

Technical Data Sheet

ANTIFROGEN® KF VP 1974

HEAT TRANSFER
FLUID



Product description

Antifrogen® KF VP 1974 is a physiologically harmless, colorless heat transfer fluid based on an aqueous potassium formate solution with an effective frost and corrosion protection. The product is used in industrial and food refrigeration systems and enables an energy-efficient operation of your systems due to its extremely low viscosity even at very low temperatures.

Antifrogen® KF VP 1974 contains a finely balanced combination of corrosion inhibitors (free of nitrites, amines, borates and carcinogenic, mutagenic and reprotoxic substances) for a reliable protection against corrosion and ageing of various metallic materials.

The frost resistance is dependent on the mixing ratio with water (deionized, distilled water) and is -53 °C for the undiluted brine. The minimum usage concentration is 50 % v/v in water (-20 °C frost resistance). The low-temperature brine can be used in a very wide range of temperatures and demonstrates an outstanding corrosion protection during long-term use even at a temperature of 80 °C. Clariant recommends checking the performance of the product by the Antifrogen® service every two years.

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BUSINESS UNIT CARE CHEMICALS

TECHNICAL APPLICATIONS
EMEA IA

www.antifrogen.com

Technical Data

The following characteristics are for guidance only and should not be taken as product specifications. For more details see page 8.*

Antifrogen® KF VP 1974

Appearance	colorless liquid	-
Frost resistance	-53 °C	ASTM D 1177
Density at 20 °C	1,349 g/cm ³	DIN 51757
Refractive index at 20 °C	1,387	DIN 51423, part 2
pH-value	11	DIN 19268
Boiling point at 1013 mbar	116 °C	ASTM D 1120

Corrosion protection

Corrosion test according to ASTM D 1384 (336 h, 88 °C, 6 l/h air):

Metallic material	Average change in weight of the metallic material [g/m ²]			
	Potassium formate ^a	Calcium chloride ^b	Antifrogen® KF VP 1974 ^c	Limits ^d
Copper	-4,9	-11	-0,5	3,6
Brass (MS 63)	-22,9	-36	-1,8	3,6
Steel (C15)	-22,9	-95	-1,8	3,6
Gray iron (CG 22)	-38,1	-310	-3,0	3,5
Cast aluminium (AlSi6Cu3)	-20,3	-135	+0,4	10,4

^a Potassium formate solution without corrosion inhibitors

^b Calcium chloride solution without corrosion inhibitors

^c Antifrogen® KF VP 1974 undiluted

^d Limits for ASTM D 1384 based on the norm ASTM D 3306-05 (Specification for Glycol Base Engine Coolant for Automobile and Light-Duty Service)

The minor changes in weight of the metals and alloys tested in combination with Antifrogen® KF VP 1974 demonstrate the high effectiveness of the corrosion inhibitors. Calcium chloride brines as well as formate- and acetate water mixtures without any inhibitors cannot be used due to the corrosive properties. Antifrogen® KF VP 1974 provides a reliable corrosion protection even after long-term tests of half a year at high temperature (80 °C) which confirms its suitability for permanent usage.

Compatibility with sealing materials

According to data published in literature and the results of our own experiments, the following plastics and elastomers are suitable for the use in components that come in contact with Antifrogen® KF VP 1974 water mixtures of common concentration:

EPDM	Olefin rubber
LDPE / HDPE	Polyethylene low / high density
NBR	Nitril rubber
PP	Polypropylene
PTFE	Polytetrafluorethylene

** The sealing materials have been tested at 80 °C under specific conditions. Please also consider the data on the chemical resistance of these materials given by the respective manufacturers.

Application guidelines

1. The frost resistance is dependent on the mixing ratio with water and is -53 °C for the undiluted brine. To dilute Antifrogen® KF VP 1974 only demineralized water may be used to prevent precipitations. Concentrations lower than the minimum usage concentration of 50 % v/v Antifrogen® KF VP 1974 in water (-20 °C frost resistance) should not be applied as they no longer provide sufficient corrosion protection, especially for ferrous metals. Phase separation of Antifrogen® KF VP 1974 water mixtures does not occur.
2. Antifrogen® KF VP 1974 should be applied in closed systems as contact with atmospheric oxygen leads to a faster consumption of the inhibitors. In open systems operation as high-temperature brine is not permitted. In addition any unnecessary incorporation of air has to be avoided.
3. When assembling the plant, only chloride-free soldering agents should be used, as chloride residues are highly corrosive and can lead to pitting corrosion.
4. Since soft solder is not resistant to Antifrogen® KF VP 1974 we recommend the use of hard solder.
5. The contact of Antifrogen® KF VP 1974 with galvanized components should be prevented as zinc is dissolved.
6. Before the system is filled with Antifrogen® KF VP 1974 it has to be drained, thoroughly rinsed with water (esp. if the system was filled with a chloride containing brine) and carefully checked for corrosion

