DATA SHEET

T007-EN-03-Optifluid

DESCRIPTION

The Optisun solar fluid is specially designed to protect the various components of a solar installation.

High heat transfer capacity

Optifluid has a very high heat capacity and at the same time good flow properties (viscosity) even at low temperatures. This allows the use of a more energy-efficient circulation pump and the installation of a smaller pipe diameter.

Effective protection against the risk of corrosion

Special inhibitors reliably protect solar systems against the risk of corrosion if different materials are used in the construction of the solar system (different metals, steel and copper).

Non-toxic to humans and the environment

According to the European nomenclature, Optifluid is not considered a hazardous product. It is easily biodegradable, non-irritating and has a low water contamination rate. Nevertheless, we advise you to use the product with care; when handling it, make sure to protect your eyes and skin from contact with the product.

CE

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TECHNICAL FEATURES

Item code	105.005
Appearance	liquid, clear, red-fluorescent
Density (20 °C)	1.032 – 1.035 g/cm³ ASTM D 1122
Refraction index nD20	1.380 – 1.384 DIN 51757
pH value	9.0 – 10.5 ASTM D 1287
Alkalinity reserve	min. 20 ml 0.1 n HCl ASTM D 1121
Viscosity (20 °C)	4.5 – 5.5 mm²/s DIN 51562
Boiling point	102 – 105 °C ASTM D 1120
Flashpoint	Not flammable DIN 51376
Water proportion	55 – 58 % DIN 51777
Frost protection	up to –28 °C ASTM D 1177

Quality control

The above data are average values at the time this publication went to press. They are not product specifications. Specified characteristics may be communicated in the form of a specification sheet.

Features

Optifluid is a slightly odorous fluid based on an aqueous solution of propylene glycol, which is harmless to health. It was developed as a heat transfer medium for high-temperature solar systems.

Optifluid contains corrosion inhibitors in a high enough proportion to provide long-term and reliable protection against corrosion, ageing and incrustation of metallic materials commonly used in the solar energy sector. Optifluid keeps the surfaces of the heat exchangers clean and thus ensures a constant high level of efficiency of the system to be protected.

Optifluid must never be mixed with other heat transfer media or diluted with water, in order to preserve its specificity. Fluid losses should only be compensated with Optifluid.

If Optifluid is continuously exposed to temperatures above 170 °C, it will age prematurely. At temperatures above 200 °C, a slow chemical change of the propylene glycol begins, which can endanger the functional reliability of the system.

Anti-corrosion effect

The following table shows the corrosion protection effect of Optifluid. Corrosion test according to ASTM D 1384 (American Society for Testing and Materials). Average weight change in g/m².

Material	in g/m²
Copper (SF Cu)	-2.0
Soft solder (L Sn 30)	-6.0
Brass (MS 63)	-4.0
Steel (HI)	-0.1
Grey iron (GG 26)	-0.2
Cast aluminium (G AlSi6Cu4)	-0.3

Compatibility with sealing materials

Optifluid does not attack the sealing materials normally used in the heating sector. Based on our experience, our own tests and data from the literature, we have compiled a table of sealants, elastomers and plastics that are stable to Optifluid:

Material
Hemp
Butyl rubber IIR
Polychlorinated rubber CR
Ethylene propylene diene rubber (up to 150°C) EPDM
Fluorocarbon elastomers FPM
Rubber up to 80°C NR
Nitrile rubber NBR
Polyacetals POM
Polyamide up to 115°C PA
Polybutene PB
Flexible or rigid polyethylene PE-LD, PE-HD
Cross-linked polyethylene PE-X
Polypropylene PP
Polytetrafluoroethylene PTFE
Poly(vinyl chloride) PVC h
Styrene butadiene rubber up to 100 °C SBR
Unsaturated polyesters UP

Phenol or urea-formaldehyde resins are not stable, nor are plasticised PVC and polyurethane elastomers.

When elastomers are used, it must be taken into account that the useful properties of these materials are determined not only by the properties of the base rubber (e.g. EPDM), but also by the nature and quantity of the additives and by the manufacturing/vulcanisation conditions. We therefore recommend to carry out a suitability test on Optifluid before the first application. This is particularly important in the case of elastomers used as membrane materials for expansion tanks according to DIN 4807.

Flat gaskets (seals) based on 70 EPDM 281 (up to 160 °C) and e.g. REINZ-AFM 34 or Centellen 3820 (up to 200 °C) based on special aramid/NBR have proven their stability at Optifluid.

