

® Protectogen

Corrosion inhibitor for closed heating and cooling systems without antifreezing action

Product description

Protectogen is a yellowish, water soluble, glycol free liquid, which is a highly efficient combination of organic and anorganic salts for sufficient corrosion inhibition. The product is free of nitrite, amine and heavy metals. Furthermore, the product is free of phosphates and silicates which can lead to precipitations in combination with hard water.

Notes on use *)

Product properties

The technical data below describe the product and does not constitute of part of the delivery specification. The mandatory product specification will be found in the current technical data sheet.

Density at 20 °C (DIN 51757)	g/cm ³	approx.. 1.10
Refractive index at 20 °C (DIN 51423, part 2)		approx. 1.434
pH value (pure) pH value (2 % v/v in water) (DIN 51369)		approx. 10.5 approx. 8.0
Reserve alkalinity (ASTM D 1121)	ml 0.1 m HCl	min. 60
Pour point (pure) (DIN 51583)	°C	approx. -30
Kinematic viscosity at 20 °C (DIN 51562)	mm ² /s	approx. 350
Boiling point at 1013 mbar (ASTM D 1120)	°C	approx. +113
Surface tension (2 % v/v) in deionized water at 20°C	mN/m	approx. 47
Electrical conductivity (2 % v/v) in deionized water at 20°C	µS/cm	approx. 4800

*) The technical data describe the product and does not constitute of part of the delivery specification. The mandatory product specification will be found in the current technical data sheet. Additional informations on product properties, toxicological, ecological and safety relevant data can be found in the current EG safety data sheet.

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Application properties

Protectogen is usually used in a concentration of 2 Vol-% in mixture with drinking water which has a maximum concentration of 100 mg/kg chlorides. 2.0 l Protectogen will be added for 100 l ready-made product. This mixture does not offer any frost resistance and it is therefore not suitable for outdoor applications

in winter. For protection from frost, please use our products [®] Antifrogen N, L or KF. The following table shows the relatively low corrosion of common used metals caused by Protectogen/water mixtures. The values were determined by the ASTM D 1384 method and show the weight loss of the metals in g/m² due to corrosion.

Metal	Weight loss in g/m ²	
	Protectogen 2.0 % (v/v)	Mains water 14 °dH
Copper (Cu)	-0.7	-1.0
Soft solder (WL 30)	-1.9	-11
Brass (MS 63)	-0.7	-1.0
Steel (St 37)	-0.4	-72
Cast iron (GG 25)	-0.8	-182
Aluminium (AlSi6Cu3)	-4.8	-28

Mixtures of Protectogen with tap water are dealing with a long lasting corrosion protection of all common used metals such as copper, brass, iron metals, soft solder, aluminium alloys and combinations thereof, even in mixed installation. Since zinc may be dissolved – especially at higher temperatures – please avoid to use galvanized pipelines.

Seals which are commonly used in heating systems (IT seals and elastomers) have been found to be resistant. Protectogen is especially suitable for the use in **cold water sets** which do not require frost protection, i.e. in a temperature range from +5 to +15°C. By adding Protectogen, the specific heat transfer abilities of water will not be influenced significantly at all. Protectogen can be added even in closed heating systems if there is any possibility of

oxygen access through seals or plastic elements which can not be avoided. Special additives prevent lime precipitations due to hard water. **Protectogen can be used in a temperature range from approx. +5 to +95 °C.** Please note the following tips regarding filling of the installation and activity of the product:

® Protectogen**Filling, operation and activity duration with Protectogen****1. Checking of the installation**

Before filling the system with Protectogen/water the pipe connections, vessels and circulating pumps should be checked for tightness. Especially regarding older systems it is recommended to renew all sealants. Suitable for this purpose are common IT- and rubber sealants. In order to seal the pipe connections, a combination of hemp with (R)Fermit or (R)Fermitol (Nissen & Volk, Hamburg) or (R)Loctite has been carried out. During system construction only chloride-free solvents shall be used.

