CLARIANT

ANTIFROGEN L

Technical Data Sheet

Publisher
Rothausstrasse 61
4132 Muttenz
Switzerland

Copyright ©
Clariant International Ltd, 2022

Contact
BU INDUSTRIAL & CONSUMER SPECIALTIES
www.ics.clariant.com
www.clariant.com

Issue
March 2022

ANTIFROGEN L

Heat transfer fluid

Technical Data[1]
Antifrogen L Konzentrat

Basic composition	propylene glycol, water, corrosion inhibitors

Chemical and physical data

Appearance	Clear, blue liquid
Odor	Almost odorless
Density (20°C) DIN 51757	1.043 g/cm³
Refractive index (20°C) DIN 51423 part 2	1.432
pH value (20 °C, 33 %v/v in DI-water) DIN 19268	Ca. 9
Reserve alkalinity ASTM D 1121	Min 4 ml 0.1M HCl
Kin. viscosity (20°C) DIN 51562	59 mm²/s
Surface tension (20 °C, 33 %v/v in DI-water) DIN EN 14370	36 mN/m
Electr. conductivity (25 °C, 33 %v/v in DI-water) DIN EN 27888	ca. 2400 µS/cm
Boiling point (1013 mbar) ASTM D 1120	155°C
Flash point ASTM D 6450	104°C

For further physical data, please see the **Antifrogen Online Calculator** on www.antifrogen.com.

[1]These characteristics are for guidance only and not to be taken as product specifications.

Publisher
Rothausstrasse 61
4132 Muttenz
Switzerland

Copyright ©
Clariant International Ltd, 2022

Contact
BU INDUSTRIAL & CONSUMER SPECIALTIES
www.ics.clariant.com
www.clariant.com

Product Description

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

Antifrogen L mixed with water offers reliable and long-lasting protection from frost, corrosion and deposits for closed heating and cooling systems and is used in a wide range of applications such as in HVAC, process cooling and heating in the food and pharmaceutical industry or as an anti-freeze in sprinkler systems..

- Appearance: blue liquid.
- Propylene glycol based.
- Contains highly efficient corrosion inhibitors.
- Fulfills and exceeds ASTM D 1384-05 corrosion test standard.
- Minimum usage concentration: 25 % v/v Antifrogen L in water (corresponds to freezing point of ca. -10 °C).
- Permanent usage temperatures: ca. -30 °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.
- Available in both concentrate and various water mixtures.

Applications

Antifrogen L is used as heat transfer fluid, antifreeze and corrosion inhibitor in closed cooling and heating systems (chillers, chilled water air-conditioning systems, re-coolers, heat pumps, heating circuits prone to frost, etc.) for various applications:

- Heating, ventilation and air conditioning – HVAC (shopping malls, clinics, hotels, office buildings, production, storage and exhbitions halls, airports).
- Cooling of production equipment and facilities in the food and beverage industry (breweries, dairies, wineries, ice cream and chocolate factories, meat and fish processing, baking lines, flash freezing) .
- Process cooling and heating in the pharmaceutical and chemical industry.
- Industrial heat recovery.
- Sprinkler systems - Approval of the VdS (www.vds.de, certificate number G4040093) as antifreeze in stationary water extinguishing systems (certificate on www.antifrogen.com).
    - VdS-certified material is only available from the distributors listed at www.antifrogen.com.

Publisher
Rothausstrasse 61
4132 Muttenz
Switzerland

Copyright ©
Clariant International Ltd, 2022

Contact
BU INDUSTRIAL & CONSUMER SPECIALTIES
www.ics.clariant.com
www.clariant.com

Corrosion Protection

Antifrogen L contains a highly efficient combination of corrosion inhibitors which provide long-term corrosion protection for the metals of the cooling and heating installations by forming a thin protective film on the metal surface. In addition, Antifrogen L stabilizes the pH value of the liquid and keeps it within the optimal range. Metals such as carbon steel, brass, copper, cast iron, cast aluminum and many other metal alloys are protected against corrosion for many years.

To determine the efficiency of corrosion inhibitors in heat transfer fluids, the corrosion test ASTM D 1384 (88 °C, 6 l/h air, 336 h, synthetic corrosive water for dilution) has become established. The following table shows the results of Antifrogen L compared to propylene glycol without any corrosion inhibitors.

Average change in weight of metals in g/m2 due to corrosion, tested according to ASTM D 1384 (88 °C, 6 l/h air, synthetic corrosive water for dilution).

Metal	33 %v/v Antifrogen L in water (336 h)	33 %v/v Antifrogen L in water (3000 h)	33 %v/v Propylenglykol without additives in water (336 h)	Limits[2]
Copper (SF Cu)	**-0.4**	**-2.8**	**-1.2**	**3.6**
Soft Solder (WL 30)	**-0.6**	**-0.1**	**-136**	**11.2**
Brass (MS 63)	**-0.3**	**-1.3**	**-2.5**	**3.6**
Steel (C15)	**+0.1**	**+0.4**	**-225**	**3.6**
Cast iron (CG 22)	**-0.3**	**-1.6**	**-92**	**3.5**
Cast aluminium (AlSi6Cu3)	**+0.6**	**-1.7**	**-68**	**10.4**

[2] maximum permitted weight changes acc. to ASTM D 3306-05 (for 336 h)

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.

Galvanized components should be **avoided** if possible, as all glycol-water mixtures can dissolve zinc.

