

ANTIFROGEN L

Technical Data Sheet

For VdS Applications

ANTIFROGEN L

Product Description and Applications

Antifrogen L is a propylene glycol based coolant and heat transfer fluid with highly efficient anti-corrosion additives.

- Appearance: blue liquid.
- Propylene glycol based.
- Contains highly efficient corrosion inhibitors.
- Fulfills and exceeds ASTM D 1384-05 corrosion test standard.
- Permanent usage temperatures: ca. -19 °C to +150 °C.
- Corrosion inhibition free of borates, phosphates, nitrites, amines, silicates and CMR-substances (cancerogenic, mutagenic and reprotoxic).
- Produced exclusively with high quality, pure glycol. No recycled glycol.

Antifrogen L water mixtures are used as antifreeze in sprinkler systems and provide reliable and long-lasting protection against frost, corrosion and deposits.

Antifrogen L is approved in the following water mixtures as an antifreeze and anticorrosive agent in sprinkler systems. These four products have a VdS approval (VdS Schadenverhütung GmbH, approval number G4040093, www.vds.de) as an antifreeze agent in stationary water extinguishing systems (certificate at www.antifrogen.de available).

Approved mixtures for VdS applications:

- See also VdS approval at www.vds.de
 - Antifrogen L Watermixture 25%
 - Antifrogen L Watermixture 32%
 - Antifrogen L Watermixture 35%
 - Antifrogen L Watermixture 38%

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Corrosion Protection

Antifrogen L contains an extremely effective combination of corrosion inhibitors, which permanently protects the metals of the sprinkler systems against corrosion by depositing on the metal surface and forming a thin protective film. In addition, Antifrogen L stabilizes the pH value of the liquid and keeps it within the optimum range. Metals such as unalloyed steel, brass, copper, cast iron, cast aluminum and many other metal alloys are protected from corrosion for many years.

To determine the effectiveness of corrosion inhibitors in heat transfer fluids, the corrosion test ASTM D 1384 (88 °C, 6 l/h air, 336 h, synthetically corrosive water for dilution) has become established. According to these measurements, Antifrogen L water mixtures provide very efficient corrosion protection for the following materials, even in continuous operation:

- Copper (SF Cu)
- Soft Solder (WL 30)
- Brass (MS 63)
- Steel (C15)
- Cast Iron (CG 22)
- Cast Aluminium (AlSi6Cu3)

Antifrogen L shows superior performance in corrosion protection even after an extended test period of 3000 hours. The minimal weight changes of the tested metals and alloys confirm the suitability of Antifrogen L for long-term operation.

In contrast, **propylene glycol-water mixtures without the addition of inhibitors cannot be used** due to their highly corrosive properties.

Contact with galvanized components shall be avoided, since glycol-water mixtures dissolve zinc.

Antifreeze

Propylene glycol is used as the base for the Antifrogen antifreeze. The frost protection depends on the mixing ratio with water (see table below).

Antifrogen L in Water	Freezing Point (ASTM D 1177)
25 % v/v	-10 °C
32 % v/v	-14 °C
35 % v/v	-17 °C
38 % v/v	-19 °C

The freezing point is the temperature at which ice crystals begin to form when cooling an Antifrogen L water mixture. If the temperature is lowered further, an ice slurry (still pumpable) is formed until the mixture eventually solidifies at the pour point. Below this temperature there is a risk of bursting for the installation.

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Compatibility with Sealing Materials / Plastics

The plastics and elastomers listed in the following table are resistant to Antifrogen L water mixtures based on our experimental results and literature references. Please also refer to the data provided by the respective manufacturers regarding the chemical resistance of these materials.

ABS	Acrylnitrile Butadiene Styrene	POM	Polyacetal
FKM	Fluorkarbon Elastomers	PP	Polypropylene
IIR	Butyl Rubber	PTFE	Polytetrafluorethylene
HDPE	Polyethylene high density	Hart PVC	Polyvinylchloride unplasticized
LDPE	Polyethylene low density		
NBR	Nitril Rubber	SBR	Styrene Butadiene Rubber up to 100°C
NR	Nature Rubber up to 80°C	SI	Silikone Rubber
PA	Polyamide	UP	Polyester Resins
PB	Polybutene		

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Polyurethane elastomers (PU), flexible PVC and phenol formaldehyde resins are not resistant.

