
Corrosion Inhibitor HQ

Super concentrate for the manufacture of [®]Genantin HQ (nitrite, amine, phosphate and silicate free)

Product Description

Corrosion Inhibitor HQ is a colourless, water-soluble liquid, which, apart from monoethylene glycol, contains a highly effective combination of inhibitors. The product does not contain any nitrite, amine, phosphate and silicate.

Application Advice

Product Properties

The typical values below are used as a product description, they are not part of the product specification. The definitive product specification is in the valid typical values sheet.

Density at 20 °C (DIN 51757, ASTM D 1122)	g/cm ³	approx. 1.11
Refractive index at 20 °C (DIN 53491, ASTM D 1747)		approx. 1.415
pH value (5 % V/V) (DIN 53785, ASTM D 1287)		approx. 8.5
Reserve alkalinity (ASTM D 1121)	ml c (HCl) 0,1 m	above 35
Pour point (DIN 51583, ASTM D 97)	°C	approx. -35
Kinematic Viscosity at 20 °C (DIN 51562, ASTM D 2515)	mm ² /s	approx. 23
Boiling point at 1013 h Pa (ASTM D 1120)	°C	approx. 107

Corrosion Inhibitor HQ

Application Properties

High-quality [®]Genantin HQ can be manufactured from Corrosion Inhibitor HQ and monoethylene glycol by simple mixing at room temperature. It combines very good corrosion and cavitation protection for aluminium alloys with excellent protection for steel, cast iron and non-ferrous heavy metals.

The mixture ratio is 10 %/weight Corrosion Inhibitor HQ and 90 %/weight ethylene glycol.

Fibre quality or technical quality of the monoethylene glycol are considerations for a suitable glycol quality which meets the following criteria:

Hazen colour value (APHA)	below 15
Water content	below 0.5 %
pH value (10 %ig)	6.5 – 7.5
Electrical conductivity (undiluted)	below 0.2 μ S/cm
Reducing substances (in accordance with Fehling)	negative
Diethylene glycol content (GC)	below 0.5 %

If these purity criteria are adhered to, it is guaranteed that the Genantin HQ ready mixed from the components fulfils the requirements according to national and international standards.

The product is colourless. Any coloration must be done separately with a suitable dye stuff.

More detailed information about the corrosion and cavitation performance can be seen from our Genantin HQ information sheet (see part two in this leaflet).

Safety, Toxicology and Ecology

Corrosion Inhibitor HQ is harmful to humans and animals if swallowed. Seek medical advice immediately if swallowed inadvertently.

A one-off lethal dose of 100 ml/person can be taken by humans. In most published cases of poisoning, apart from kidney damage, cerebral damage and oedema of the lungs are observed in particular.

Corrosion Inhibitor HQ

Corrosion inhibitor HQ can be disposed of in a special waste incineration plant in line with local regulations. Corrosion Inhibitor HQ/water mixtures can be biodegraded. The percentage of ethylene glycol in Corrosion Inhibitor HQ is approx. 25 % m/m along with water and organic and inorganic salts which are effective in equal combination for a long time as corrosion inhibitors. Corrosion Inhibitor HQ does not contain neither amines, nitrites and phosphates, nor silicates.

The latest valid EC safety data sheet contains further information.

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 constructed as guaranteeing specific properties of the products described or their suitability for a particular application. Any existing industrial property rights must be observed. The quality of our products is guaranteed under our General Conditions of Sale.

Despatch and Storage

Corrosion Inhibitor HQ is supplied in road and rail tankers.

Corrosion Inhibitor HQ has a shelf life of at least 2 years.

As zinc is not resistant to the diluted and undiluted product, consideration should be taken of this when refilling the product supplied.

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® Genantin HQ

Nitrit-free, amine-free, phosphate-free and silicate-free Antifreeze and Corrosion Inhibitor

Product Description

Genantin HQ is a colourless liquid on a corrosion-inhibited monoethylene glycol base. It is used as a nitrite- and silicate-free radiator antifreeze in cars and truck engines.

