



Product Information

23.09.2015

MARLOTHERM SH

Product description

MARLOTHERM SH is a high-performance synthetic, organic heat-transfer medium for use in the liquid phase in closed, forced circulation heat-transfer systems.

MARLOTHERM SH can be used over the whole working range without being kept under pressure. The boiling range of the product at atmospheric pressure is above the use limit. The heat-transfer medium can be used up to a maximum bulk temperature of 350 ° C. The film temperature should not exceed the limit of 380°C either significantly or for a prolonged period.

MARLOTHERM SH is most suitable for indirect heating of reactors, polymerisation vessels and distillation columns, of processing machines and driers, and also heat exchangers in process plants and systems for heat recovery.

MARLOTHERM SH is also suitable for use in heating and cooling systems. The technical characteristics of a MARLOTHERM SH charge can also be matched to the specific requirements of a system and optimized by mixing with MARLOTHERM LH.

The heat-transfer systems should be designed and operated in accordance with the recommendations of DIN 4754 "heat-transfer installation working with organic heat-transfer fluids".

Heat-transfer plants containing a MARLOTHERM SH charge can be started up at temperatures down to -5°C. Steam tracing is generally not necessary. At external temperatures below -5°C, the heat-transfer medium is to be protected from excessive cooling during the shut-down phase, or the viscosity of the charge is to be lowered by mixing with an appropriate amount of MARLOTHERM LH. MARLOTHERM LH can be added to a MARLOTHERM SH charge without concern, as long as the system is operated at a heater outlet temperature below the boiling point of MARLOTHERM LH. At operating temperatures above the boiling point of MARLOTHERM LH, it is necessary to first check whether the heat-transfer plant is approved for operation at the higher pressure.

MARLOTHERM SH circuits are advantageously operated using an inert gas back pressure of less than 100 mbar at the expansion vessel. Nitrogen has proven to be a suitable inert gas. Inert gas blanketing is the best protection against changes caused by oxidation. Antioxidants are unstable at operating temperatures above 200°C and are ineffective even after short operating times.

Marlotherm SH ist thermally stable up to very high operating temperatures. The Marlotherm SH charge can be used for several years without significant changes. At very high temperatures, low-boiling and high-boiling decomposition products may be formed.

Their degree of formation rises with increasing operating temperatures. The decomposition products remain completely dissolved in the MARLOTHERM SH charge. A build-up of low boilers should, however, be avoided, since they can impair the operation of the heat-transfer system, particularly in the upper range from 340 to 350°C.

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For this reason, the low ends should be removed; their removal may be discontinuous, but at temperatures above 340°C should be continuous via the expansion vessel. To assist this measure, the temperature of the expansion vessel should be raised to about 150°C. If used according to the recommended operation parameters, MARLOTHERM SH forms no deposits on the walls and does not lead to accumulation of solids in the heat-transfer circuit. MARLOTHERM SH plants can be operated reliably and without high maintenance costs.

To check the operating condition of heat-transfer systems, quality controls should be carried out at appropriate intervals on representative samples from the main stream of the circuit. Scope of testing and sampling have to be individually matched to the charge volume and the operating temperature of the heat-transfer plant. The analysis can be carried out on request by Sasol Customer Service.

Product data (specification)

| Property | Value | Unit | Test method |
|---------------------|---------------|--------------------|-----------------|
| Appearance at 20 °C | liquid, clear | - | visual |
| Chlorine | < 10 | ppm | DIN 51408 |
| Acid number | ≤ 0,02 | mg KOH/g | DIN EN ISO 2114 |
| Density at 20°C | 1.04 - 1.05 | g/ml | DIN 51757 |
| Viscosity at 20°C | 42 - 52 | mm ² /s | DIN 51562 |

General product description

| Property | Value | Unit | Test method |
|---------------------------------------|--------------------|------|---|
| Boiling range at 1013 mbar | about 385 - 395 | °C | ASTM D 1078 |
| Pour point | about -34 | °C | DIN ISO 3016 |
| Flash point | about 200 | °C | EN 22719 |
| Ignition temperature | about 500 | °C | Regulation (EU) 440/2008; Method A.15. |
| Permissible heater outlet temperature | 350 | °C | - |
| Permissible heater film temperature | 380 | °C | - |
| Pumpability limit | ca. - 5 | °C | - |