For pipe thread connections in which hemp is used, the application of sealing compounds such as Fermit® or Fermitol® has proven to be effective.

When sealing tapes made of polytetrafluoroethylene (PTFE) are used, leaks may occur due to the low surface tension of Antifrogen L water mixtures.

The lower surface tension and thus better wetting capacity of Antifrogen L in comparison to water can cause rust that is already present to get detached. Small corrosion damages can thus become visible as leaks when changing from water to an Antifrogen L water mixture.

Application Guidelines

1. Homogeneous mixtures of water and Antifrogen L do not demix.
2. Antifrogen L should only be used in closed systems, since the contact with atmospheric oxygen can affect the corrosion protection performance.
3. When installing the system, only **chloride-free solders** should be used as chloride residues can cause pitting corrosion.
4. Contact of Antifrogen L with **galvanized components shall be avoided**, as zinc is dissolved by glycol-water mixtures. The steel underneath the zinc layer is protected by the Antifrogen L corrosion inhibitors, but zinc deposits can form in the system, which can lead to blocking, for example.
5. Before the system is filled with an Antifrogen L water mixture, it has to be emptied, thoroughly rinsed with water (esp. if the system was filled with a brine or chloride

containing fluid) and **checked for corrosion damages**. If necessary, **professional cleaning** (e.g. acid pickling) is recommended to remove rust, deposits or third-party products. Systems with corrosion or deposits (e.g. limescale, biofilm) present, cannot be operated corrosion-proof with Antifrogen L as the metals may be unevenly inhibited and the inhibitors may be prematurely consumed.

6. Emptied systems should be refilled immediately to avoid any risk of corrosion, even if the system is not to be put into operation until a later date.
7. **Mixing with other products must be avoided** as it can lead to corrosion, precipitations and foaming. The system may only be topped up with an Antifrogen L water mixture.
8. More information about our Antifrogen Service can be found on www.antifrogen.com.

Application Guidelines for Maintaining the VdS Certification

1. Antifrogen L may only be used for VdS applications in the concentrations approved by the VdS.
2. Therefore, after a leak or withdrawal, only an Antifrogen L water mixture approved by the VdS may be used to fill it up.
3. Antifrogen L mixtures can be used to fill the pipe networks of sprinkler systems. However, it must be proven that the sprinkler in the most unfavorable position from a hydraulic point of view allows clean water to emerge after 4 minutes at the latest.
4. It must be ensured that, as a result of temperature fluctuations, no impermissible pressures can arise for the area of the pipe network filled with antifreeze. This can be achieved, for example, with a safety valve and an automatic pressure-maintaining pump.
5. For use in sprinkler systems, the material properties and frost protection of the antifreeze must be checked once a year by the manufacturer (Antifrogen-Service, www.antifrogen.com). The submitted samples must be marked as VdS-relevant. If necessary, VdS can request a copy of the test results either from Clariant or from the operator.
6. For use in systems with more than 20 sprinklers in one section, prior agreement with the VdS Technical Testing Center is required.
7. The mixtures mentioned can be used in a pressure range from 0 to 16 bar.
8. Only the four available Antifrogen L water mixtures (25, 32, 35 and 38%) are permitted as VdS approved extinguishing liquids for Class A Fires in sprinkler systems and can be used for filling.
9. The safe use of Antifrogen L water mixtures is subject to the following conditions, which are determined by the Antifrogen Service (www.antifrogen.com):

- a. **Frost Protection.**

It depends on the freezing point and must be matched to the respective system. The frost protection may change over the course of use (e.g. due to aging, sampling, residual water when filling, etc.). For VdS systems, the freezing point must not fall below -19 °C.

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b. Corrosion Protection:

The corrosion protection is determined by the Antifrogen Service using a procedure agreed with the VdS and is shown in the test report.

If the frost protection no longer suits your system or the defined corrosion protection is no longer sufficient, this will be stated in the test report. The system must then be emptied and refilled with one of the four available, VdS-approved Antifrogen L water mixtures, taking into account the above points.

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Safety

You can find an up-to-date safety data sheet (MSDS) at www.antifrogen.de. This also includes information on storage, transport and disposal.