Genantin HQ fulfills the requirements according to BS 6580, UNE 26-361-88, ASTM D 1384 and ASTM D 4340.

Application Advice

Product Properties

The typical values below are used as a product description, they do not form part of the product specification. The definitive product specification is in the valid typical values sheet.

Density at 20 °C (DIN 51757, ASTM D 1122)	g/cm ³	approx. 1.11
Refractive index at 20 °C (DIN 53491, ASTM D 1747)		approx. 1.429
Reserve alkalinity (ASTM D 1121)	ml 0.1 m HCl	approx. 3.5-4.5
Freezing point (1:2) (ASTM D 1177)	°C	approx. -18
Foaming performance (ASTM D 1881)		non-foaming
Boiling point at 1013 mbar (ASTM D 1120)	°C	over 160
pH Value (1:2) (DIN 53785, ASTM D 1287)		approx. 8
Corrosion inhibitors		present
Water (DIN 51777, ASTM D 1123)	% (m/m)	below 5
Pour point (DIN 51583, ASTM D 97)	°C	approx. -27
Viscosity at 20 °C (DIN 51562, ASTM D 2515)	mm ² /s	approx. 20
Specific heat at 20 °C	kJ/kg · K	approx. 2.3

Frost Resistance

Nowadays almost all car radiator antifreezes are formulated on a monoethylene glycol base, which has the effect of reducing the freezing point when mixed with water. The percentage of monoethylene glycol determines the freezing point of the mixture. The frost resistance of Genantin HQ can be seen from the diagrams in the appendix. It should be mentioned that there is little sense in using more concentrated solutions than 60 %/vol. because the solidification point increases again. Genantin/water mixtures have no destroying effect whatsoever from approx. 33 %/vol., even when supercooled below the solidification point.

Genantin HQ is best diluted with deionized or drinking water which contains a maximum of 100 mg/kg chloride ions. Genantin HQ is only slightly volatile at temperatures up to 100 °C, so that the water found in the radiator antifreeze initially vaporizes first. Genantin/water mixtures do not separate; they have neither a flash point nor a burning point.

Corrosion Inhibition

Uninhibited monoethylene glycol/water mixtures have a more corrosive effect on the metals of the cooling system than water on its own, as can be seen from the table below. This is a result of the lower surface tension of the monoethylene glycol, which is used to manufacture the radiator antifreeze. Genantin HQ therefore contains effective inhibitors which offer the metals of the engine block and the radiator protection from corrosion and should prevent lime deposits from the water used. A new active silicate-free substance combination has been developed for this.

The table below shows the comparatively low corrosion of common metals by a Genantin HQ/ASTM water mixture adjusted to approx. -20 °C in comparison with a non-inhibited glycol/ASTM water mixture 1:2 and with mains water without any additives.

Corrosion to Metals Weight loss in g/m², tested in accordance with ASTM D 1384

Metal	Genantin HQ, 1:2 in ASTM water	Monoethylene glycol, 1:2 in ASTM water	Mains Water 14° dH
Copper	-0.7	-2.8	-0.8
Soft solder WL 30	-1.6	-135	-10.9
Brass (Ms 63)	-0.5	-7.6	-0.7
Steel (St 37)	-0.1	-152	-76
Cast iron (GG 25)	-0.6	-273	-192
Cast Aluminium	-0.9	-16	-32

The good anti-corrosive properties of Genantin HQ/water mixtures decrease, as expected, as the water content increases. For this reason, the Genantin percentage in the coolant should not be less than 33

%/vol. A usage concentration of 40-50 %/vol. is common and has proved to be best.

In order to test the performance of the radiator anti-freeze on heated test metals in line with large-scale industrial practice, a hot corrosion test is carried out with a 40 %/vol. Genantin HQ/water mixture. Heated samples made from cast aluminium (or cast iron)

heated to 180-200 °C are added to a coolant circulation for this test. The tests carried out in accordance with FVV specifications show the following results:

Performance in the Hot Test

Metal	Medium	Weight Loss after Cleaning (mg/plate)
Aluminium (AlSi ₁₀ Mg wa)	Deionat, fresh; 40 % v/v Genantin HQ	-85
Aluminium (AlSi ₁₀ Mg wa)	Deionat, fresh; 20 % v/v Genantin HQ	-61
Cast iron (GG 25)	Deionat, fresh; 20 % v/v Genantin HQ	-17

Testing conditions: 95 °C, 1.5 bar, 47 h

Application Advice

Genantin HQ should only be mixed with deionized water or normal drinking water.