damages. If necessary we recommend an acid pickling with subsequent neutralization to remove persistent rust deposits. Systems with corrosion or deposits (e. g. limescale, biological deposits) present cannot be operated corrosion-proof with Antifrogen® KF VP 1974 later on since the metals may be unevenly inhibited and the inhibitors may be prematurely consumed.

7. To prevent corrosion, drained systems should immediately be refilled with Antifrogen® KF VP 1974, even if the system is to be operated at a later date.
8. Mixtures of Antifrogen® KF VP 1974 with water should roughly be premixed either before or during filling the system. The installation of a filter element to protect against solid particles is recommended.
9. Since Antifrogen® KF VP 1974 water mixtures exhibit a higher viscosity and density than pure water, a higher pressure drop in pipelines must be taken into account.
10. After leakage or withdrawal, the system is only to be filled up with an Antifrogen® KF VP 1974 water mixture of the same concentration! Mixing with other products, especially chloride brines but also glycol-based fluids, must definitely be avoided since chemical reactions and precipitation may occur.
11. When stored in the closed original packaging Antifrogen® KF VP 1974 can be kept for two years. Storage in galvanized containers is to be avoided.
12. Antifrogen® KF VP 1974 can be disposed of in accordance with local regulations. In each case the water and waste regulations have to be taken into account.

Antifrogen® Service

According to our experience Antifrogen® KF VP 1974 can be relied upon to give many years protection.

For further information please contact our Antifrogen-Service, www.antifrogen.com.

Toxicological characteristics and safety

Antifrogen® KF VP 1974 has neither a flash point nor a fire point.

Antifrogen® KF VP 1974 is inhibited without the use of nitrites, amines, borates and does not contain any CMR substances nor other substances restricted in accordance with the EC Directive 2011/65/EU, Article 4 §1 (such as lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls and polybrominated diphenyl ethers).

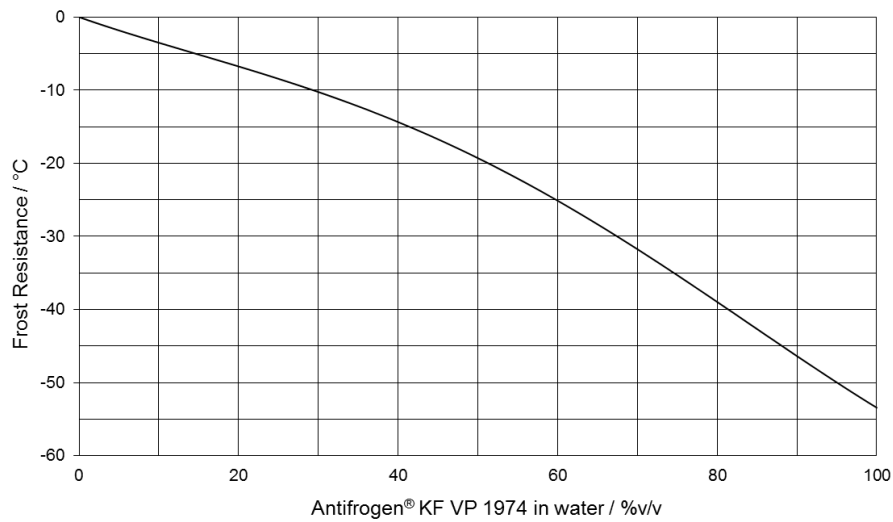
Antifrogen® KF VP 1974 is toxicologically harmless, readily biodegradable and classified in water hazard class WHC 1 (slightly hazardous to water).

When dealing with chemical products all necessary precautions have to be taken and industrial sanitary standards have to be met.