Guidelines for use

The special properties of the Optifluid product require the user to comply with the following guidelines if he wants to protect his installation for a long time.

1. The solar system must be carried out in a closed circuit, as an input of atmospheric oxygen would lead to a more rapid consumption of the inhibitors present in the Optifluid product.
2. Soldering must be carried out with Ag or Cu filler material (hard soldering). If soft solder is used, intensive rinsing is required to remove residues of chloride-containing flux.
3. Flexible connecting elements should be low oxygen diffusion hoses or preferably metal hoses.
4. The installations must not be equipped with galvanised heat exchangers, heat accumulators, containers or pipes on the primary side, as propylene glycol can dissolve zinc.
5. Optifluid is chemically inert. However, it must be ensured that all sealing and connection materials used in solar systems are stable up to the maximum stagnation temperature according to the manufacturer's specifications.
6. Copper rods must be kept away from the system, as hot mixtures of propylene glycol and water can dissolve the rods.
7. It must be ensured that there is no parasitic electric potential between the elements of the installation that are in contact with Optifluid.
8. All pipes must be arranged in such a way that there can be no disturbance of the flow due to gas pockets or sediment.
9. During installation and before filling, the system must be protected against the ingress of dirt and water. Afterwards, an internal cleaning (flushing) must be carried out to remove solids and installation aids.
10. After the first filling/start-up of the system, the dirt traps must be cleaned so that the flow of Optifluid is not impeded. This cleaning must be carried out after 14 days at the latest.
11. 11. In case of losses due to leakage or sampling, compensate only with Optifluid. Do not dilute with water!

Safety

Optifluid contains propylene glycol and is not subject to labelling according to EC Directive 1999/45/EC («Directive preparation»)

Handling

When handling Optifluid, it is important to strictly adhere to the safety and occupational hygiene measures required for the use of chemicals and to observe the information in our safety data sheet.

Ecology

Optifluid is a low water pollutant (water hazard class WGK 1 according to German law, assessment according to VwVwS of 17.05.1999). It is biodegradable. If correctly introduced into suitable biological purification plants, no disturbance of the biodegrading activity of the activated sludge is to be expected.

