Product information

Solar fluid VT51 df ready for use

Non-toxic antifreeze for systems with high temperature loads

Description and applications

VT51 df is a transparent red liquid. It is safe to handle as it consists of non-toxic glycol with a high molecular mass.

VT51 df is also based on specially selected high boiling point glycols with:

- ✓ Excellent stability at high temperatures.
- ✓ Boiling point above 270°C at atmospheric pressure. The glycols do not boil in stagnant situations in the solar systems, thus maintaining the additives in a dissolved state without blocking the tubes.
- ✓ Physiologically harmless.
- ✓ Biodegradable.

VT51 df meets the European quality requirements and standards.

The product is ready to use. Do not dilute with water, otherwise the anti-freeze and anti-corrosion properties are not guaranteed.

Further advantages of **VT51 df:**

- ✓ The product maintains the thermal circuit in perfect operating condition for a longer period of time than conventional products due to the 100% organic additive addition.
- ✓ It optimizes the heat transfer and thus improves the performance of the system.
- ✓ It protects against corrosion: aluminum, copper, brass, steel and cast iron.
- ✓ The red color makes it easier to detect a leak in the circuit.
- ✓ It is a silicate-free product, prevents clogging and allows longer service life.
- ✓ It is free of nitrite, nitrate, amine, phosphate and borax. This makes it better for the environment and safer to use.

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Product features:

Appearance	Red, transparent liquid
Glykol Content	50 % (by weight)
pH-value at °C	8,0 – 9,5
Boiling point in circuit[1]	125°C
Protection temperature	-28°C
Density at 20°C	1,07 – 1.09 g/ml
Viscosity at 20°C	4,19 mPas
Heat capacity at 20°C	3,34 KJ/Kg.K
Thermal conductivity at 20°C	0,395 W/mK

The data originate from own measurements and specific literature. They are not part of technical specifications.

Corrosion protection:

Mixtures of propylene glycol and water are more corrosive than water, therefore they must not be used without antioxidant additives to guarantee the integrity of the fluid circuit.

The following table shows the anti-corrosioneffectiveness of the **VT51 df** mixture in accordance with the ASTM D 1384 standard. For better comparison, the test values of the mixture without additives and of pure water are also given.

[1] Calculated for a pressure in the primary circuit of 2 bar.

material	VT51 df	Propylene glycol without additives (50% Vol.)	water
copper	-0,15	-1,2	-1,0
weld seam	-0,36	-136	-11
brass	0,33	-2,5	-1,0
steel	0,40	-225	-76
cast iron	2,09	-92	-192
aluminium	-0,68	-68	-32

The results are given in g/m² or tests on metal coupons. A positive result means a net gain, due to the formation of a stable protective layer over the metal surface..

Test description ASTM D 1384:

The metal samples in the previous table are exposed for two weeks (336 hours) to a 33% anti-freeze solution with corrosive water and forced ventilation at a temperature of 88 ˚C.

Compatibility with other materials:

VT51 df is compatible with the materials commonly used in heating circuits. The following table contains plastics, sealing materials and elastomers that are compatible with the product mixtures with water in the usual proportions. The data comes from both specialist literature and our own tests.

Compatibility of VT51 df with elastomers			
Material	**25°C**	**80°C**	**160°C**
Adiprene™ L-100	OK	NR	NR
Black Rubber 3773	OK	NR	NR
Buna N (bzw. 25)	OK	OK	--
Buna S	OK	Acceptable	NR
Butyl rubber	OK	OK	--
Compressed asbestos	OK	OK	Acceptable
EPDM	OK	OK	OK
EPR	OK	OK	OK
Hycar™ D-24	OK	Acceptable	--
Hypalon™	OK	NR	NR
Kalrez™	OK	OK	OK
Natural rubber	OK	NR	NR
Neopren 7797	OK	Acceptable	--
Red rubber 107	OK	NR	NR
Saraloy™ 300	OK	NR	NR
Silicone N° 65	OK	OK	--
Thiokol™ 3060	OK	NR	NR
Viton™ A	OK	OK	NR
OK: Recommended	*NR:* Not recommended		--: No Data

Phenolic resins, plasticized PVC and polyurethanes are **not** compatible with **VT51 df.**

Zinc is not compatible with glycol or its water mixtures. Therefore, contact with zinc or galvanized containers should be avoided.