Appendix

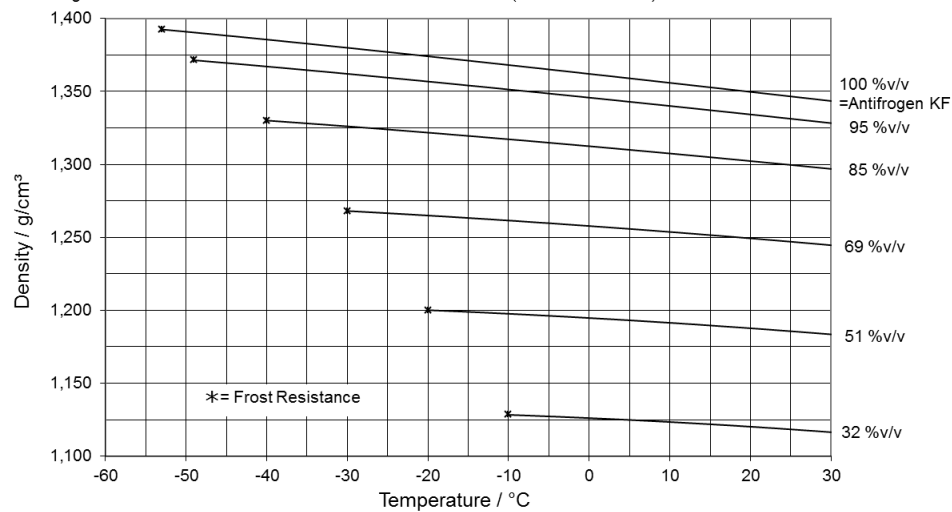
Frost Resistance

of Antifrogen® KF VP 1974 water mixtures (freezing point acc. to ASTM D 1177)



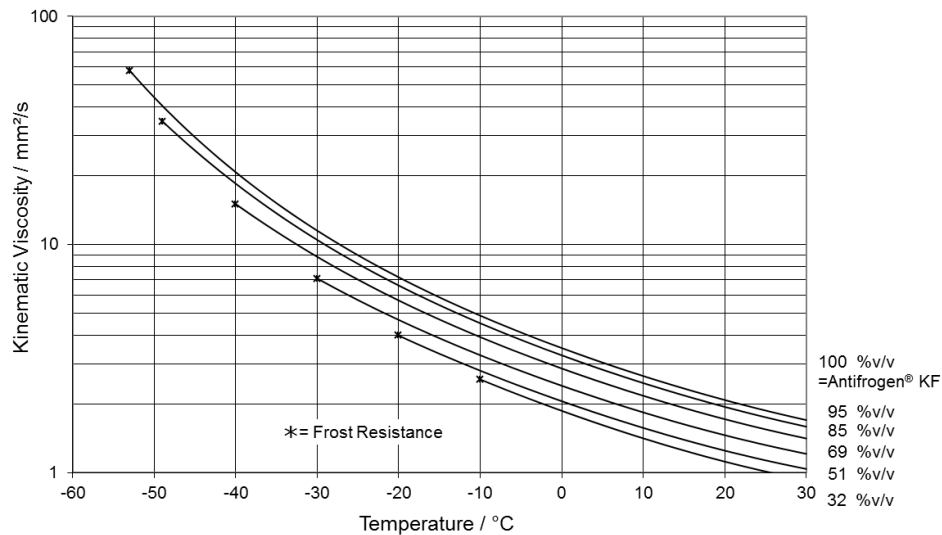
Density

of Antifrogen® KF VP 1974 water mixtures of various concentrations (acc to DIN 51757)



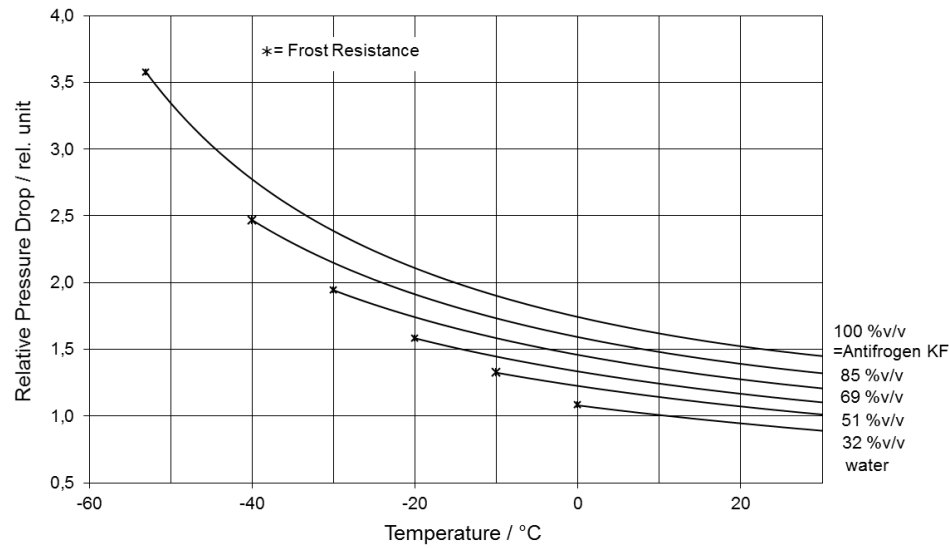
Kinematic Viscosity

of Antifrogen® KF VP 1974 water mixtures of various concentrations (acc. to DIN 51562)



