CLARIANT

Universal heat transfer fluid **ANTIFROGEN® N**

what is precious to you?

ANTIFROGEN® N

UNIVERSAL HEAT TRANSFER FLUID

Antifrogen N is a monoethylene glycol based heat transfer fluid for industrial applications, like closed hot water heating systems, cooling and refrigeration equipment, heat pumps, gravity systems and wind energy turbines, but can be also applied in railroad engines and to stock up leakage detector-Clariant.

Antifrogen N contains a highly efficient combination of inhibitors which provides excellent corrosion prevention and long term stability in your installations. The frost resistance is defined by the mixing ratio with water (chloride content < 100 ppm, water hardness 0° - 25° GH) and shall be at least 20% v/v of Antifrogen N (corresponds to frost protection down to -9 °C).

Antifrogen N is inhibited without the use of nitrite, amine, borate, phosphate and silicate, does neither contain CMR substances (Cancerogenic Mutagenic Reprotoxic) nor any other restricted substances as described in the EG-guideline 2011/65/EG, article 4 §1 (i.e. lead, mercury, cadmium, chromate VI, polybrominated biphenyl or diphenyl ether).

Antifrogen N is harmful to humans if swallowed (Cat. 4) and not suitable for the use in the food or pharmaceutical industry. For those applications the use of Antifrogen L is recommended.

Antifrogen N is classified to be readily biodegradable and non-toxic to aquatic organisms and meets the requirements of the German water hazard class WGK 1. It complies with our standards for sustainable acting and responsible care. Antifrogen N aqua keeps its operational efficiency over many years. Clariant advises to verify the performance during regular maintenance by the Antifrogen Service every 2 years, which is free of charge.

Product characteristics

Basis	monoethylene glycol
Appearance (20 °C)	clear yellow liquid
Density (20 °C, DIN 51757)	1.1138 g/cm³
Refraction index (20 °C, DIN 51423 part 2)	1.434
Minimum usage concentration	20 % v/v in water
Permanent usage temperature	-50 to +150 °C

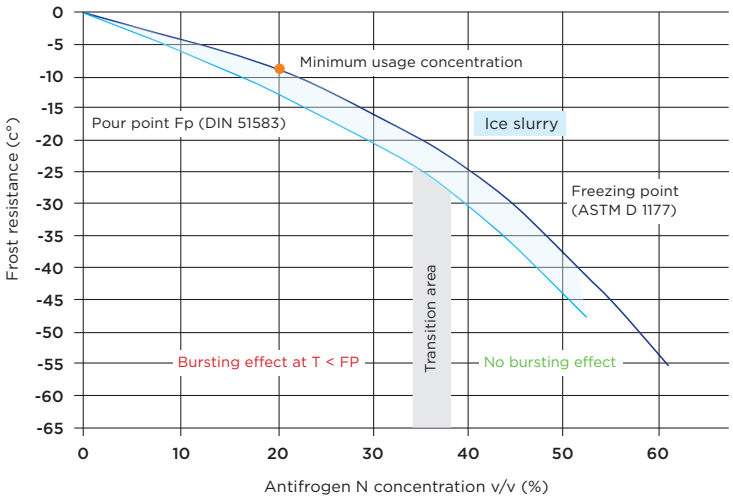
FROST AND CORROSION PROTECTION

ASTM D 1384 has been established as standardized test method to determine the protection of various metals/alloys against corrosion in water and glycol based heat exchange fluids. Antifrogen N possesses an excellent protection performance even after a prolonged test duration of 3000 h. The very minor weight losses of tested metals/alloys show its long term reliability and suitability for permanent usage.

Metal	MEG [a]	Antifrogen N [b] 336 hours	Antifrogen N [b] 3000 hours	Limits [c]
copper	-2.8	-0.9	-1.0	3.6
soft solder (WL 30)	-135	-0.9	-5.2	11.2
brass (MS 63)	-7.6	-0.8	-1.6	3.6
steel (C 15)	-152	-0.1	-0.3	3.6
gray iron (GG 22)	-273	-±0	-0.2	3.5
cast aluminium (AlSi6Cu3)	-16	-0.3	-2.7	10.4

Given values show the weight losses/increases of the metals in g/m² (acc. ASTM D 1384, at 88 °C, 6 l/h of air)
a monoethylene glycol (MEG) without inhibitors / demineralized water (1:2 v/v)
b Antifrogen N/ demineralized water (1:2 v/v)
c limits of ASTM D 1384 in accordance to ASTM D 3306-05 (Glycol Base Engine Coolant for Automobile)

The frost resistance of Antifrogen N is defined by its mixing ratio with water and does not change when used in closed systems over a long period of time. Antifrogen N/ water mixtures with a concentration of 38% v/v (frost resistance -23 °C) and more do not exhibit a bursting effect at any temperature.



Special Antifrogen N antifreeze testers and refractometers are available for determining the frost resistance.

www.clariant.com

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