Availability

As a VdS-approved product, Antifrogen L is only available from the dealers listed at www.antifrogen.com or in the VdS certificate in the following water mixtures:

- Antifrogen L Water-mixture 25%
- Antifrogen L Water-mixture 32%
- Antifrogen L Water-mixture 35%
- Antifrogen L Water-mixture 38%

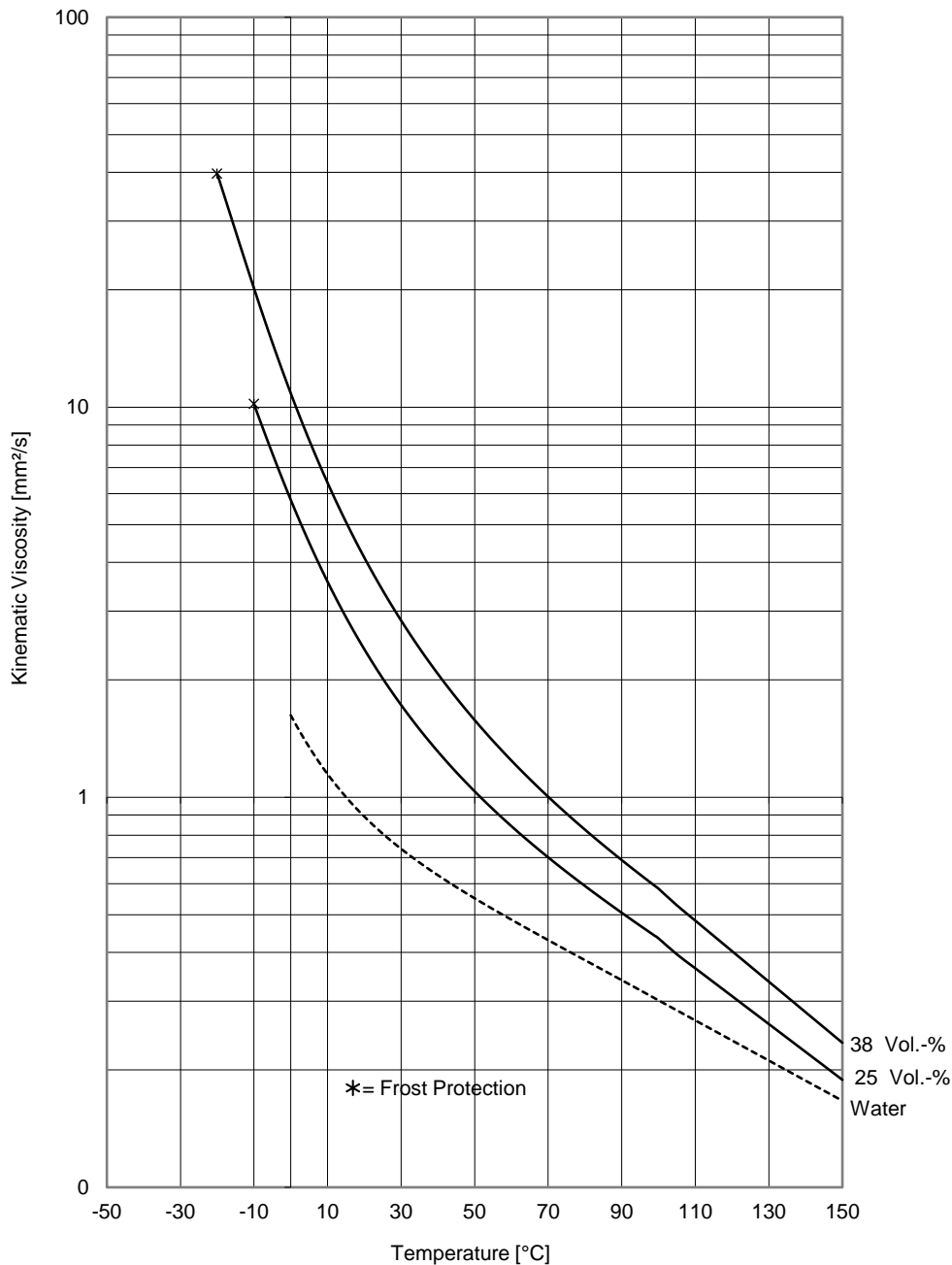
Physical Data

Kinematic Viscosity
of Antifrogen L water mixtures at different concentrations

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(¹) In the range of 0-16 bar it can be assumed that the viscosity is independent of the pressure.