Before the first filling, drain the cooling system with the heat switched on and rinse thoroughly with warm water. Either hard or soft water can be used. The mixture ratio of Genantin/water depends on the degree of the frost resistance desired. Generally, approx. 40 %/vol. (approx. -26 °C) is adequate (see frost resistance table). Leave the engine running warm and check the condition of the liquid using an antifreeze tester, an areometer or a refractometer.

To refill, the required quantity of Genantin HQ/water is simply added after checking the freezing resistance.

Aqueous solutions of Genantin HQ cause less swelling of coolant hoses and seals in comparison with water on its own. When transferring from running with water to running with radiator anti-freezes, shrinkage of seals will occur, which, of course, is noticeable from the leakage of coolant. The possibility of later leakage and of corrosion in the summer months can be avoided if the anti-freeze remains in the cooling system for the whole year.

Safety, Toxicology and Ecology

Genantin HQ is harmful to humans and animals if swallowed. Seek medical advice immediately if swallowed inadvertently.

A one-off lethal dose of 100 ml/person can be taken by humans. In not published cases of poisoning, apart from kidney damage, cerebral damage and oedema of the lungs are observed in particular.

Monoethylene glycol, the base product of Genantin HQ has been classified in accordance with the List of Water-Pollutant Substances (VwVwS from 17. May 1999) to Water Pollution Class WGK 1 (slightly water-pollutant). This also applies to the mixtures of Genantin HQ with water. Genantin HQ/water mixtures show no acute damage effect to fish and bacteria. They are easily biodegradable. Generally, there is therefore the possibility of Genantin HQ/water mixtures being biodegraded after consultation with the operator of a waste water treatment plant, if the respective water and waste legislation regulations permit this.

Appendix

The following diagrams give details of the major physical properties of Genantin HQ/water mixtures.

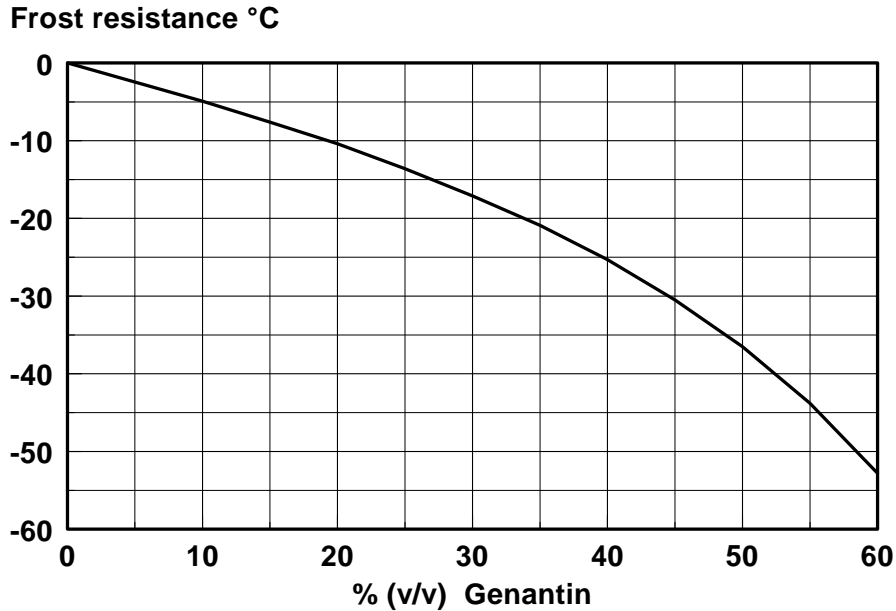
The monoethylene glycol percentage in Genantin HQ is over 92 %, along with some water and organic salts, which, in an equal combination, are effective for a long period of time as corrosion inhibitors. Genantin HQ does not contain nitrites, phosphates, amines and silicates.