Filling the system

After the pressure test, which can be used to determine the circuit volume, the circuit must be completely emptied and then immediately filled with **VT51 df** to fill it. The circuit must then be vented.

Before filling the circuit, it should be rinsed with water, especially if there were previously agents with chlorides in the circuit.

After draining the old antifreeze from the system, it should be rinsed with water to remove deposits and solids before **VT51 df** is filled. Existing corrosion can considerably shorten the service life of the product. If corrosion is detected, corrective measures must be taken before the system is filled.

Mixtures with other antifreezes should be avoided to prevent possible incompatibilities that shorten the service life of the product.

It is important to avoid the system being shut down for long periods of time and the antifreeze not circulating in the circuit and not being subjected to thermal stress, as this can impair product stability and thus considerably shorten the service life.

VT51 df is stable for at least 2 years in normal storage conditions and airtight containers.

The system must not be fitted with galvanized heat exchangers, containers or pipes because glycol corrodes zinc.

Minor and existing corrosion damage can be detectedafter filling with **VT51 df** due to the lower surface tension compared to water.

Heat resistance:

Permanent service temperatures: from -28 °C to 190 °C.

Permanent temperatures above 200°C lead to premature ageing of the product. For systems whose stagnation temperature exceeds 200°C, it is recommended to provide expansion tanks to absorb all the liquid and empty the collectors in the event of stagnation.

Temperatures above 200°C lead to a slow change in the chemical properties of the antifreeze, which can jeopardize the operational safety of the system.

Precautionary measures:

As this is a non-flammable, non-corrosive product, no special precautions are required when using the product.

Avoid eye contact. If contact occurs, wash the eye with plenty of water for at least 10 minutes. The product

- Do not swallow.
- Keep out of reach of children.

Store in a clean and ventilated place. Tightly closed containers are recommended to preserve the properties.

Temperatur (ºC)	Density (Kg/m3)
-20	1108
-10	1099
0	1091
10	1084
20	1077
30	1070
40	1063
50	1057
60	1049
70	1042
80	1034
90	1026
100	1018
110	1009
120	1000
130	991
140	982
150	973
160	965
170	956
180	949

Temperatur (ºC)	Cp (KJ/KgK)
-20	3,21
-10	3,24
0	3,27
10	3,31
20	3,34
30	3,38
40	3,41
50	3,45
60	3,49
70	3,53
80	3,57
90	3,61
100	3,65
110	3,69
120	3,74
130	3,78
140	3,83
150	3,87
160	3,92
170	3,97
180	4,02

Temperatur (ºC)	Viscosity (mPas)
-20	17,36
-10	12,30
0	8,62
10	6,00
20	4,19
30	2,96
40	2,16
50	1,63
60	1,29
70	1,06
80	0,89
90	0,74
100	0,62
110	0,51
120	0,41
130	0,35
140	0,31
150	0,29
160	0,29
170	0,26
180	0,17

Temperatur (ºC)	Thermal conductivity (W/mK)
-20	0,393
-10	0,394
0	0,394
10	0,395
20	0,395
30	0,396
40	0,396
50	0,397
60	0,398
70	0,398
80	0,399
90	0,399
100	0,400
110	0,400
120	0,401
130	0,402
140	0,402
150	0,403
160	0,403
170	0,404
180	0,404

The data presented in this document is based on our current knowledge and experience. It is intended to provide information on the correct use of the product. It does not necessarily form part of the technical specifications.

It is the responsibility of the customer supplied by us to ensure that the property rights and relevant regulations are observed.

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