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NEUTRAGUARD® NEO



Non contractual photo.

NEUTRAGUARD® NEO, with a Mono Propylene Glycol base and corrosion inhibitors, is a concentrated anti-freeze heat transfer fluid used in the circulation of central heating, solar thermal, underfloor heating and geothermal.

Once diluted in water, **NEUTRAGUARD® NEO** provides excellent protection against frost and reinforced protection against corrosion of either old or modern metals present in the various circuits (steel, aluminium, copper, brass, soldering, etc.); this protection has been validated by a number of static and dynamic heat tests.

The **NEUTRAGUARD® NEO** formula is free of Borax, a component recently classified as Toxic following the 30th European Adaptation to Technical Progress.

The anti-corrosion inhibition technology used in **NEUTRAGUARD® NEO** is organic, based on neutralised carboxylic acids, without phosphates, nitrites or amines. These anti-corrosion agents provide a long lasting protection.

The **NEUTRAGUARD® NEO** formula is **authorised by the General Directorate of Health, in compliance with the advice from ANSES (ex AFSSA)**, as a heat transfer fluid for thermal exchange in single exchange domestic water production systems, until a maximal concentration of 60% in volume.

Its exclusive formulation was developed to ensure excellent compatibility with hard water while avoiding the risks of the precipitate of inhibiting systems. Dilution in demineralised water is always preferable to avoid tartar deposit.

The medium-term risks of deposits are linked to the corrosion of the installation but change in the chemical composition is also considerably reduced by the stability of the formula of the inhibition.

You are advised to verify the concentration in **NEUTRAGUARD® NEO** during the maintenance works (at least once a year) to avoid all risks of clogging.

NEUTRAGUARD® NEO's red colouring makes it immediately identifiable.



1. PHYSICAL PROPERTIES OF NEUTRAGUARD® NEO

Appearance	red liquid
Density at 20°C (AFNOR NF R 15-602-1/ ASTM D 1122)	1.053 ± 0.002 kg/dm ³
pH (AFNOR NF T 90-008 / ASTM D 1287)	
at 50% volume in water	7.5 to 9
at 33% volume in water	7.5 to 9
Alkaline reserve (AFNOR NF T 78-101 / ASTM D 1121) (ml HCl N/10 for 10ml de NEUTRAGUARD® NEO)	≥ 4 ml
Freezing point °C (AFNOR NF T 78-102 / ASTM D 1177)	
33% volume in water	- 15 ± 2°C
50% volume in water	- 32 ± 2°C
Boiling point °C (AFNOR R 15-602-4 / ASTM D 1120)	
at atmospheric pressure	139 ± 2°C

2. PHYSICAL PROPERTIES OF NEUTRAGUARD® NEO WATER SOLUTIONS

NEUTRAGUARD® NEO is miscible in all proportions with water.

2.1. Freezing point of NEUTRAGUARD® NEO water solutions (in °C)

The freezing points of NEUTRAGUARD® NEO water solutions given below correspond to the formation of a crystalline mixture and not to a measurement in compact mass.

NEUTRAGUARD® NEO concentration (% by volume)	15	20	25	30	35	40	45	50	55	60
Freezing point in °C ± 2	- 5	- 7	- 10	- 13	- 17	- 22	- 27	- 32	- 39	- 45

Normative references : AFNOR NF T 78-102 / ASTM D 1177

NB: apart from the protection against frost, we advise you to use NEUTRAGUARD® NEO concentrated at a minimum of 33% to have optimal protection against corrosion.

The freezing points are always subject to variation because of the phenomena of superfusion that they can produce.

To be used as a transfer fluid and especially in negative temperatures, it is absolutely essential to take into account the viscosity to calculate the charge loss.



In actual fact, the viscosities of solutions with a Mono Propylene Glycol base are much higher than the solutions with a Mono Ethylene Glycol base, especially when approaching the freezing point.

Maintaining anti-frost / anti-corrosion ability of water solutions

The loss of **NEUTRAGUARD® NEO** water solutions, even borne at their boiling temperatures, is practically nought because of the weak volatility and the absence of the formation of azeotropes in water.

Because the installations are generally closed circuits, the water cannot evaporate and the anti-frost power of the water solutions is strongly maintained where there is no leak.

If used in the old installations with expansion tanks, exposed to the open air, it is advised to check the pressure manometer and, if necessary, to reintroduce water in the installation whilst checking the **NEUTRAGUARD® NEO** concentration per mass volume.

It is, in any event, always advisable, at least once a year, to check the concentration of **NEUTRAGUARD® NEO** in the mixture at a density of 20°C by using a suitable hydrometer or by checking its freezing point by using a suitable refractometer.

It is absolutely essential to check the pH of the water of the circuit, the exterior corrosion of the pipes and the identification of the areas of bad circulation or the blockage of the valves.