Frost Protection

The anti-freeze agent used in Antifrogen L is propylene glycol. The frost protection depends on the mixing ratio with water (see table below).

Publisher
Rothausstrasse 61
4132 Muttenz
Switzerland

Copyright ©
Clariant International Ltd, 2022

Contact
BU INDUSTRIAL & CONSUMER SPECIALTIES
www.ics.clariant.com
www.clariant.com

Antifrogen L in water	Freezing point (ASTM D 1177)	Pour point (DIN EN 23015)	Density at 20°C (DIN 51757)	nD20 (DIN 51423)
25 % v/v	-10°C	Ca. -12°C	1.021 g/cm^3	1.362
30 % v/v	-13 °C	ca. -16 °C	1.026 g/cm^3	1.367
35 % v/v	-17 °C	ca. -20 °C	1.030 g/cm^3	1.373
40 % v/v	-21 °C	ca. -25 °C	1.034 g/cm^3	1.378
45 % v/v	-26 °C	ca. -31 °C	1.037 g/cm^3	1.384
50 % v/v	-33 °C	ca. -42 °C	1.040 g/cm^3	1.390
55 % v/v	-40 °C	< -50 °C	1.042 g/cm^3	1.395

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.

To **determine the frost protection** of Antifrogen L water mixtures, a refractometer or an antifreeze tester suitable for propylene glycol water mixtures (available from Antifrogen distributors) can be used for instance.

Our **Antifrogen Online Calculator** (www.antifrogen.com) assists you in calculating the amount of Antifrogen L or water needed to **increase or decrease the frost protection of your installation**. It also provides a more detailed conversion table for Antifrogen concentration – freezing point – refractive index.

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	Acrylonitrile-butadiene-styrene	**PA**	Polyamide
CPE	Polyethylene crosslinked	**PB**	Polybutene
CR	Polychlorbutadiene elastomers	**PC**	Polycarbonate
EPDM	Olefin rubber	**POM**	Polyacetal
FKM	Fluorocarbon elastomers	**PP**	Polypropylene
HR	Butyl rubber	**PTFE**	Polytetrafluorethylene
HDPE	Polyethylene high density	**Hart PVC**	Polyvinylchloride unplasticized
LDPE	Polyethylene low density		
MFQ	Fluorosilicone rubber	**SBR**	Styrene butadien rubber up to 100 °C

NBR	Nitril rubber	**SI**	Silicone rubber
NR	Nature rubber up to 80 °C	**UP**	Polyester resins

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. Antifrogen L is **only to be applied in dilution with water**, for which demineralized water or tap water (chloride content: < 100 mg/kg, water hardness: 0 to 25 °dH) can be used. Concentrations lower than the **minimum concentration of 25 %v/v Antifrogen L in water** must not be used as too dilute mixtures do not provide sufficient corrosion protection and might lead to the growth of microorganisms and formation of biofilms. The recommended maximum usage concentration is 50 %v/v Antifrogen L in water. Homogeneous mixtures of water and Antifrogen L do not de-mix.
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** should be **avoided** as zinc is dissolved by glycol-water mixtures. Though the steel under the zinc layer is protected by the Antifrogen L corrosion inhibitors, the zinc deposits can cause pump damage etc. in the system. To remove these deposits, the installation of a fine filter with a mesh size of approx. 100 to 150 µm has proven to be effective.
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.

Publisher
Rothausstrasse 61
4132 Muttenz
Switzerland

Copyright ©
Clariant International Ltd, 2022

Contact
BU INDUSTRIAL & CONSUMER SPECIALTIES
www.ics.clariant.com
www.clariant.com

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. Information about our Antifrogen Service can be found on www.antifrogen.com.

Physical Data

Physical data of Antifrogen L water mixtures are available in the **Antifrogen Online Calculator** on www.antifrogen.com.

Safety Data Sheet

The latest Material Safety Data Sheet (MSDS) can be downloaded from www.antifrogen.com. It also contains information on storage, transport and disposal.

Distributors

Antifrogen L is available as a concentrate or as a ready-to-use water mixtures from our Antifrogen distributors (see distributor overview on www.antifrogen.com).

Publisher
Rothausstrasse 61
4132 Muttenz
Switzerland

Copyright ©
Clariant International Ltd, 2022

Contact
BU INDUSTRIAL & CONSUMER SPECIALTIES
www.ics.clariant.com
www.clariant.com

This information corresponds to the present state of our knowledge and is intended as a general description of our products and their possible applications. Clariant makes no warranties, express or implied, as to the information's accuracy, adequacy, sufficiency or freedom from defect and assumes no liability in connection with any use of this information. Any user of this product is responsible for determining the suitability of Clariant's products for its particular application.* Nothing included in this information waives any of Clariant's General Terms and Conditions of Sale, which control unless it agrees otherwise in writing. Any existing intellectual/industrial property rights must be observed. Due to possible changes in our products and applicable national and international regulations and laws, the status of our products could change. Material Safety Data Sheets providing safety precautions, that should be observed when handling or storing Clariant products, are available upon request and are provided in compliance with applicable law. You should obtain and review the applicable Material Safety Data Sheet information before handling any of these products. For additional information, please contact Clariant.

*For sales to customers located within the United States and Canada the following applies in addition:
NO EXPRESS OR IMPLIED WARRANTY IS MADE OF THE MERCHANTABILITY, SUITABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE OF ANY PRODUCT OR SERVICE.

© 2022 Clariant International Ltd,
Rothausstrasse 61, 4132 Muttenz, Switzerland