



# Glysofor

## Glysofor EVO N - Specification

### Product features

Glysofor EVO N is an environmentally-friendly antifreeze concentrate and heat transfer medium based on monoethylene glycol in combination with biodegradable corrosion inhibitors.

Glysofor EVO N is used in heating and cooling systems, heat pumps, or other water circuits which are susceptible to frost, and combines the advantages of a MEG-based antifreeze with the optimised biodegradability of the additives it contains.

It was specially developed for application areas which have particular environmental requirements, especially in respect of biodegradability, while also focusing on physical characteristics such as heat conductivity and viscosity.

Glysofor EVO N is formulated such that, in the event of unintentional release (e.g. by a leak), the microbial breakdown of the ingredients is not expected to be hindered.

Specifically, the good rates at which the ingredients biodegrade into the pure substance is not negatively impacted by the combination of substances in the recipe.

Antifreeze concentrate and heat transfer medium

Basis: Monoethylene glycol

Operating temperature: -30 bis +50 °C

Corrosion inhibition is free of triazole

Optimised biodegradability

All ingredients WHC 1

Areas of application: Heating and refrigeration systems, heat pumps and other frost endangered water circuits

Glysofor EVO N is used simultaneously as an antifreeze, corrosion protection agent as well as the heat transfer medium. Glysofor EVO N ideally prevents frost damage, corrosion, deposits, sludge accumulation, and biofilms.

Glysofor EVO N is biodegradable, environmentally friendly and, in water circuits, exhibits longterm resistance to the formation of biofilms, rot, and microbiological decomposition, which avoids deposition and sludge accumulation.

Extended half-life periods or an accumulation of persistent intermediate degradation products are also not anticipated during the biodegradation of Glysofor EVO N.

The corrosion inhibition of Glysofor EVO N is completely free of nitrite, nitrate, borate, phosphate, triazole, and silicate.

Homogeneous Glysofor EVO N/water mixtures do not separate, which ensures continuous frost resistance. This guarantees year-round, longterm, and low-maintenance operation of the system.

## Product data

Chemical name	Ethylene glycol (monoethylene glycol), aqua dest., anti-corrosion additive
Appearance	Pink liquid
Packaging	Canisters / barrels / IBCs / tank vehicles
ADR	KI 0 number
EC-No.	2034733
CAS-No.	107 - 21 - 1
WHC	1
Applied concentration:	At least 20 Vol% (Frost protection up to approx. -9 °C)
Operating temperature range:	-30 to +50 °C
Areas of application:	Antifreeze concentrate and heat transfer medium
Density (20 °C)	1,12 g/cm <sup>3</sup>
pH-value	7,3 - 8,3
Boiling point (1013 mbar)	approx. 197 °C
Vapour pressure (20 °C)	0,053 mbar
Specific heat (20 °C)	2,35 kJ/kg K
Thermal conductivity (20 °C)	0,29 W/m K
Dynamic viscosity (20 °C)	21 mPa s

## Heat transfer medium

In heating systems, heat pump systems, heat recovery plants, industrial plants, or water circuits Glysofor EVO N is used as a heat transfer fluid. It guarantees optimum heat transmission from a heat generator to a heat consumer within a water circuit.

## Cooling brine / Cooling medium

In industrial cooling systems, Glysofor EVO N is used as a cooling brine. Glysofor EVO N is used to transfer cold from a central refrigeration system to different cooling consumers. Typical application areas are air-conditioning systems or cooling equipment in industrial and production facilities. Thanks to the excellent ability of Glysofor EVO N to lower the freezing point, refrigeration and deep freeze systems can be safely operated at sub-zero temperatures at low as -30°C.

## Antifreeze

Using glycol, in this case monoethylene glycol, Glysofor EVO N significantly lowers the freezing point of water. In this way, Glysofor EVO N ensures that the aqueous solutions remain in workable liquid form, even in sub-zero temperatures. With Glysofor EVO N, heating, cooling, and water circuits can be temporarily switched off, even during frost conditions, while however remaining ready for operation at any time. Glysofor EVO N reliably avoids bursts caused by frost, which also result in damage to the system.

Glysofor N – 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

## Corrosion protection

Glysofor EVO N contains a combination of corrosion inhibitors, which provide optimal corrosion protection for metals. All of the corrosion inhibitors used are classed in the lowest water pollution class 1 and have optimum biodegradability. The use of nitrate, nitrite, phosphate, borate, silicate, and triazole was consciously dispensed with in the formulation of Glysofor EVO N.