2. Identifying content of the system and flushing

Simultaneously to checking the tightness of the system, the needed water amount should be determined by use of a hydrometer. The installation should be drained again to get rid of rust and other pollutions. Older systems which were running without corrosion protective additives, must be thoroughly inspected and cleaned well; this can be achieved by use of inhibited acid.

3. Dosage

Protectogen should be diluted with tap water or deionized water. The dosage for sufficient corrosion protection is 2 % v/v, i.e. 2 l Protectogen for 100 l water capacity. The tap water used for diluting Protectogen should have a middle grade of hardness and it should not contain more than 100 ppm (mg/kg) chlorides (this can be requested at your local water-treatment plant).

4. Filling the installation

Only clean, thoroughly rinsed and rust-free systems should be filled with Protectogen. After checking the tightness the system should be filled right away with Protectogen/water in order to avoid corrosion damages.

5. Performance check

Due to the danger of corrosion, low concentrations of Protectogen/water mixtures should be avoided.

If the system is topped up with liquid the performance of the mixture should be checked, at least on a yearly basis. This service (for free) is offered by: Clariant GmbH, Werk Gendorf, Division FUN, R&D, Bau 300, D-84504 Burgkirchen, Germany, Tel.: +49 - (0) 86 79 - 7 22 72.

The data in our service report relate solely to the sample sent to us. Guidance on further use of the product tested assumes that the system is in proper condition and properly operated. We would expressly point out that, particularly where corrosion or scale is already present in the system, interactions with the product may occur with unpredictable consequences. We accept no liability whatsoever for any damage resulting from the improper condition or operation of the system.

6. Draining

The system should be left drained only for a short time.

7. Duration of activity

The activity of the corrosion inhibitors strongly depends on the individual application conditions. Therefore, the systems should be designed as closed circuits with expansion tanks. By using the recommended concentration of Protectogen the corrosion inhibitors will have a long-lasting effect. Regarding open systems the inhibitor activity may decrease significantly faster, especially at higher temperatures.

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8. Mixing with other products

Any mixture of Protectogen with other products – particularly with salt or glycole based products – can lead to incompatibilities.

Safety, Toxicology and Ecology

Protectogen is harmful to humans and animals if swallowed. Consult a doctor immediately if the product is swallowed inadvertently.

The water hazard class of the pure product is WGK 1, the ready-made Protectogen/water mixture is rated as being not water-polluting.

Undiluted Protectogen can be disposed of in a special waste incineration plant in accordance with local regulations. The biodegradability of Protectogen/water mixtures is very good; the mixtures can therefore be taken to a biological treatment plant for biodegradation, after consultation with the operator, provided the relevant legal provisions on water and waste allow this. The product contains organic and anorganic salts which act as corrosion inhibiting agents for a long time. Protectogen is free of amines, nitrates, phosphates and heavy metals.

Further information will be found in the current EG safety data sheet.