2.2. Density of water solutions of NEUTRAGUARD® NEO at 20°C (kg/dm³)

NEUTRAGUARD® NEO concentration (% by volume)	Solution density kg / dm ³
10	1.008
15	1.013
20	1.018
25	1.023
30	1.028
35	1.032
40	1.037
45	1.040
50	1.044
55	1.046
60	1.048

Normative references: AFNOR NF R 15-602-1 / ASTM D 1122

The density read on the scale of a suitable hydrometer corresponds very approximately to the density indicated at 20°C.

Taking into account the weak variations in density of the product within the context of its concentration in water, it is necessary to use a precise hydrometer.

2.3. Boiling points of NEUTRAGUARD® NEO water solutions (°C)

NEUTRAGUARD® NEO concentration (% by volume)	20	30	40	50	60
Boiling point (°C)	103	104	105	106	107

**2.4. Density depending on the temperature of NEUTRAGUARD® NEO (kg/dm³)**

NEUTRAGUARD® NEO concentration (% by volume)	25	30	35	40	45	50						
Temperature °C	FROST ZONE											
- 30												1.064
- 20											1.052	1.056
- 10	1.030	1.038	1.044	1.050	1.054	1.058						
0	1.029	1.036	1.041	1.047	1.050	1.054						
10	1.026	1.032	1.037	1.042	1.045	1.049						
20	1.023	1.028	1.032	1.037	1.040	1.044						
30	1.017	1.023	1.027	1.032	1.034	1.037						
40	1.012	1.017	1.021	1.025	1.027	1.031						
50	1.006	1.011	1.014	1.019	1.021	1.024						
60	0.999	1.004	1.008	1.012	1.013	1.017						
70	0.992	0.997	1.000	1.004	1.006	1.009						
80	0.985	0.990	0.993	0.997	0.998	1.001						
90	0.977	0.982	0.985	0.989	0.990	0.993						
100	0.970	0.974	0.977	0.981	0.982	0.985						

Indicative library data.

2.5. Cinematic viscosity of water solutions of NEUTRAGUARD® NEO (cSt)*

NEUTRAGUARD® NEO concentration (% by volume)	25	30	35	40	45	50						
Temperature °C	FROST ZONE											
- 30												206.7
- 20											44.3	60.8
- 10	9.7	12.8	16.9	22.3	29.3	38.2						
0	6.0	7.7	9.8	12.4	15.7	19.7						
10	3.9	4.9	6.1	7.5	9.2	11.2						
20	2.8	3.3	4.0	4.9	5.8	6.9						
30	2.0	2.4	2.8	3.3	3.9	4.5						
40	1.5	1.8	2.1	2.4	2.8	3.1						
50	1.2	1.4	1.6	1.8	2.1	2.3						
60	1.0	1.1	1.3	1.4	1.6	1.8						
70	0.8	0.9	1.0	1.2	1.3	1.4						
80	0.7	0.8	0.9	1.0	1.1	1.2						
90	0.6	0.7	0.7	0.8	0.9	1.0						
100	0.5	0.6	0.7	0.7	0.8	0.8						

Indicative library data.



2.6. Specific heat of water solutions of NEUTRAGUARD® NEO (kJ.kg⁻¹.K⁻¹)*

NEUTRAGUARD® NEO concentration (% by volume)	25	30	35	40	45	50						
Temperature °C	FROST ZONE											
- 30												3.4
- 20											3.6	3.5
- 10	3.9	3.8	3.7	3.6	3.5	3.4						
0	3.9	3.9	3.8	3.7	3.6	3.5						
10	4.0	3.9	3.8	3.7	3.6	3.5						
20	4.0	3.9	3.8	3.7	3.6	3.5						
30	4.0	3.9	3.8	3.8	3.7	3.6						
40	4.0	3.9	3.9	3.8	3.7	3.6						
50	4.0	3.9	3.9	3.8	3.7	3.7						
60	4.0	4.0	3.9	3.8	3.8	3.7						
70	4.0	4.0	3.9	3.9	3.8	3.7						
80	4.1	4.0	4.0	3.9	3.8	3.8						
90	4.1	4.0	4.0	3.9	3.9	3.8						
100	4.1	4.0	4.0	4.0	3.9	3.8						

Indicative library data.