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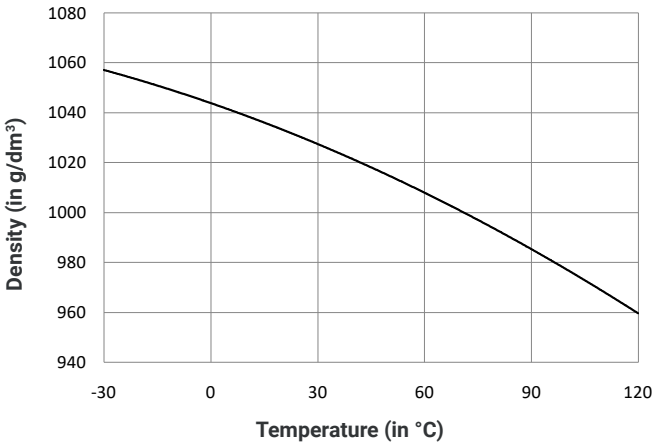
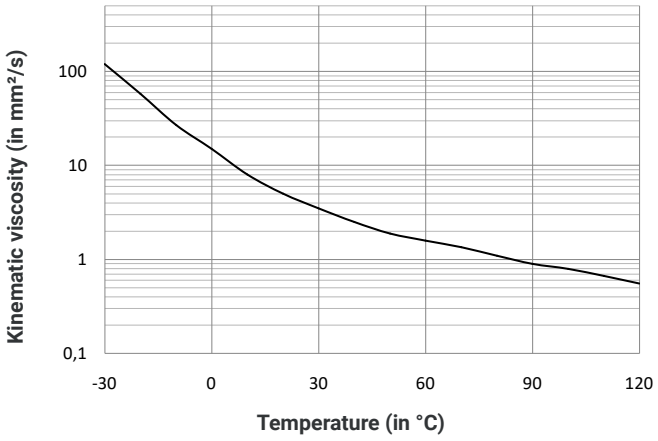
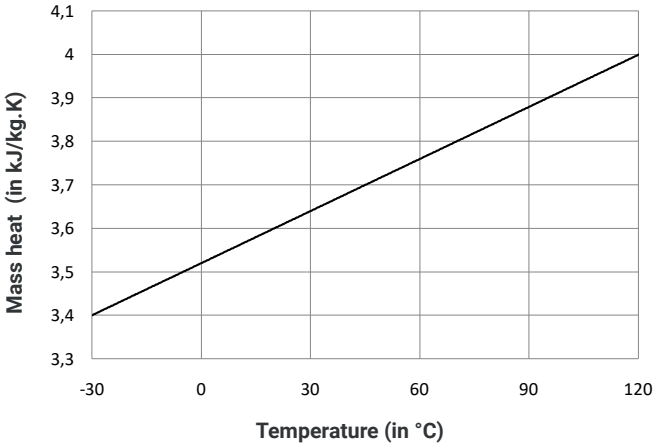
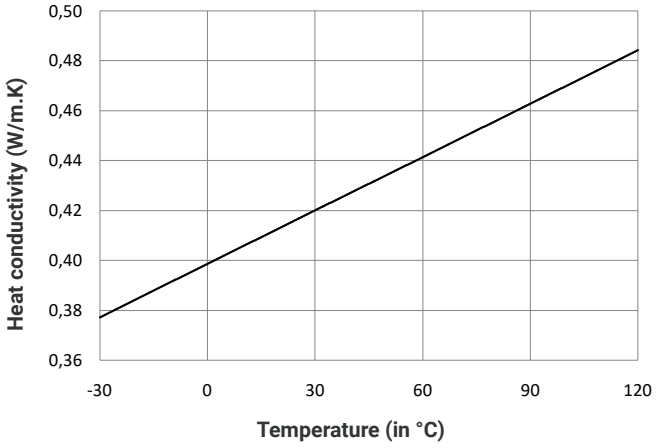
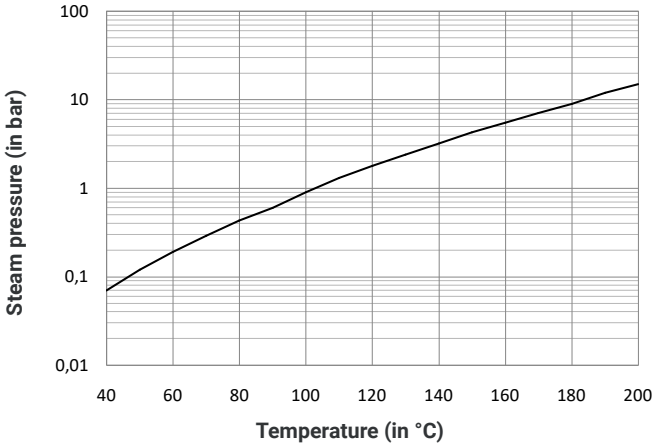
Graphs of physical values

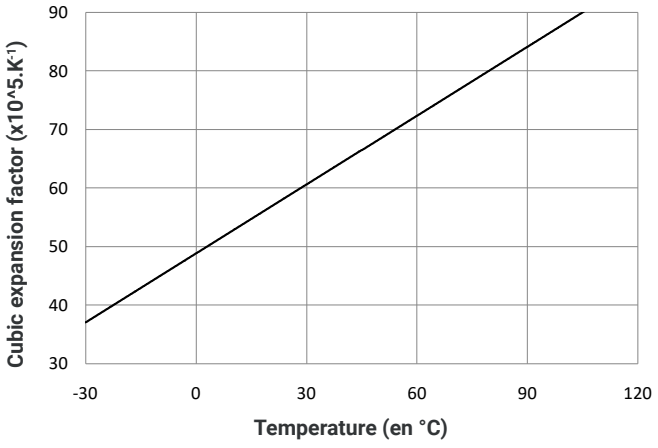












SAFETY DATA

Identification of the substance/preparation and of the company

Product name:Optifluid ready to use, frost protection to -28°C.
Significant identified uses: Heat transfer fluid for solar thermal installations.
Company: Sunoptimo SA, Chaussée de Marhce 940 E, 5100 Namur
Emergency information: Centre anti-poisons de Nancy: +33 3 83 32 36 36
Company: TYFOROP Chemie GmbH, Anton-Rée-Weg 7, D - 20537 Hamburg

Hazard identification

- Labelling elements according to Regulation (EC) No 1272/2008 [CLP]: The product is not subject to labelling according to GHS criteria.
- Labelling elements according to Directive 67/548/EEC or 1999/45/EC ('Preparations Directive'): The product is not subject to labelling according to the EC Directives.
- Classification of the substance or mixture: According to Regulation (EC) No. 1272/2008 [CLP]: Not required to be classified according to GHS criteria. According to Directive 67/548/EEC / 1999/45/EC: Possible hazards: No particular hazards known.
- Other hazards: PBT / vPvB assessment: According to Annex XIII of Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain any substance meeting the PBT (persistent/bioaccumulative/toxic) or vPvB (very persistent and very bioaccumulative) criteria.