Transport and Storage

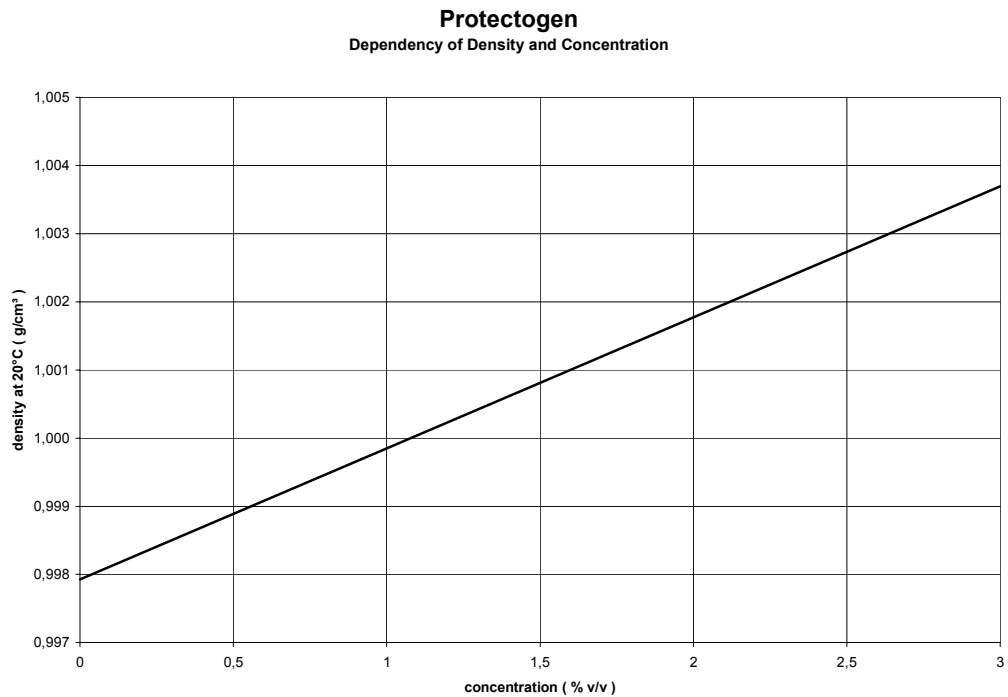
Protectogen is supplied in non-returnable drums (240 kg). Smaller canisters are available from our dealers. The storage stability of Protectogen at room temperature in its original sealed container is limited to 2 years.

Appendix

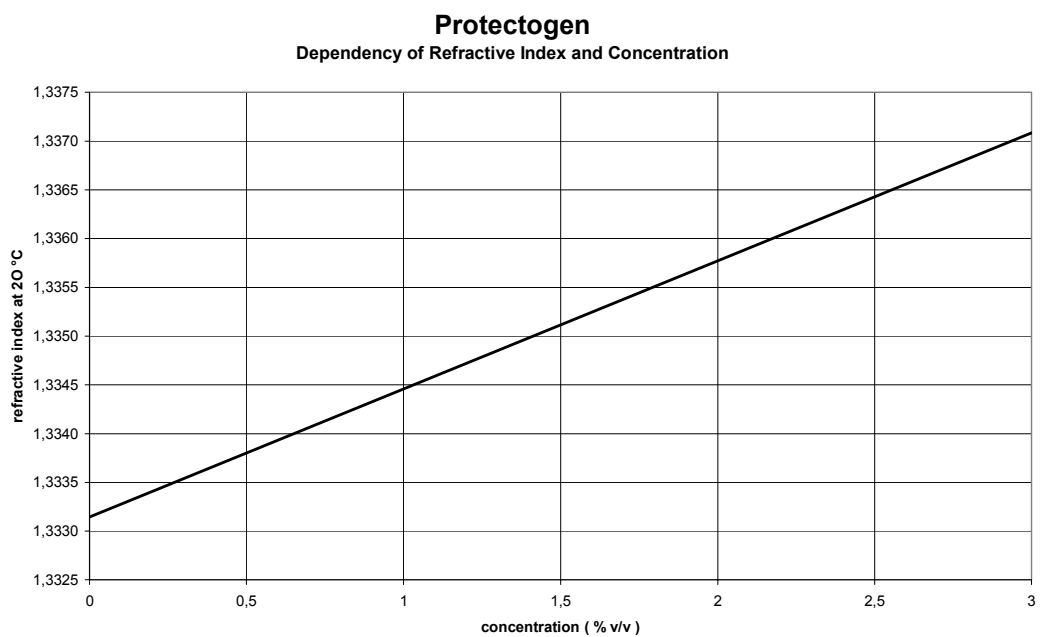
The following diagrams show the most important physical properties of Protectogen/water mixtures.

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Density (0-3 %)



Refractive index (0-3 %)



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This information is based on our present state of knowledge and is intended to provide general notes on our products and their uses. It should not therefore be construed as guaranteeing specific properties application.

Any existing industrial property rights must be observed. The quality of our product is guaranteed under our General Conditions of Sale. We

would expressly point out that, particularly where corrosion or scale is already present in the system, interactions with the product may occur with unpredictable consequences. We accept no liability whatsoever for any damage resulting from the improper condition or operation of the system.

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