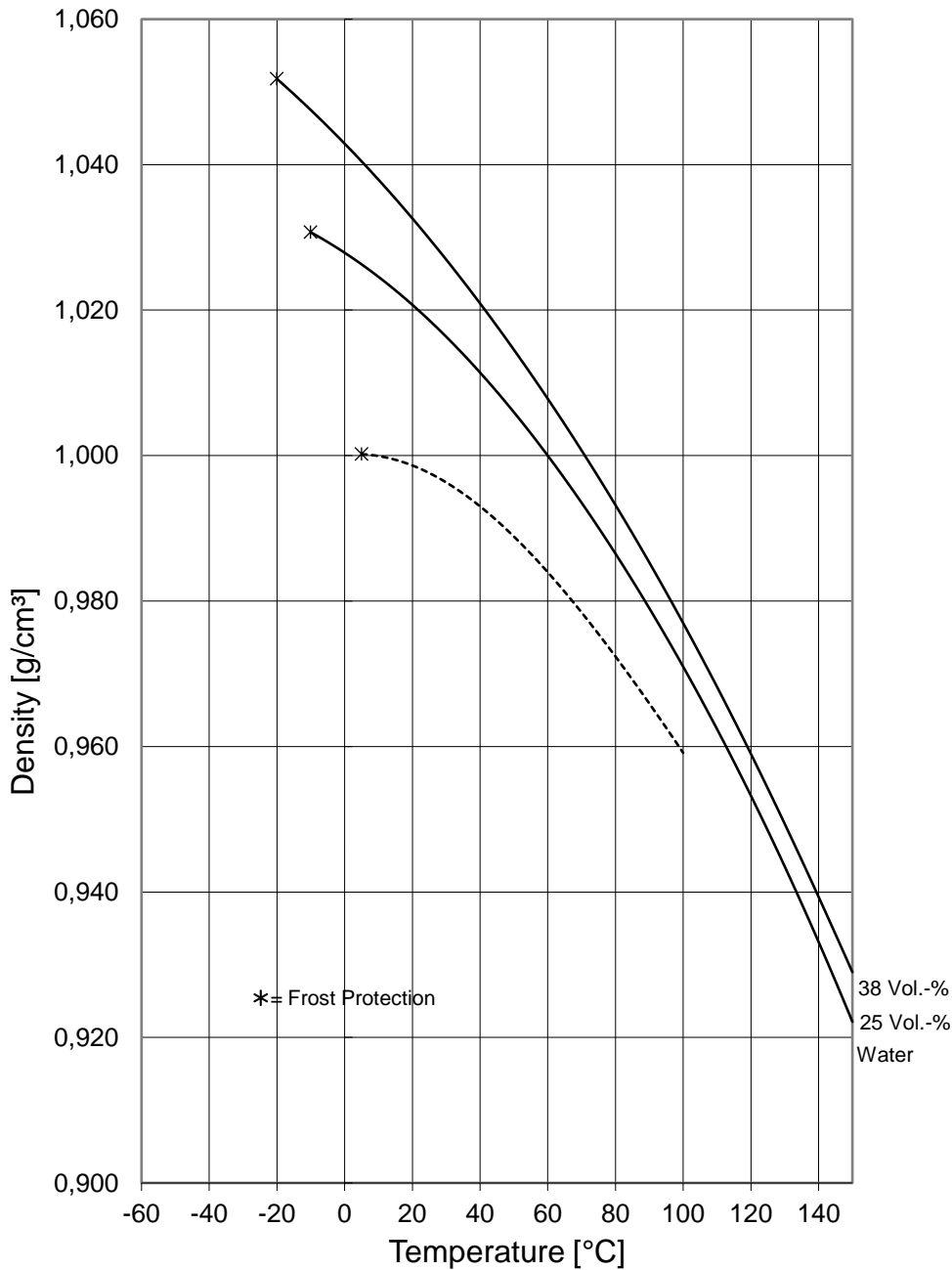
Density

of Antifrogen L water mixtures at different concentrations

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