First aid measures

- General information: Remove contaminated clothing.
  After inhalation: In case of discomfort after inhalation of vapours/aerosols: Fresh air, medical attention.
- After skin contact: Wash thoroughly with soap and water.
- After eye contact: Wash thoroughly with running water for at least 15 minutes: hold eyelids apart.
- After swallowing: Rinse out mouth and give plenty of water to drink.
- Main symptoms and effects, acute and delayed: The main known symptoms and effects are described in the label (see section 2) and/or in section 11. To date, no other significant symptoms or effects are known.
- Indication of any immediate medical attention and special treatment needed: Symptomatic treatment (decontamination, vital functions), no specific antidote known.

Composition/information on ingredients

Chemical characterisation: 1.2-propylene glycol with corrosion inhibitors, aqueous solution.
Hazardous components (GHS) according to regulation 1272/2008 / directive 1999/45/EC.

Substance	Reg. (CE) 1272/2008	Dir. 1999/45/CE
1,1'-Iminodipropane-2-ol		
Content (w/w): > 1 % - < 3	Serious eye damage	Hazard symbol: Xi
CAS number: 110-97-4	Ocular irritation: Cat. 2	R-phrases: 36
EC number: 203-820-9	H319	
REACH registration number: 01-2119475444-34		
INDEX number: 603-083-00-7		

If hazardous components are mentioned, the texts corresponding to the hazard symbols and risk phrases are given in chapter 16.

Fire-fighting measures

- Recommended extinguishing media: Product is not combustible. Fight surrounding fire with water spray, extinguishing powder, alcohol-resistant foam.
- Special hazards: Harmful vapours. Release of smoke/mist. The substances and groups of substances listed may be released in a fire.
- Special hazards arising from the substance or mixture: Advice for firefighters: Special protective equipment: Wear self-contained breathing apparatus.
- Other information: The hazard depends on the products and conditions of combustion. Contaminated extinguishing water should be disposed of in accordance with local regulations.

Measures to be taken in the event of an accidental release

- Personal precautions, protective equipment and emergency procedures: Use personal protective clothing.
- Environmental precautions: Contain contaminated water/fire fighting water. Do not discharge into drains/surface water/groundwater.
- Methods and equipment for containment and cleaning up large quantities: Pump up product.
- Residues: Pick up with suitable liquid-absorbing materials. Recovered material should be disposed of in accordance with applicable regulations.
- Reference to other sections: Information on exposure controls/personal protection and disposal considerations can be found in sections 8 and 13.

Handling and storage

- Precautions for safe handling: No special measures necessary.
- Protection against fire and explosion: No special measures necessary.
- Conditions for safe storage, including any incompatibilities: Keep containers tightly closed in a dry place. Storage in galvanized containers is not recommended.
- Specific end uses: For the relevant uses identified in section 1, the advice given in this section 7 should be followed.

Exposure controls/personal protection

- Exposure parameters to be monitored at the workplace: No known occupational exposure limits to be monitored.
- Personal protective equipment: Respiratory protection when releasing vapours/aerosols: Medium efficiency particulate filter for solid and liquid particles (e.g. EN 143 or 149, type P2 or FFP2).
- Hand protection: Chemical resistant gloves (EN 374). (Recommended: nitrile rubber, protection class: 6). Due to the variety of types, the manufacturer's instructions for use must be observed.
- Eye protection: Safety goggles with side protection (rimmed goggles, EN 166).
- General protective and hygienic measures: Observe the usual precautionary measures when handling chemicals. Wearing closed work clothes is recommended.

Physical and chemical properties

Information on essential physical and chemical properties:

Physical state	Liquid
Colour	Red-fluorescent
Odour	Product specification
pH value (20 °C)	9.0 - 10.5. (ASTM D 1287)
Ice flocculation point	ca. -25 °C. (ASTM D 1177)
Freeze protection	ca. -28 °C
Solidification temperature	ca. -31 °C. (DIN 51583)
Boiling point	>100 °C. (ASTM D 1120)
Flash point	Not applicable. (DIN EN 22179, ISO 2719)
Lower explosion limit	2.6 % (V). (1.2-propylene glycol)
Upper explosion limit	12.6 % (V). (1.2-propylene glycol)
Auto-ignition temperature	Not applicable. (DIN 51794)
Vapour pressure (20 °C)	ca. 20 hPa
Density (20 °C)	ca. 1.034 g/cm3 . (DIN 51757)
Solubility (qualitative) solvents	Polar solvents: Soluble
Viscosity (kinematic, 20 °C)	ca. 5.0 mm2/s. (DIN 51562)
Explosion hazard	No explosive properties
Other information	Solubility in water: Unlimited