## Application

**Glysofor EVO N is delivered as a concentrate and, depending on the desired frost protection value, must be diluted with water.**

**Preparation:** Before the plant is filled for the first time, it should be tested for leaks. For this purpose, the plant should initially be filled with chloride-free water in the amount specified by the plant manufacturer, so that if any leakage occurs, no frost protection agent will be released accidentally. If the capacity of the plant is not known, the filling in of water must be closely monitored in order to simultaneously determine the exact capacity (via the water meter, where necessary). Determining the capacity proves helpful for calculating and adjusting the desired frost protection value. If it is not possible to test the plant using water (e.g. due to low temperatures), the plant should be observed during the filling process as far as possible.

**Filling:** If the capacity of the plant is not known, the required quantity of Glysofor EVO N can be calculated using the table below. In order to ensure an ideal distribution, the system should first be filled with approx. 50% of the required quantity of water, followed by the entire required quantity of Glysofor L and finally the remaining quantity of water.

**Refilling:** If the system needs to be refilled, and the required refilling quantity is not known, an estimated quantity of Glysofor EVO N is premixed, proportional to the desired level of frost protection. The premixed Glysofor EVO N /water mixture is then filled into the system.

**Testing the frost protection:** After the system has been filled, a several hours long circulation should take place (overnight, if possible). The Glysofor EVO N concentration can be determined by means of the specific density of the Glysofor EVO N/water mixture. The values listed in the table below represent the weight in grams per litre. The frost protection value setting is determined based on the temperatures that can be expected in that region. In order to ensure reliable frost protection at all times, we recommend a 5 to 10 % higher setting for this value.

## Application guidelines

Galvanised components are to be avoided, as zinc is generally volatile with glycol and products which contain glycol. The water that is used for producing the solution should have a maximum hardness of 25 °dH and a maximum chloride content of 100 mg/l. Generally, tap water fulfils these requirements. Pipe connections are to be made of hard solder and chloride-containing flux materials are to be avoided or are to be removed completely by flushing after usage. Scalings on copper components, metal swarf and contaminations are to be removed completely before the plant is filled. Plants that are to be operated with Glysofor must not be in contact with any external electrical potential. When installing the plant, it must be ensured that the future operation is not interrupted by circulatory disturbances caused by air cushions or debris. Plants that are operated with Glycogard must be installed as closed systems and are to be filled completely and vented directly after the pressure test is carried out. Gas and air cushions are to be removed immediately. Breathers are to be applied in such a way that they keep the system free from air and oxygen at all times and that, in the case of low pressure, no air can be sucked in. If an existing plant is to be filled with Glysofor, the corrosion status should be checked beforehand. Before a system that is damaged by corrosion is filled, it must be completely reconstructed. In order to ensure a sufficient level of functionality and frost protection at all times, the condition and concentration of Glysofor EVO N should be tested at least once per year. This is particularly advisable if work has been carried out on the operated system or the liquid has been refilled. Overheating must be strictly avoided, as this can lead to damage and the premature ageing of Glysofor EVO N.