2.7. Thermal conductivity of water solutions of NEUTRAGUARD® NEO (W.m⁻¹.K⁻¹)*

NEUTRAGUARD NEO® concentration (% by volume)	25	30	35	40	45	50						
Temperature °C	FROST ZONE											
- 30												0.39
- 20											0.41	0.40
- 10	0.46	0.45	0.43	0.42	0.40	0.39						
0	0.47	0.45	0.43	0.42	0.40	0.39						
10	0.48	0.46	0.44	0.42	0.40	0.38						
20	0.48	0.46	0.44	0.42	0.40	0.38						
30	0.49	0.47	0.44	0.42	0.40	0.38						
40	0.50	0.47	0.44	0.42	0.40	0.38						
50	0.50	0.47	0.45	0.42	0.40	0.37						
60	0.51	0.48	0.45	0.42	0.40	0.37						
70	0.51	0.48	0.45	0.42	0.40	0.37						
80	0.52	0.49	0.46	0.43	0.40	0.37						
90	0.52	0.49	0.46	0.43	0.40	0.37						
100	0.53	0.50	0.46	0.43	0.40	0.37						

Indicative library data

**2.8. Refraction index of water solutions of NEUTRAGUARD® NEO at 20°C**

NEUTRAGUARD® NEO concentration (% by volume)	Refraction index
30	1,3662
40	1,3776
50	1,3872
60	1,3947
70	1,4011
80	1,4050

2.9. Protection of metals provided by NEUTRAGUARD® NEO in water solution

These tests were performed using **NEUTRAGUARD® NEO** diluted to 33% by volume in synthetically corrosive water. For your information, we show in the table below the performance requirements defined by AFNOR NF R 15-601 and ASTM D 3306 standards for cooling liquids.

Metals	Mass loss (mg / test tube)	Limits of the NF R 15-601 standard	Limits of the ASTM D 3306 standard
Copper	± 2	[- 5 ; +5]	[- 10 ; +10]
Soldering	± 4	[- 5 ; +5]	[- 30 ; +10]
Brass	± 2	[- 5 ; +5]	[- 10 ; +10]
Steel	± 1	[- 2,5 ; +2,5]	[- 10 ; +10]
Cast iron	± 2	[- 4 ; +4]	[- 10 ; +10]
Aluminium	± 8	[- 10 ; +20]	[- 30 ; +30]

Normative test method references : AFNOR NF R 15-602-7 / ASTM D 1384

*** The data stated in paragraph 2 of this document is merely indicative and does not constitute a sales specification.**

3. PRESSURE LOSS

As regards the use of an anti-frost solution in a circuit of transfer to positive and especially to negative temperatures, it is advisable to take the viscosity of the water solution into account to calculate the pressure loss.



4. RECOMMENDATIONS FOR USE

4.1. Cleaning the installation

It is strongly recommended that the installations be thoroughly cleaned with Dispersant D before filling them with the **NEUTRAGUARD® NEO + WATER** if they contain many deposits and especially metal oxides.

In fact, glycol solutions have an important wetting power and can shake out the pre-existing deposits (ex: rust...) responsible for sludge creation.

The cleaning procedure is as follows:

- Make the circuit circulate water for 1 to 2 hours, then drain the installation quickly and fully to the lowest point.
- Prepare and put "dispersant D*" solution at 20 g/litre of water in the installation.
- Let the product circulate for at least 2 hours.
- Quickly drain the installation to the lowest point.

- Adequately and carefully rinse with water until it is clear and the pH is approximately 7 (± 0.5).

Depending on the state of the circuit, it may be necessary to clean several times.

It is important to drain and carefully rinse with water after every time it has been cleaned.

Please note: If there are tartar deposits on the installation and it is seriously oxidised with scales, it is advisable to first treat the circulation with a solution of "desoxydant P*" at approximately 100 g/l of water at 50°C for 2 hours.

After it has been drained, follow the treatment with "dispersant D*" in the above mentioned manner.

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4.2. Recommendations and putting NEUTRAGUARD® NEO into the installation.

To achieve homogeneity, it is advisable to prepare a mixture before putting it into the installation and to fill it by using a suitable pump connected to the point of the outlet.

The solutions of glycol water have a moisture ability more important than only water and it is advisable to ensure that the joints of the installation are compatible with this product (especially with porous joints of paper, hemp, etc.).

As regards the filling the installation, it may be necessary to tighten the joints and joints with stronger ones to prevent oozing.

In practice, to obtain adequate protection against corrosion, the minimum recommended concentration volume is 33%.

In any event, taking into account the diversity of the materials encountered in the installations, (exchangers, pipes, joints, etc.), it is advisable to check manufacturers' equipment to see whether their parts are compatible with Monopropylene Glycol.

NEUTRAGUARD® NEO may not be used with galvanised steel.

The data stated (viscosity, heat specification, etc.) are meant to help the user in using the product. It lightens his burden of having to make all the calculations (charge loss, etc.) required to make the installation function well.

The information contained in this product sheet is the result of our studies and experience. It is provided in good faith, but should not, under any circumstance, be taken to constitute a guarantee on our part or an assumption of our responsibility. This is particularly the case when third party rights are at stake or in situations where a user of one of our products fails to observe applicable regulations.

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