Genantin HQ/water mixtures have neither a flash point nor a burning point. The latest valid EC safety sheet contains further information.

Storage

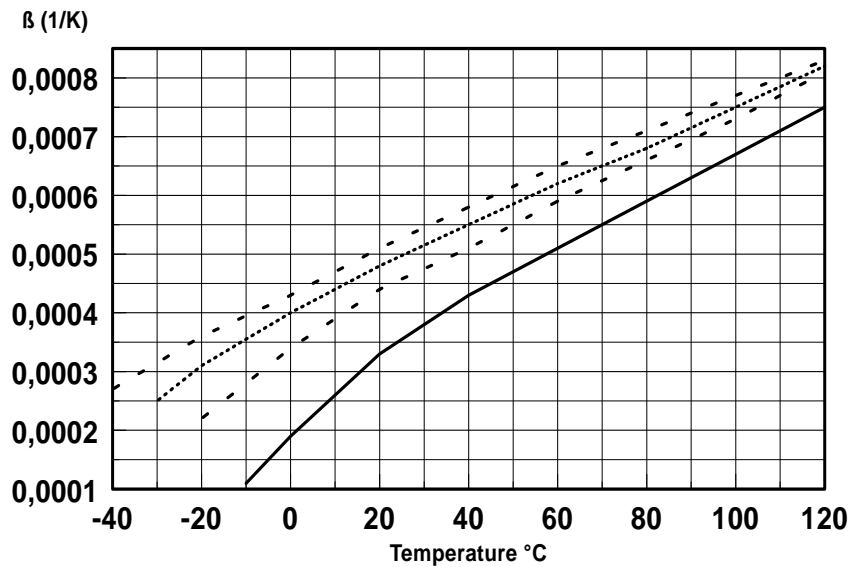
Genantin HQ has a shelf life of at least 2 years. As zinc is not resistant to Genantin HQ, consideration should be taken when refilling the product supplied.