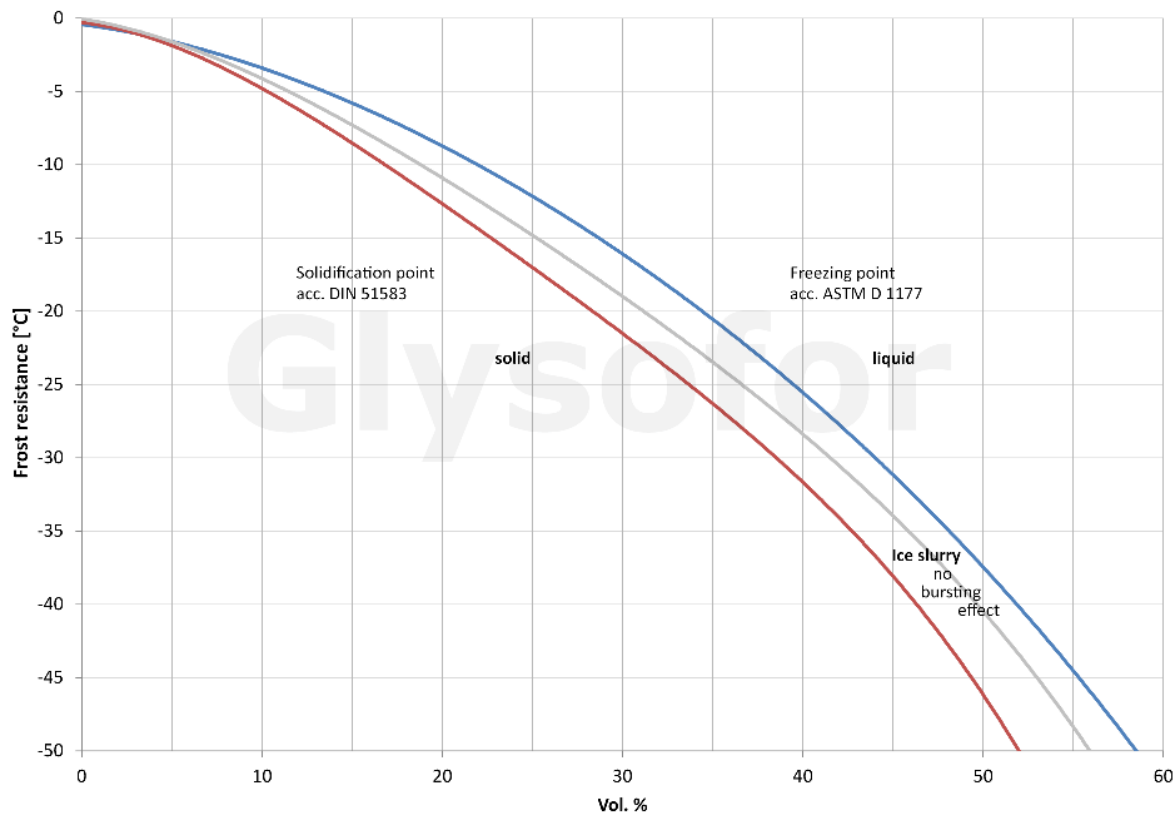


## Technical data

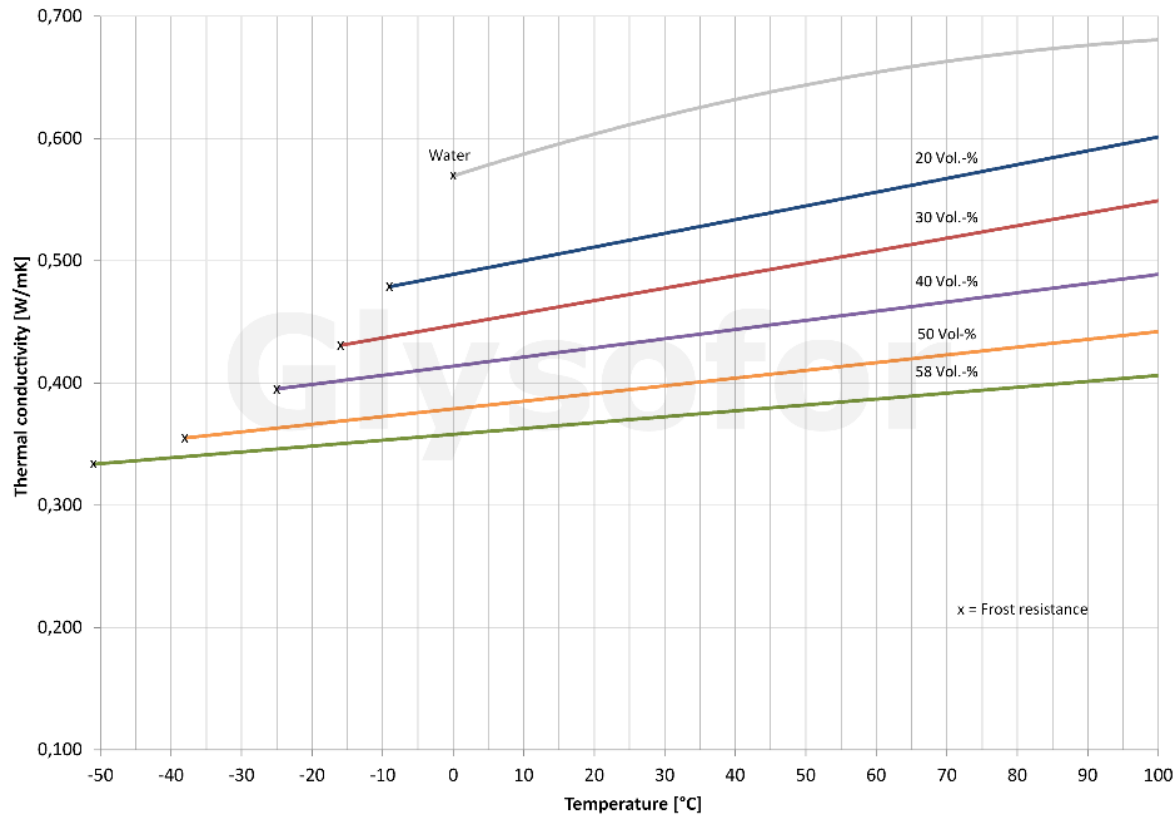
Concentrate [Vol.%]	Frost resistance [°C]	Temp. [°C]	Thermal conductivity [W/m K]	Spec. heat capacity [kJ/kg K]	Density [g/cm <sup>3</sup> ]	Kinemat. viscosity [mm <sup>2</sup> /s]	Cub. Expansion coefficient [K <sup>-1</sup> ]	Rel. Pressure drop factor [Factor]
20	-9	0	0,490	3,92	1,035	3,34	0,00021	1,28
		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	2,38	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
		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
100	0,490	3,81	1,013	0,66	0,00072	0,82		
50	-31	-30	0,376	3,09	1,090	38,99	0,00039	2,15
		-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
		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 <sup>3</sup> ]	Kinemat. viscosity [mm <sup>2</sup> /s]	Cub. Expansion coefficient [K <sup>-1</sup> ]	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		

