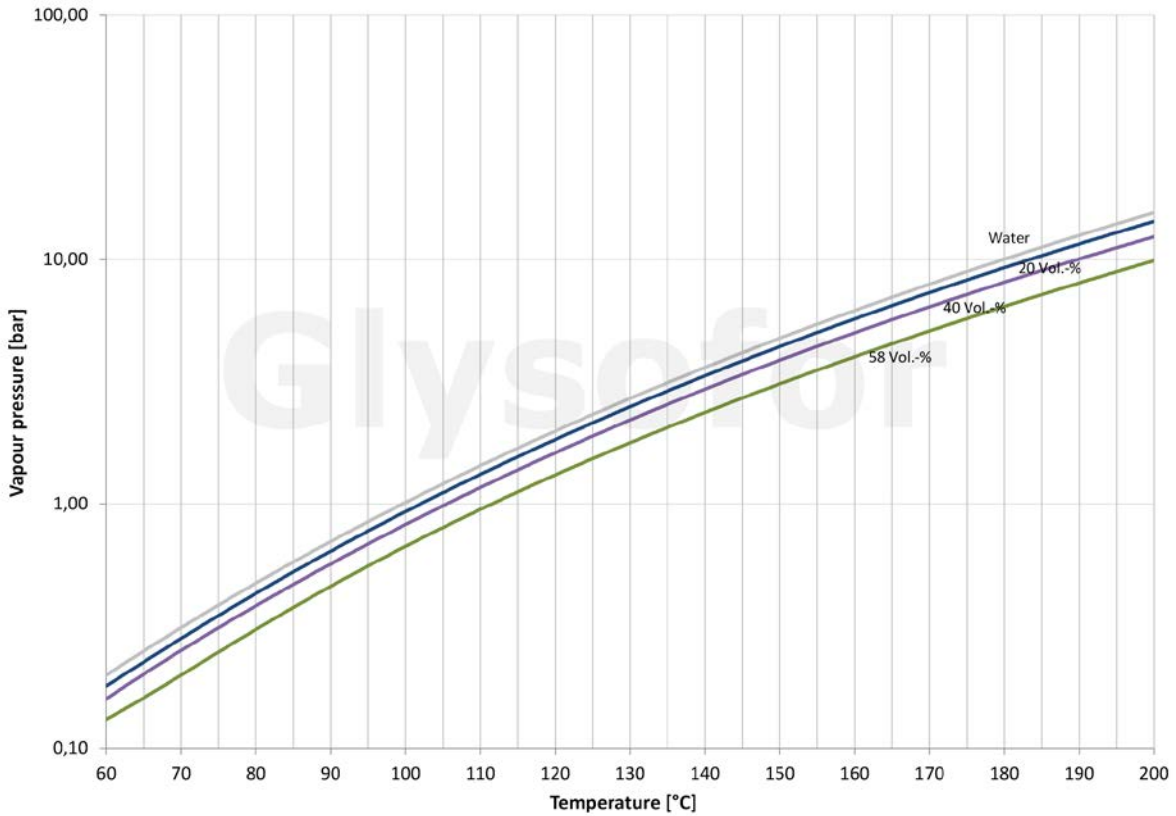
Cub. expansion coefficient of Glysofor ELM - water mixtures



Relative pressure drop factor of Glysofor ELM - water mixtures



Vapour pressure of Glysofor ELM - water mixtures



Packaging sizes

- 10 kg canister
- 25 kg canister
- 30 kg canister
- 220 kg barrel
- 1.000 kg IBC
- 24.000 kg tank vehicle

Glysofor ELM is not classified as dangerous to the national / international transport regulations. The delivery container consist of pure PE and can be supplied by the use of recycling. The product should always be stored sealed. Due to the high purity, the product should not be transferred or contaminated with other substances.

This data relates to the correct and appropriate application of our products, with due consideration of the professional standards and regulations of the area of application. It is for informational purposes only and does not absolve the obligation to carry out the due materials testing upon arrival. The data is based on our current state of knowledge and is not meant to guarantee specific properties. No general or legally binding statement on certain features, in a concrete application, can be derived from the above data. It is meant to describe our products with regard to their composition and offer application advice. Any industrial property rights of third parties and the suitability for a special application purpose are to be observed and verified by the user.



WITTIG Umweltchemie GmbH
Carl-Bosch-Straße 17
D-53501 Grafschaft-Ringen

Tel.: +49 (0) 2641 - 20510 0
Fax: +49 (0) 2641 - 20510 22
info@glysofor.de – www.glysofor.de