Stability and reactivity

- Corrosion of metals: Not corrosive to metal.
- Chemical stability: The product is stable, when the storage requirements/recommendations are observed.
- Peroxides: 0 %. The product does not contain peroxides.
- Possibility of hazardous reactions: No hazardous reactions when stored and handled as prescribed.
- Conditions to avoid: No conditions to avoid are to be expected.
- Incompatible products: Strong oxidizing agents.
- Hazardous decomposition products: None, if stored and handled as prescribed.

Toxicological information

- Acute toxicity: Experimental/calculated data: LD50 rat (oral): >2000 mg/kg. LD50 rabbit (dermal): >2000 mg/kg, literature data.
- Skin corrosion/irritation rabbit: non-irritant (OECD Test Guideline 404).
- Severe eye damage/irritation rabbit: non-irritant (OECD Test Guideline 405).
- Other information on toxicity: The product has not been tested. Toxicological data are deduced from the properties of the individual components.

Environmental information

- Toxicity to fish: LC50 (96 h) >100 mg/l, Leuciscus idus. Aquatic invertebrates: EC50 (48 h) >100 mg/l. Aquatic plants: EC50 (72 h) >100 mg/l. Microorganisms/activated sludge effect: >1000 mg/l (DEV-L2). Appropriate introduction of low concentrations into suitable biological treatment plants does not disturb the biological action cycle of activated sludge.
- Persistence and degradability: Elimination data: >70% reduction in DOC (28 days) (OECD 301 A, new version). Eliminates well by biodegradation.

- Bioaccumulative potential: Accumulation in organisms is not expected.
- Mobility in soil (and other compartments if available): Assessment of transport between environmental compartments: The substance does not evaporate from the water surface to the atmosphere. Absorption onto the solid phase of the soil is not expected.
- PBT and vPvB assessment results: According to Annex XIII of Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain any substance meeting the PBT (persistent/bioaccumulative/toxic) or vPvB (very persistent and very bioaccumulative) criteria. Data on 1,1'-Iminodipropan-2-ol: according to Annex XIII of Regulation (EC) No. 1907/2006 (REACH): 1. Does not meet the PBT (persistent/ bio-accumulative/toxic) criteria. Self-classification. 2. Does not meet vPvB (very persistent and very bioaccumulative) criteria.

Further information on ecotoxicity: Do not allow product to enter water without prior treatment. The product has not been tested. Ecotoxicological data are derived from the properties of the individual components.

Disposal considerations

- Methods of waste disposal: The product should be disposed of in an approved landfill or incinerated in an approved facility in accordance with local regulations.
- Uncleaned packaging: Uncontaminated packaging may be reused. Packaging that cannot be cleaned should be disposed of in the same way as the product it contained.

Transport information

- Land transport -ADR, RID: Not a dangerous product in the sense of the transport regulations.
- Inland waterway transport -ADR, RID -ADNR: Not dangerous in the sense of transport regulations.
- Sea transport -IMDG: Not dangerous in the sense of transport regulations.
- Air transport -ICAO/IATA: Not a dangerous product in the sense of transport regulations.

Regulatory information

- Safety, health and environmental regulations/legislation specific to the substance or mixture: Code de la Sécurité Sociale, Art. L 461-1 to L 461-8 (France): 49, 49bis, 84
- Chemical Safety Assessment: Chemical Safety Assessment (CSA) not yet performed due to registration deadlines.

Other information

Full text of hazard symbols and R-phrases, if hazardous substances are mentioned in chapter 3 under 'Hazardous components' - no product classification!
Xi: Irritant.
R36: Irritating to eyes.
H319: Causes severe eye irritation.
The vertical lines on the left hand side indicate changes from the previous version. The data contained in this safety data sheet are based on our experience and current knowledge and describe the product with regard to safety requirements. The data can in no way be regarded as a product specification. Neither the product specifications nor the areas of application of the product can be deduced from the data in this safety data sheet. It is the responsibility of the purchaser of our products to ensure that all proprietary rights and existing laws are observed.

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your solar heat supplier

You can find this data sheet and all our other documents on our website **www.sunoptimo.com.**