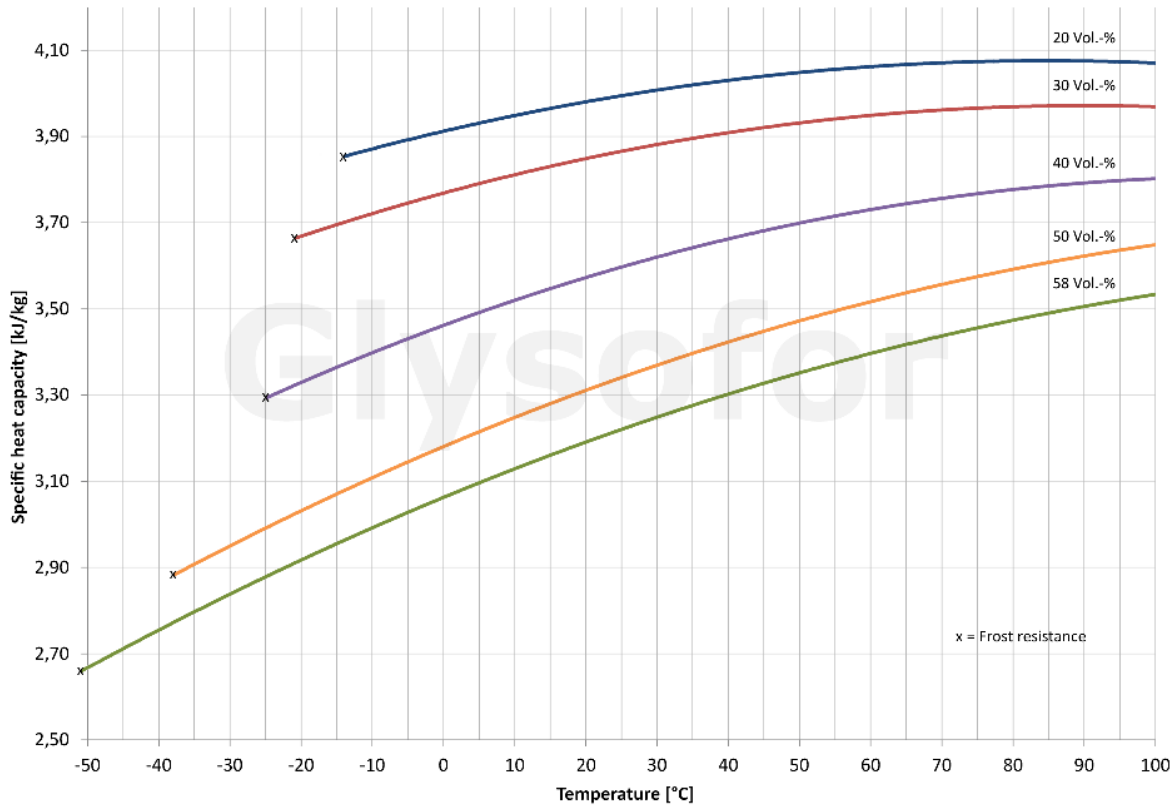
### Frost resistance of Glysofor EVO N - water mixtures



