TECHNICAL DATA SHEET (TDS) AND INSTRUCTIONS FOR USE

METOX ANTIFROZEN L

Heat Transfer Fluid for the Food Industry

Cooling in the food industry, freeze and corrosion protection in refrigeration and heat pump systems, fire-extinguishing medium

Product Description

Metox Antifrozen (L) is a liquid used as a heat transfer medium in heat pump systems and in food industry plants such as breweries, dairies, ice cream factories, cold stores and fish processing plants. Its corrosion inhibitor package is free of nitrites, amines, borates, silicates and phosphates. The corrosion protection system has been formulated for maximum effectiveness without the use of CMR substances (carcinogenic, mutagenic and reprotoxic).

Features and Benefits

- **Based on 1,2-monopropylene glycol**
- **Contains corrosion inhibitors:** free of nitrites, amines, borates, silicates and phosphates.
- **No CMR substances:** the corrosion protection system is formulated without carcinogenic, mutagenic or reprotoxic substances.
- **Minimum use concentration:** 25% by volume (freeze protection −10 °C)
- **Continuous service temperature:** approx. −25 to +150 °C
- **Fire-extinguishing medium:** can be used in sprinkler systems.



30 kg drum

Packaging

Metox Antifrozen (L) is supplied in 25 kg and 30 kg drums and 1,000 kg IBC containers.

Storage

- Metox Antifrozen (L) should be stored indoors in its original, tightly closed packaging in a dry place.
- Protect from direct sunlight and excessive heat.
- Keep containers upright and out of reach of unauthorised persons; keep lids closed when not in use.

Areas of Use

- Cooling in the food industry (breweries, dairies, ice cream, cold stores, fish processing)
- Heat pump systems and ground-coupled circuits
- Closed hot water heating and heat recovery systems
- Sprinkler fire-extinguishing systems

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Technical Properties

Property	Unit	Value
Density at 20 °C (DIN 51757)	g/cm³	approx. 1.043
Refractive index at 20 °C (DIN 51423-2)	–	approx. 1.432
pH (L : water = 1:2, DIN 51369)	–	approx. 8.6
Reserve alkalinity (ASTM D 1121)	ml 0.1 M HCl	min. 4
Boiling point at 1013 mbar (ASTM D 1120)	°C	approx. 155
Pour point (DIN 51583)	°C	approx. −58
Kinematic viscosity at 20 °C (DIN 51562)	mm²/s	approx. 59
Surface tension at 20 °C (1:2, ASTM D 1331)	mN/m	approx. 47
Specific electrical conductivity at 25 °C (1:2)	µS/cm	approx. 2,800
Specific heat at 20 °C	kJ/kg·K	approx. 2.5
Thermal conductivity at 20 °C	W/m·K	approx. 0.21
Colour	–	Please consult us for colour options.

The quality system certified to DIN EN ISO 9001 covers production and quality control. The technical data characterise the product; they are taken from our own measurements or from the literature and do not form part of the delivery specification. A product specification can be supplied on request.

Freezing point table

Metox Antifrozen (L), % by vol.	Water, % by vol.	Freezing point, °C
20	80	-7
25	75	-9.5
30	70	-12
35	65	-16
40	60	-21
45	55	-26
50	50	-33

Values are approximate; test method ASTM D 1177 / DIN 51583. Minimum use concentration: 25% by volume.

Information on Fields of Application

As a heat transfer fluid, Metox Antifrozen (L) has two functions: it keeps the aqueous solution liquid at the required temperature and protects the metals in the system against corrosion. Its antifreeze function is based on monopropylene glycol, whose boiling point of approx. 187 °C prevents evaporation losses.

Hot water heating systems

In closed hot water heating systems the whole system or part of it can be shut down even below 0 °C and restarted without problems, giving fuel savings in buildings that are not heated continuously. Freeze protection down to −20 °C is usually sufficient. In underfloor heating with plastic pipes without an oxygen barrier, a minimum of 30% by volume is recommended. After draining the previous fluid the system must be flushed thoroughly with water; small leaks that become apparent after the changeover must be remedied by tightening connections or renewing the sealing material.

Heat pump, heat recovery and cooling circuits

In heat pump systems Metox Antifrozen (L) is used as the heat transfer medium in the external circuits; to prevent corrosion the concentration must not fall below 25% by volume. It is also used in heat recovery systems that may be exposed to frost. Systems previously operated with salt-based coolants must be flushed first with a rust inhibitor and then thoroughly with water; if a chloride-rich fluid was used, flushing must be very thorough. If only one secondary circuit is changed over to Metox Antifrozen (L), the two fluids must be kept completely separate. In natural circulation systems the product must be pre-mixed with water.

Sprinkler systems

The product can be used to fill the pipework of sprinkler systems; pure water must reach even the hydraulically least favourable sprinkler head no later than 4 minutes after activation, and impermissible pressure changes caused by temperature variations must not occur. Pre-diluted mixtures are available at 25, 32, 35 and 38% by volume and can be used in sprinkler systems operating at 0–16 bar.

Instructions for Use

1. When installing the system, use only chloride-free soldering materials.
2. Drain the previous fluid and flush the system thoroughly with water. Check older systems to make sure no rust is present; systems with light rust cannot subsequently be operated corrosion-free.
3. Metox Antifrozen (L) is miscible with water in any ratio; nevertheless, first fill the system with about two thirds of the required water using the circulation pumps, then add Metox Antifrozen (L) and top up with water. Complete mixing is achieved by operating the system and may take several days.
4. Leave the system filled after a pressure test; refill drained systems within a few days.
5. In case of leakage, top up only with Metox Antifrozen (L) of the same concentration; do not mix with other products or other antifreeze products.
6. Flush systems used only temporarily thoroughly with water several times before refilling.