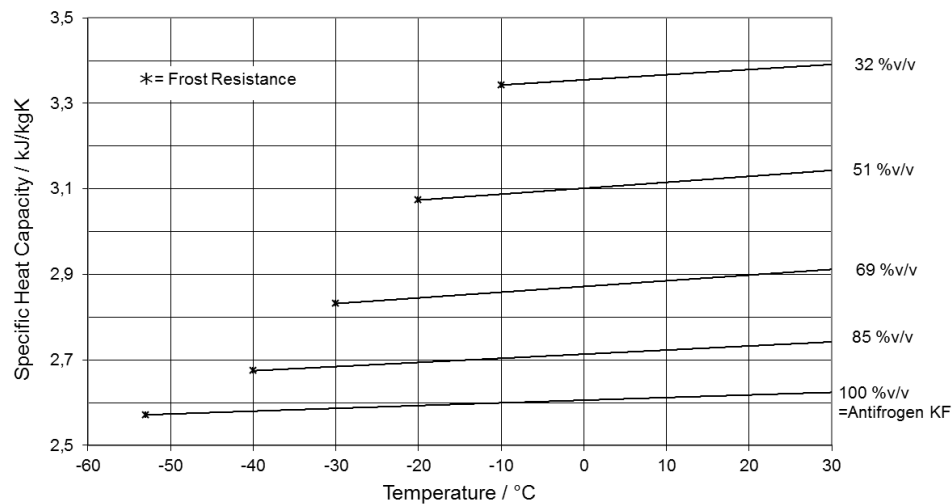
Relative Pressure Drop

of Antifrogen® KF VP 1974 water mixtures in comparison to water (+10°C) for turbulent flow



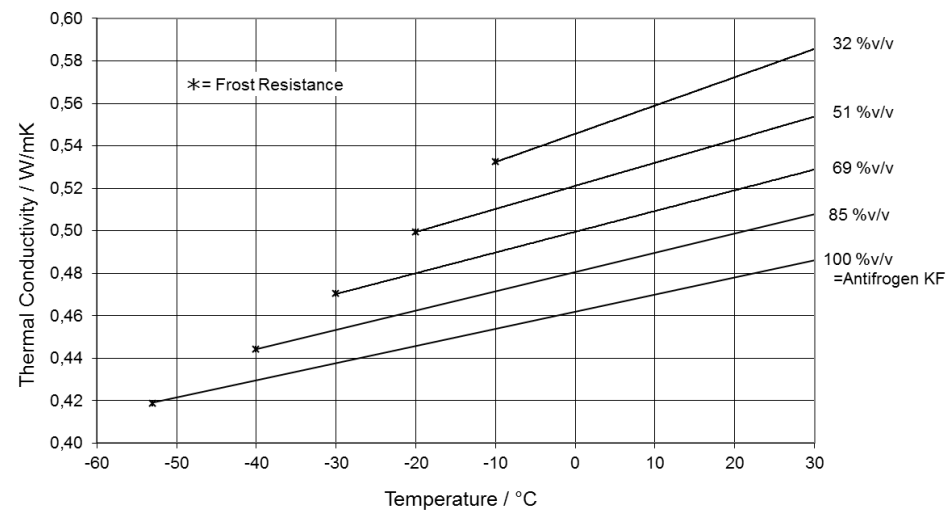
Specific Heat Capacity

of Antifrogen® KF VP 1974 water mixtures of various concentrations



Thermal Conductivity

of Antifrogen® KF VP 1974 water mixtures of various concentrations



^{*)} The product specifications are given in the product specification sheet. The certified quality system in accordance with DIN EN ISO 9001 is used in production and quality control. This ensures a consistent high product quality. For further information to product characteristics, toxicological, ecological and safety-related data, please refer to the MSDS currently in force.

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