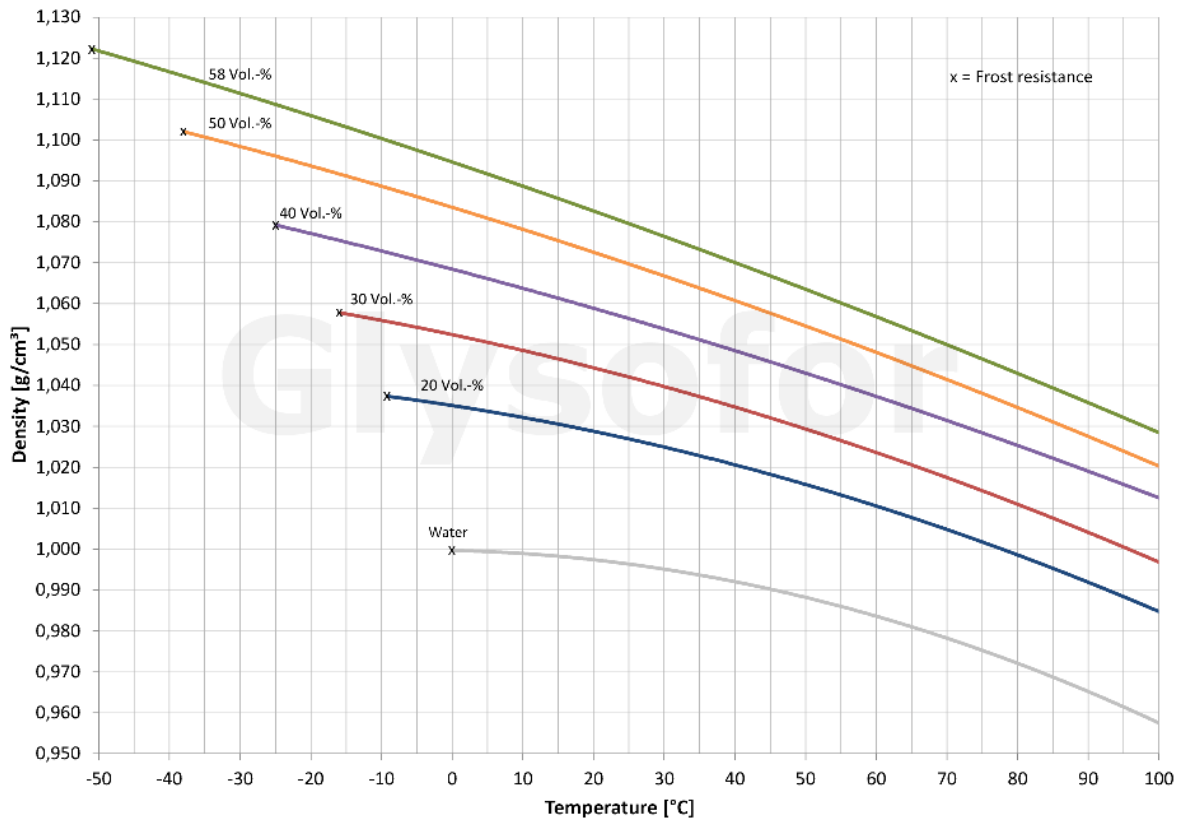
### Thermal conductivity of Glysofor EVO N - water mixtures



