



Heat Transfer Fluids

## NEUTRAGEL® NEO



Non contractual photo

**NEUTRAGEL® NEO**, is a concentrated antifreeze based on Mono Ethylene Glycol and corrosion inhibitors. It is a heat transfer fluid designed for refrigeration installations working at low temperatures and for central heating systems. It is however not authorized for use in single exchange domestic water production systems.

When **NEUTRAGEL® NEO** is diluted with water the resulting fluid provides excellent protection against freezing and gives enhanced protection against metal corrosion in various types of circuits (steel, aluminium, copper, brass, soldered, etc.). This protection has been confirmed by numerous static and dynamic heat tests.

The **NEUTRAGEL® NEO** formula is free of Borax, an additive classified as toxic following the 30<sup>th</sup> European ATP (Adaptation to Technical Progress).

The anti-corrosion inhibition technology used in **NEUTRAGEL® NEO** is organic, based on neutralised carboxylic acids, without phosphates, nitrites or amines. The active agents contribute to a longer lifespan and protect against corrosion.

Its exclusive formula ensures excellent hard water stability without risking precipitation of the inhibitor systems. However, the use of demineralised water for dilution is recommended to avoid scale.

In addition, the stability of the inhibitor formula considerably reduces potential deposits caused by corrosion and alteration of the chemical composition.

It is advisable to verify the **NEUTRAGEL® NEO** concentration during maintenance operations (at least once a year).

**NEUTRAGEL® NEO's** colouring\* makes it immediately identifiable.

## 1. PHYSICAL PROPERTIES OF NEUTRAGEL® NEO

Appearance .....	red liquid
Density (AFNOR NF R 15-602-1 / ASTM D 1122).....	1.117 ± 0.003 kg/dm <sup>3</sup>
pH (AFNOR NF T 90-008 / ASTM D 1287)	
33% in volume in water .....	7.5 to 8.5
Freezing point °C (AFNOR NF T 78-102 / ASTM D 1177)	
33% in volume in water .....	- 18 ± 2° C
50% in volume in water .....	- 37 ± 2° C
Alkaline reserve (AFNOR NF T 78-101 / ASTM D 1121)	
(ml HCl N/10 for 10 ml of <b>NEUTRAGEL® NEO</b> ) .....	≥4 ml
Boiling point °C (AFNOR R 15-602-4 / ASTM D 1120)	
at atmospheric pressure .....	161 ± 2° C

## 2. PHYSICAL PROPERTIES OF NEUTRAGEL® NEO AQUEOUS SOLUTIONS

**NEUTRAGEL® NEO** is miscible in all proportions with water

### 2.1. Freezing point of NEUTRAGEL® NEO aqueous solutions in °C

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

% <b>NEUTRAGEL® NEO</b> in volume	25	30	35	40	45	50
Freezing point in °C (+/- 2)	-12	-16	-20	-25	-30	-37

Relevant standards: AFNOR NF T 78-102 / ASTM D 1177

In addition to freezing protection, we recommend you use **NEUTRAGEL® NEO** concentrated at a minimum of 33% to achieve optimal protection against corrosion.

Freezing points are always subject to variation because of super-cooling phenomena that can occur.

When used as a transfer fluid and particularly at temperatures below 0°C, it is essential the viscosity is taken into consideration when calculating the pressure loss.

## Conservation of the antifreeze / anti-corrosion power of the aqueous solutions

The loss of **NEUTRAGEL® NEO** from aqueous solutions even when brought to the boiling point, is virtually nil due to its low volatility and because it does not form an azeotrope with water.

As the installations are generally closed circuit systems, water cannot evaporate and the antifreeze power of the aqueous solution is maintained where there is no leakage.

When used in older installations with an open expansion tank, it is advised to check the pressure gauge and add water if necessary when checking the **NEUTRAGEL® NEO** concentration by measuring the density.

In all cases, it is advisable, to check the concentration of **NEUTRAGEL® NEO** at least once a year, by measuring its density at 20°C using a suitable hydrometer or by checking its freezing point by using a suitable refractometer.

It is essential to check the pH of the fluid in the circuit, any exterior corrosion of the pipework and identify any areas of poor circulation or potential blocking of valves.