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Phys. data of MARLOTHERM SH

| Temperature | | Density | | Specific heat | | Thermal conductivity | | Viscosity kinematic | | Vapor pressure | |
|-------------|-----|-------------------|--------------------|---------------|-----------|----------------------|--------------|---------------------|------|----------------|-------|
| °C | °F | kg/m ³ | lb/ft ³ | kJ/kg K | Btu/lb °F | W/m K | Btu/ft*hr °F | mm ² /s | cSt | hPa | psi |
| 0 | 32 | 1058 | 66.0 | 1.48 | 0.354 | 0.133 | 0.077 | 321 | 321 | - | - |
| 20 | 68 | 1044 | 65.2 | 1.55 | 0.370 | 0.131 | 0.076 | 47 | 47 | - | - |
| 40 | 104 | 1030 | 64.3 | 1.62 | 0.387 | 0.128 | 0.074 | 16.5 | 16.5 | - | - |
| 60 | 140 | 1016 | 63.4 | 1.70 | 0.406 | 0.125 | 0.072 | 8.10 | 8.10 | - | - |
| 80 | 176 | 1001 | 62.5 | 1.77 | 0.423 | 0.123 | 0.071 | 4.70 | 4.70 | - | - |
| 100 | 212 | 987 | 61.6 | 1.85 | 0.442 | 0.120 | 0.069 | 3.10 | 3.10 | - | - |
| 120 | 248 | 973 | 60.7 | 1.92 | 0.459 | 0.117 | 0.068 | 2.30 | 2.30 | - | - |
| 140 | 284 | 958 | 59.8 | 1.99 | 0.475 | 0.115 | 0.066 | 1.80 | 1.80 | 0.1 | - |
| 160 | 320 | 944 | 58.9 | 2.07 | 0.494 | 0.112 | 0.065 | 1.40 | 1.40 | 0.5 | - |
| 180 | 356 | 930 | 58.1 | 2.15 | 0.514 | 0.110 | 0.064 | 1.20 | 1.20 | 1.7 | 0.02 |
| 200 | 392 | 915 | 57.1 | 2.22 | 0.530 | 0.107 | 0.062 | 0.92 | 0.92 | 5.0 | 0.07 |
| 220 | 428 | 901 | 56.2 | 2.29 | 0.547 | 0.104 | 0.060 | 0.77 | 0.77 | 12 | 0.17 |
| 240 | 464 | 887 | 55.4 | 2.37 | 0.566 | 0.102 | 0.059 | 0.65 | 0.65 | 27 | 0.39 |
| 260 | 500 | 873 | 54.5 | 2.44 | 0.583 | 0.099 | 0.057 | 0.57 | 0.57 | 54 | 0.78 |
| 280 | 536 | 858 | 53.6 | 2.52 | 0.602 | 0.096 | 0.055 | 0.50 | 0.50 | 98 | 1.42 |
| 300 | 572 | 844 | 52.7 | 2.59 | 0.619 | 0.094 | 0.054 | 0.45 | 0.45 | 200 | 2.90 |
| 320 | 608 | 830 | 51.8 | 2.67 | 0.638 | 0.091 | 0.053 | 0.40 | 0.40 | 315 | 4.57 |
| 340 | 644 | 815 | 50.9 | 2.74 | 0.654 | 0.088 | 0.051 | 0.36 | 0.36 | 560 | 8.12 |
| 360 | 680 | 801 | 50.0 | 2.82 | 0.674 | 0.086 | 0.050 | 0.32 | 0.32 | 860 | 12.47 |

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Material compatibility

MARLOTHERM SH does not corrode the usual metallic materials used in construction of plants and machinery. MARLOTHERM SH is compatible with pure graphite, PTFE and fluoroelastomers. These materials can be used as base materials for seals. In selecting the seals, note must be taken of the seal manufacturer's data for temperature resistance and mechanical strength.

Rubber-elastic binders swell on contact with MARLOTHERM SH and should not be used in the seals for MARLOTHERM SH plants.

Seals made of pure graphite have proven particularly useful in heat-transfer plants using MARLOTHERM SH. To increase the strength and dimensional stability, these seals are advantageously provided with a metallic insert, e.g. a sheet metal core.

Toxicological properties and safety

MARLOTHERM SH is intended for use as heat-transfer medium in a closed plant. For safety and environmental reasons, escape of the heat-transfer medium is to be prevented or limited to a minimum amount by means of appropriate construction measures. When handling MARLOTHERM SH, the usual guidelines and recommendations for handling organic liquids should be observed and precautions should be taken.

Details are to be found in the latest safety data sheet for MARLOTHERM SH.

Customer service

MARLOTHERM SH is just one of the comprehensive range of high performance heat transfer fluids offered by Sasol for the temperature range from – 90 to 360 °C: Detailed information is available on request. Sasol has more than 50 years experience in the field of heat transfer technology. This know-how is available to you, should you have any questions or problems. Whether you have questions about the choice of heat transfer medium for a certain application, about system design, troubleshooting, safety issues or specification problems, our experts are here to help you. Just give us a call! (Phone: +492365 49 2214 / 49 5371; fax: +49 2365 49 9180)

An analytical routine check of the heat transfer medium should be part of the maintenance regulations. This check should be carried out at least once a year and is offered by Sasol to all users of MARLOTHERM. The system parameters which are measured will allow our experts an accurate assesment of the condition of the material. This way, prolonged and trouble-free operation of the plant can be ensured. Faults in the plant are quickly detected and can be avoided in due time before more extensive damage and costs occur.

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Storage and transport

MARLOTHERM SH has a virtually unlimited storage life when stored in closed metal containers (eg. aluminium or steel). No special protective measures are necessary during storage. When handling MARLOTHERM SH and when filling and operating a heat-transfer system with MARLOTHERM SH, care must be taken that the heat-transfer medium cannot enter the soil or sewer system. The product is almost insoluble in water.

If necessary, used MARLOTHERM SH can be recycled or used for energy recovery observing local regulations. Used MARLOTHERM SH can be reclaimed by fractional distillation for reuse as a heat-transfer medium. This reclaiming is possible in Sasol plants. However, for economic reasons, amounts of approximately 10 t or more have to be supplied. It is necessary to adhere to the requirements for returned goods which are set down according to criteria specific to the reclaiming and to legal criteria for waste. The values of the residue content of MARLOTHERM SH, the viscosity and the chlorine content of the goods are to be determined beforehand.

With regards to the classification of MARLOTHERM SH under the regulation governing the transport of dangerous goods, reference should be made to the EU Safety Data Sheet.

In general the waste code number for MARLOTHERM SH will be determined by its application according to the EWC. In those cases in which it has not been used as heat transfer fluid follow your local regulations.

This information is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party patent rights. In particular, no guarantee of properties in the legal sense is implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Reference to trade names used by other companies is neither a recommendation, nor is it intended to suggest that similar products could not be used. All our business transactions shall exclusively be governed by our General Sales Conditions.

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