



## Product Information

# MARLOTHERM<sup>®</sup> N

### Product description

MARLOTHERM N is an inexpensive synthetic organic heat transfer fluid for use in the liquid phase in closed, non-pressurised, forced-circulation heat transfer systems and can be used instead of mineral oils. The maximum bulk outlet temperature has been set at 300°C. The ideal working range is at operating temperatures between 150°C and 300°C.

MARLOTHERM N circuits can be operated optimally with a low inert gas back pressure of approximately 50-100 mbar in the expansion vessel, even at the top of the above range. Nitrogen has proven to be a successful inert gas. MARLOTHERM N has proven to be extremely stable to thermal influences over the entire temperature range. At high operating temperatures, thermal decomposition leads to the formation of low- and highboiling secondary products, however in amounts which can be tolerated. The low-boiler fractions can easily be removed via the expansion vessel, either during operation of the plant or during maintenance shutdowns. To ensure safe operating conditions in the plant it is necessary to avoid high concentration of low-boilers. The remaining degradation products will be dissolved in the heat transfer fluid. When the proportion of high boilers approaches 15% by mass, the charge should be replaced.

MARLOTHERM N, when used as recommended, does not form any highly viscous or solid deposits. The formation of a coating on the heat exchanger surfaces or clogging of the heat transfer circuit has never been observed.

As an organic heat transfer fluid MARLOTHERM N is relatively stable to air. The product is particularly suitable for use in heat-transfer circuits for temperature control of processing machines, calenders etc., in which contact of the heat-transfer fluid with air cannot be completely prevented due to constructional conditions. The viscosity of MARLOTHERM N allows the material to be circulated using standard centrifugal pumps at temperatures as low as -10°C without problems occurring. MARLOTHERM N can be transferred into the plant (during re-filling or during start-up) without difficulty, even under unfavorable climatic conditions. Construction and operation of the heat transfer plant should comply with the recommendations according to DIN 4754.

The condition of the heat-transfer charge should be regularly checked by means of specific product quality controls.

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### 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	0.850 - 0.900	g/ml	DIN 51757
Viscosity at 20°C	28 - 60	mm <sup>2</sup> /s	DIN 51562

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### General product description

Property	Value	Unit	Test method
Boiling range at 1013 mbar	about 330 - 400	°C	ASTM D 1078
Pour point	about -60	°C	DIN ISO 3016
Flash point	about 180	°C	EN 22719
Ignition temperature	about 330	°C	DIN 51794
Permissible heater outlettemperature	300	°C	-
Permissible heater film temperature	340	°C	-

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#### Phys. data of MARLOTHERM N

Temperature		Density		Specific heat		Thermal conductivity		Viscosity kinematic		Vapor pressure	
°C	°F	kg/m <sup>3</sup>	lb/ft <sup>3</sup>	kJ/kg K	Btu/lb °F	W/m K	Btu/ft*hr °F	mm <sup>2</sup> /s	cSt	hPa	psi
- 20	- 4	904	56.44	1.82	0.435	0.137	0.0792	504	504	-	-
0	32	890	55.56	1.89	0.451	0.136	0.0786	123	123	-	-
20	68	877	54.75	1.97	0.471	0.135	0.0780	34	34	-	-
40	104	863	53.88	2.04	0.487	0.134	0.0774	14	14	-	-
60	140	850	53.07	2.11	0.504	0.132	0.0763	7.4	7.4	-	-
80	176	836	52.19	2.19	0.523	0.130	0.0751	4.6	4.6	-	-
100	212	823	51.38	2.26	0.540	0.129	0.0745	3.0	3.0	-	-
120	248	810	50.57	2.33	0.557	0.127	0.0734	2.2	2.2	-	-
140	284	796	49.69	2.41	0.576	0.125	0.0722	1.7	1.7	-	-
160	320	783	48.88	2.48	0.592	0.124	0.0716	1.4	1.4	-	-
180	356	769	48.01	2.55	0.609	0.122	0.0705	1.1	1.1	2	0.03
200	392	755	47.14	2.62	0.626	0.121	0.0699	0.87	0.87	7	0.10
220	428	743	46.39	2.70	0.645	0.119	0.0688	0.73	0.73	16	0.23
240	464	729	45.51	2.77	0.662	0.118	0.0682	0.60	0.60	46	0.67
260	500	716	44.70	2.84	0.678	0.116	0.0670	0.50	0.50	91	1.32
280	536	702	43.83	2.92	0.697	0.114	0.0659	0.43	0.43	189	2.74
300	572	688	42.95	2.99	0.714	0.112	0.0647	0.38	0.38	390	5.66

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## Compatibility with other materials

MARLOTHERM N is non-corrosive towards metals conventionally used in plant construction. The fluid is compatible with gaskets of the quality grade It-0 or gaskets made of fluorinated elastomers which are frequently used in heat transfer plants.

The thermal stability and mechanical strength of the gaskets provided by the gasket manufacturers should always be taken into account. When the plant is running under extreme conditions, for example at constantly high temperatures or under frequent changes in temperature, then a completely sealed system is of great importance. In this case, we recommend gaskets made of pure graphite, preferably with a metal inlay.

## Toxicological properties and safety

The use and handling of MARLOTHERM<sup>®</sup> N have caused no adverse effects which can be attributed to the heat-transfer medium. Nevertheless, the usual guidelines and re-recommendations concerning organic chemicals or high-boiling solvents should be observed.

MARLOTHERM<sup>®</sup> N is intended for use in closed systems, therefore the leakage of heat-transfer fluid from the plant must be prevented or minimised for safety and environmental reasons by suitable design measures.

Details are to be found in the latest safety data sheet for MARLOTHERM<sup>®</sup> N..

## Storage and transport

MARLOTHERM N has a virtually unlimited storage life when stored in closed metal containers (e.g. aluminium or steel). No special safety precautions are required during storage.

When handling MARLOTHERM N, in particular during filling and operation of a heat-transfer circuit, care should be taken that the product cannot enter the soil or the sewer system. If necessary the disposal of used MARLOTHERM N, should be carried out in a waste incineration plant in compliance with the official regulations.

In general the waste code number for MARLOTHERM N 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.