## 2.2 Density of aqueous solutions of NEUTRAGEL® NEO at 20°C (in kg/dm³)

% <b>NEUTRAGEL® NEO</b> (in volume)	Solution density kg/dm³ (+/- 0.003)
25	1.034
30	1.041
35	1.048
40	1.055
45	1.061
50	1.067

Relevant standards: 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. A thermometric correction will need to be used above or below this temperature.

## 2.3 Boiling points aqueous solutions of NEUTRAGEL® NEO (in °C)

% <b>NEUTRAGEL® NEO</b> (in volume)	30	40	50
Boiling point in °C (+/- 2)	104	106	108

Relevant standards: AFNOR NF R 15-602-4 / ASTM D 1120

## 2.4 Density relative to the temperature of NEUTRAGEL® NEO (in kg/dm³)

NEUTRAGEL® NEO (% in volume)	25	30	35	40	45	50
Temperature °C						
- 30	FROST ZONE				1.078	1.087
- 20			1.059	1.068	1.076	1.085
- 10	1.041	1.050	1.058	1.066	1.074	1.081
0	1.040	1.048	1.055	1.063	1.070	1.077
10	1.037	1.045	1.052	1.059	1.066	1.073
20	1.034	1.041	1.048	1.055	1.061	1.067
30	1.030	1.037	1.043	1.050	1.058	1.062
40	1.025	1.033	1.038	1.044	1.053	1.056
50	1.020	1.027	1.033	1.039	1.047	1.049
60	1.014	1.021	1.027	1.033	1.040	1.043
70	1.009	1.015	1.021	1.026	1.034	1.037
80	1.002	1.009	1.015	1.020	1.028	1.030
90	0.996	1.002	1.009	1.013	1.021	1.023
100	0.990	0.996	1.002	1.007	1.014	1.017

\*Bibliographic data provided for information purposes.

## 2.5 Kinematic viscosity of aqueous solutions of NEUTRAGEL® NEO (cSt)

NEUTRAGEL® NEO (% in volume)	25	30	35	40	45	50
Temperature °C						
- 30	FROST ZONE				46.3	59.3
- 20			15.5	19.2	23.8	29.5
- 10	6.3	7.6	9.2	11.1	13.4	16.3
0	4.2	4.9	5.9	7	8.2	9.8
10	2.9	3.4	4	4.6	5.4	6.3
20	2.1	2.5	2.8	3.3	3.8	4.3
30	1.6	1.9	2.1	2.4	2.7	3.1
40	1.3	1.5	1.6	1.9	2.1	2.4
50	1	1.2	1.3	1.5	1.7	1.8
60	0.9	1	1,1	1.2	1.3	1.5
70	0.7	0.8	0.9	1	1.1	1.2
80	0.6	0.7	0.8	0.9	1	1.1
90	0.6	0.6	0.7	0.8	0.8	0.9
100	0.5	0.6	0.6	0.7	0.8	0.8

\*Bibliographic data provided for information purposes.

## 2.6 Specific heat of aqueous solutions of NEUTRAGEL® NEO (kJ.kg<sup>-1</sup>.K<sup>-1</sup>)

NEUTRAGEL® NEO (% in volume)	25	30	35	40	45	50
Temperature °C	FROST ZONE					
- 30					3.3	3.2
- 20				3.5	3.4	3.3
- 10	3.8	3.7	3.6	3.2	3.3	3.2
0	3.8	3.7	3.6	3.5	3.4	3.3
10	3.8	3.7	3.6	3.5	3.4	3.3
20	3.8	3.7	3.6	3.5	3.4	3.3
30	3.9	3.7	3.7	3.6	3.5	3.4
40	3.9	3.8	3.7	3.6	3.5	3.4
50	3.9	3.8	3.7	3.6	3.5	3.4
60	3.9	3.8	3.7	3.6	3.6	3.5
70	3.9	3.8	3.7	3.7	3.6	3.5
80	4	3.8	3.8	3.7	3.6	3.5
90	4	3.9	3.8	3.7	3.6	3.6
100	4	3.9	3.8	3.7	3.7	3.6