Freeze protection and use concentration

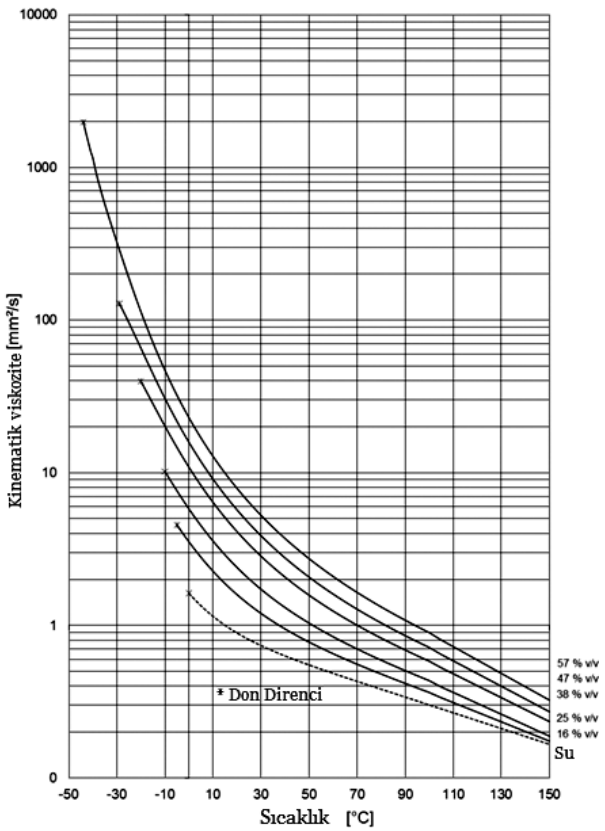
Freeze protection is determined by the mixing ratio with water and does not change for many years provided the concentration remains constant; no phase separation occurs. As corrosion protection decreases with increasing water content, the concentration must be at least 25% by volume (freeze protection down to −10 °C); below this there is a risk of bacteria, algae and fungal growth and microbial corrosion. The water used for dilution must not contain more than 100 mg/kg (ppm) chloride; water with a hardness of 0–25 °dH may be used.

Application	Adequate freeze protection
Hot water heating systems	approx. −10 to −20 °C
Other external circuits combined with heat pumps	approx. −20 to −25 °C
Ground-coupled circuits combined with heat pumps	approx. −10 to −15 °C
Cooling systems	approx. −10 to −40 °C

Heat transfer and pressure drop

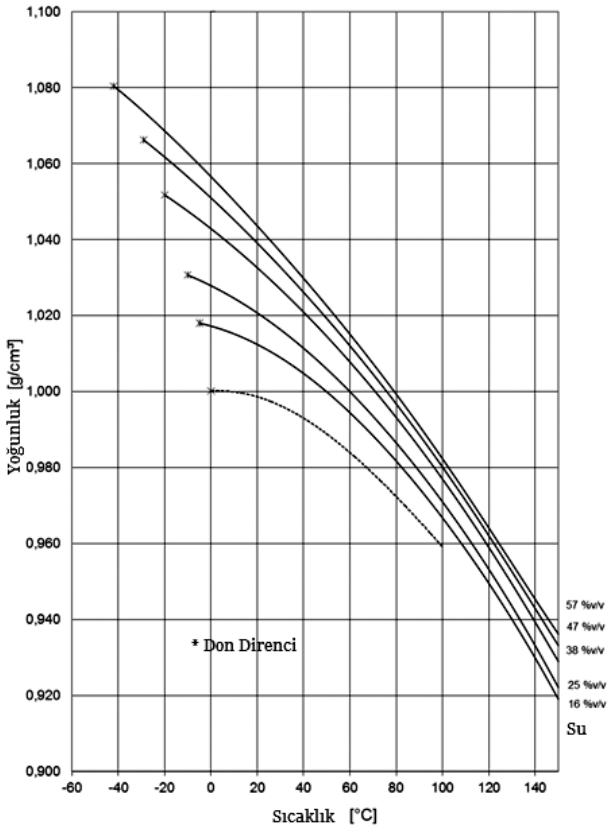
When heat is transferred to the atmosphere by radiators, the heat transferred with Metox Antifrozen (L)/water mixtures is almost the same as with water alone. In liquid/liquid heat transfer the transferable heat decreases as the product content increases; the heat transfer surface must be enlarged according to the changed k values. As the mixtures have a higher viscosity and density than water, a higher pressure drop must be expected in pipelines (see the graphs below).

Kinematik Viskozitesi



Kinematic viscosity

Yoğunluğu



Density

Material Compatibility

Metox Antifrozen (L) contains corrosion inhibitors that permanently protect metals and prevent scale formation in cooling and heating systems. Effectiveness is continuously monitored according to ASTM D 1384 (88 °C / 6 l air/h). The table shows the weight change (g/m²) of metals after 336 and 3000 hours in a Metox Antifrozen (L)/water mixture with freeze protection of −15 °C compared with an uninhibited 1,2-propylene glycol (PrG)/water mixture.

Metal	PrG	Antifrozen (L) 336 h	Antifrozen (L) 3000 h	Limit
Copper	−1.2	−0.7	−2.8	10
Soft solder (WL 30)	−136	−3.3	−2.4	30
Brass (MS 63)	−2.5	−0.8	−1.8	10
Steel (CK 22)	−225	+0.2	+0.5	10
Cast iron (GG 25)	−92	+0.7	+0.9	10
Cast aluminium (AlSi6Cu3)	−68	−2.3	−1.3	30

Glycol/water mixtures without corrosion inhibitors must not be used, as they cause more corrosion than pure water.