### Spec. heat capacity of Glysofor EVO N - water mixtures

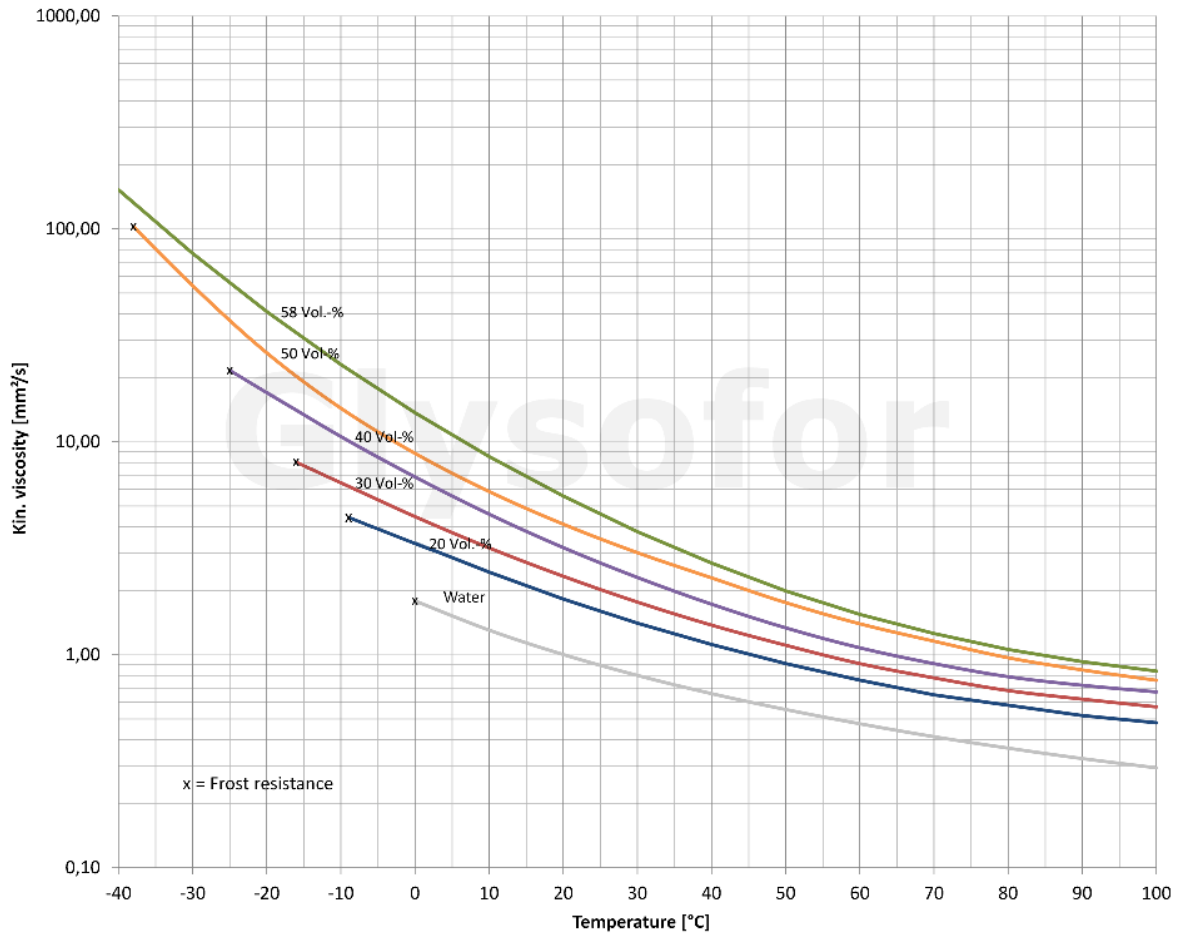


### Density of Glysofor EVO N - water mixtures