\* Bibliographic data provided for information purposes

## 2.7 Thermal conductivity of aqueous solutions of NEUTRAGEL® NEO (W.m<sup>-1</sup>.K<sup>-1</sup>)

NEUTRAGEL® NEO (% in volume)	25	30	35	40	45	50
Temperature °C	FROST ZONE					
- 30					0.435	0.426
- 20				0.456	0.445	0.425
- 10	0.486	0.472	0.459	0.446	0.434	0.423
0	0.492	0.476	0.460	0.446	0.432	0.420
10	0.497	0.479	0.461	0.445	0.430	0.416
20	0.501	0.481	0.462	0.444	0.427	0.412
30	0.506	0.483	0.462	0.442	0.424	0.408
40	0.509	0.485	0.462	0.441	0.421	0.404
50	0.513	0.487	0.462	0.439	0.419	0.400
60	0.516	0.489	0.463	0.438	0.417	0.397
70	0.520	0.491	0.464	0.438	0.415	0.395
80	0.524	0.494	0.465	0.439	0.415	0.393
90	0.529	0.498	0.468	0.441	0.416	0.393
100	0.534	0.502	0.472	0.444	0.418	0.394

\* Bibliographic data provided for information purposes.



## 2.8 Protection of metals provided by NEUTRAGEL® NEO

These tests were performed on **NEUTRAGEL® NEO** diluted to 33% of volume in synthetically corrosive water. For information, the table shows the performance requirements defined by the NF R 15-601 and ASTM D 3306 standards for coolant liquids.

Metals	Weight loss (mg / test piece)	NF R 15-601 (Limits of the standard)	ASTM D 3306 (Limits of the standard)
Copper	+/- 2,5	[- 5 ; +5]	[- 10 ; +10]
Soldering	+/- 4.1	[- 5 ; +5]	[- 30 ; +10]
Brass	+/- 1.6	[- 5 ; +5]	[- 10 ; +10]
Steel	+/- 0.4	[- 2,5 ; +2,5]	[- 10 ; +10]
Cast iron	+/- 1.2	[- 4 ; +4]	[- 10 ; +10]
Aluminium	+/- 4.3	[- 10 ; +20]	[- 30 ; +30]

Standards governing test method : AFNOR NF R 15-602-7 / ASTM D 1384

**\* The data stated in paragraph 2 of this document are purely indicative and do not constitute a sales specification.**

## 3 PRESSURE LOSS

When using a **NEUTRAGEL® NEO** solution in a heat transfer circuit at temperatures both above 0°C and in particular below 0°C, it is advisable to take account of the viscosity of the aqueous solution to calculate pressure losses.

## 4 RECOMMENDATIONS FOR USE

### 4.1 Cleaning the installation

It is strongly recommended that an installation is thoroughly cleaned before filling with **NEUTRAGEL® NEO + WATER** if it contains deposits and especially those of metal oxides. We recommend using Dispersant D\*.

Glycol solutions have a high moisture ability and they can lift off deposits that were already present in the circuit (e.g. rust) and form a sludge.

Cleaning should be done in the following manner:

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

- Quickly drain the installation from the lowest point.
- Carefully and thoroughly rinse with water until it runs clear and the pH is close to 7 ( $\pm 0.5$ ).

Depending on the condition of the circuit, it may be necessary to clean a second time.

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

Please note: If there are scale deposits in the installation and they are highly oxidised, it is advisable to pre-treat 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.

*\* Marketed by Climalife.*

### 4.2 Recommendations and adding NEUTRAGEL® NEO to the installation.

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

Installations containing solutions with a Mono Ethylene Glycol base must comply with the local sanitary regulations.

Aqueous solutions of glycol have a wetting ability greater than just water and it is advisable to ensure that the joints of the installation are compatible with this product (especially porous paper type seals, hemp, etc.).

With regard to the filling of the installation, it may be necessary to tighten joints and connections to prevent seepage or leaks.

**NEUTRAGEL® NEO** must not be used with galvanised steel.

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

Given the diversity of the materials encountered in installations, (heat exchangers, pipes, joints, seals etc.), it is advisable to check with component manufacturers that their products are compatible with Mono Ethylene Glycol.

The data provided (viscosity, specific heat, etc.) are intended to help the user apply the product. It is the user's responsibility to make any calculations (pressure loss, etc.) required for the proper operation of the installation.

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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