Frost resistance (ASTM D 1177) of Genantin/ water mixtures

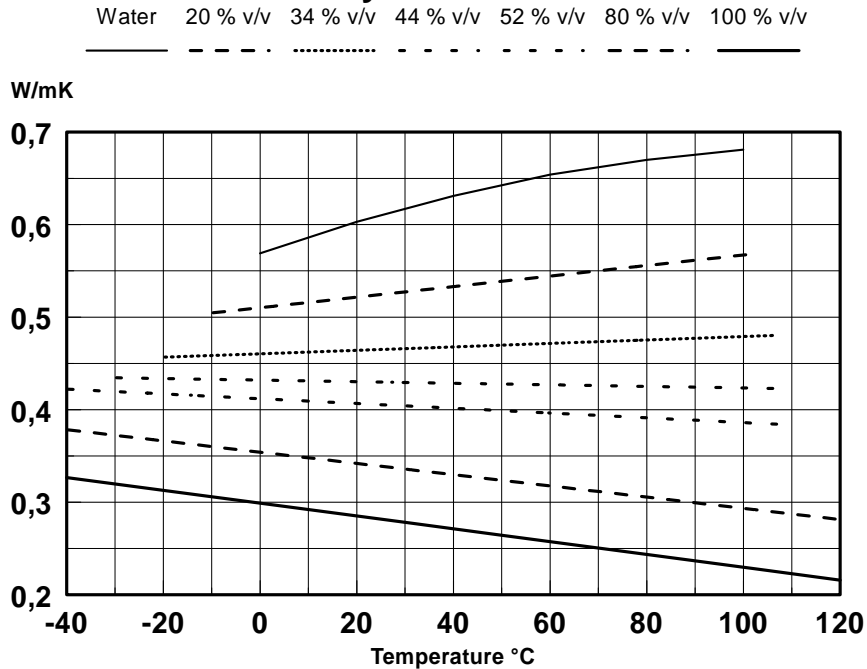


Coefficient of cubic expansion of Genantin/water mixtures

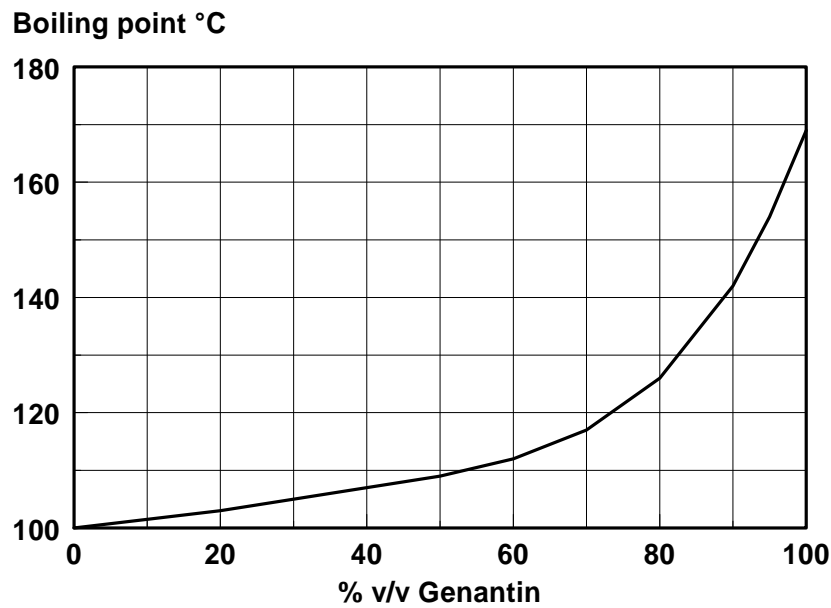
20 Vol.% 34 Vol.% 44 Vol.% 60 Vol.%



Thermal conductivity of Genantin/water mixtures

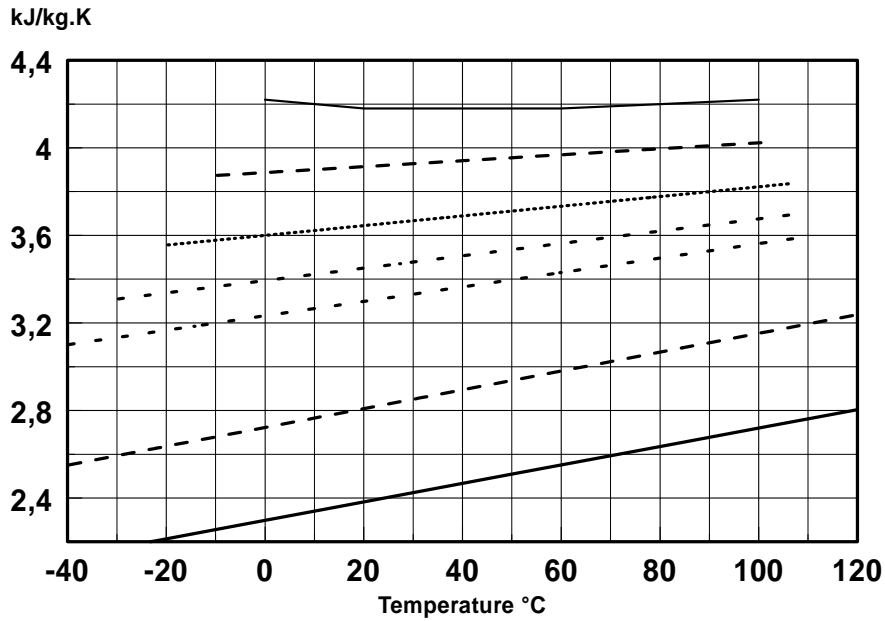


Boiling points (ASTM D 1120) of Genantin/water mixtures at 1013 mbar



Specific heat of Genantin/water mixtures

Water 20 % v/v 34 % v/v 44 % v/v 52 % v/v 80 % v/v 100 % v/v



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