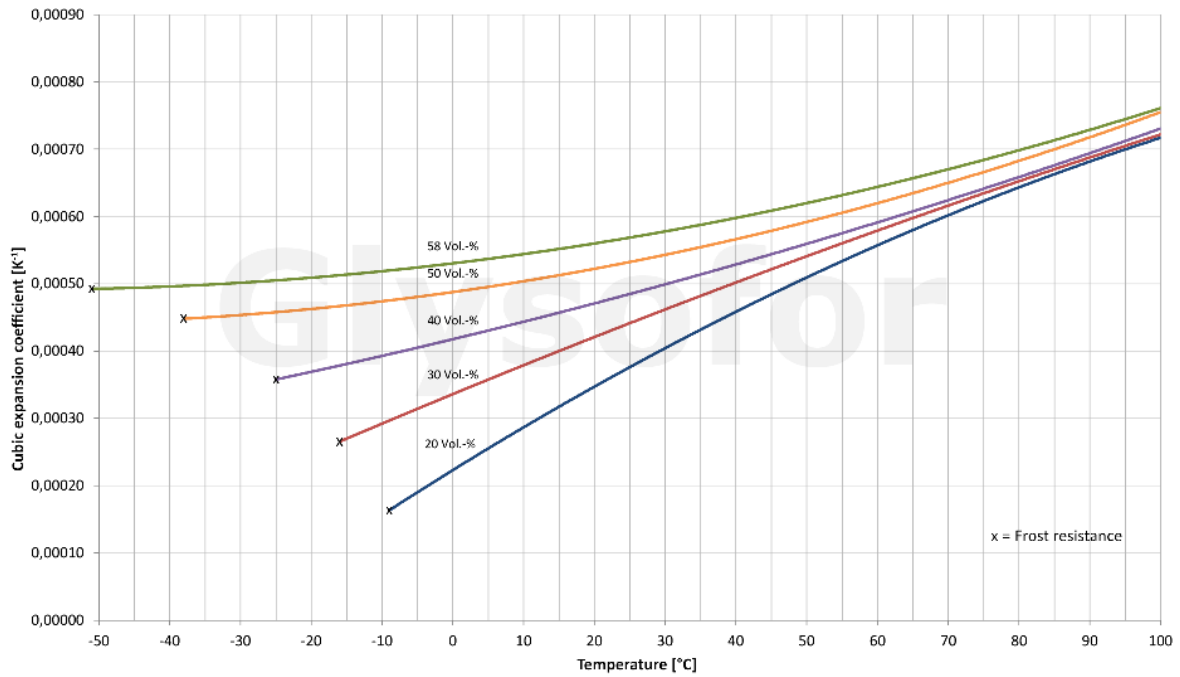




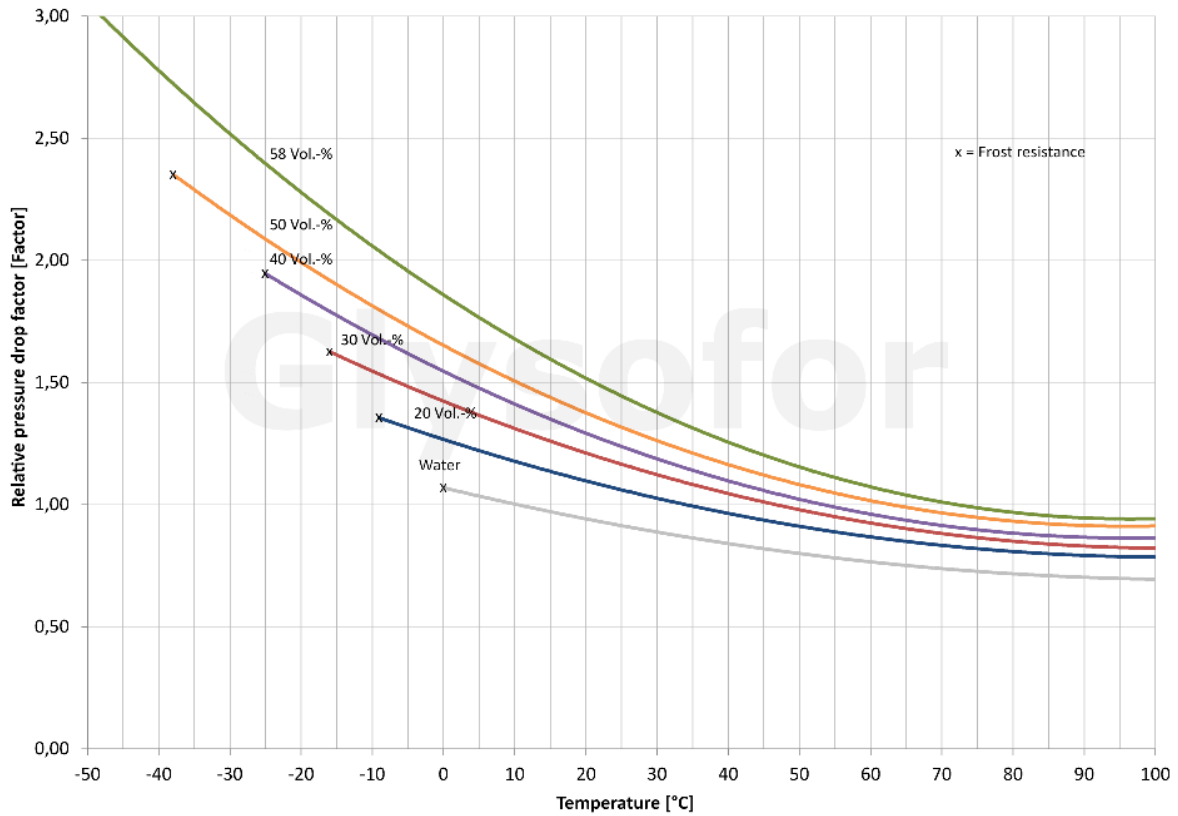
### Kinematic viscosity of Glysofor EVO N - water mixtures



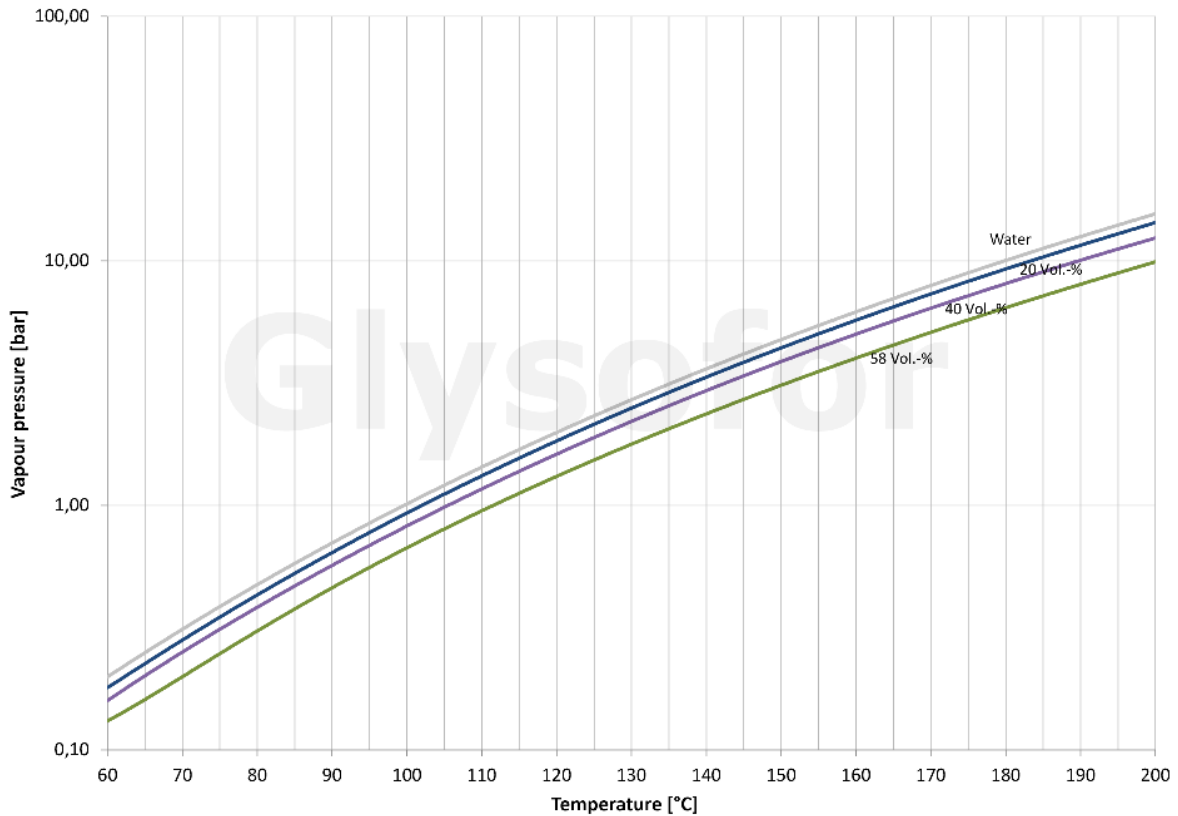
### Cub. expansion coefficient of Glysofor EVO N - water mixtures



### Relative pressure drop factor of Glysofor EVO N - water mixtures



### Vapour pressure of Glysofor EVO N - water mixtures



## Other

Pure water/glycol mixtures have very distinctive corrosive properties. You must therefore never use pure water/glycol mixtures without inhibitor equipment. We recommend Glysofor L, based on propylene, for applications in connection with food and the refrigeration or heating of food.

## Packaging sizes

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

Glysofor EVO N is completely free of nitrite, nitrate, borate, phosphate, triazole, and silicate. The raw materials used in the product have the highest possible purity.

Glysofor EVO N, and its dilutions are readily biodegradable. Glysofor EVO N has the lowest water hazard classification 1 (slight water hazard).

Glysofor EVO N 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