WACKER

CREATING TOMORROW'S SOLUTIONS

HELISOL®

HELISOL® – HEAT TRANSFER FLUIDS FOR INDUSTRIAL APPLICATIONS

A NEW LEVEL OF EFFICIENCY FOR ULTRA-HIGH AND WIDE-TEMPERATURE-RANGE OPERATION

Heat makes up two-thirds of industrial energy demand and almost one-fifth of global energy consumption. Whether it is generating process heat for heating of raw materials in chemical processes, for drying and cleaning or to convert the power of the sun generating electricity or direct steam there is a huge demand for reliable and efficient heat transfer fluids in the industrial market.

HELISOL® heat transfer fluids offered by WACKER are providing these needs because they are highly stable silicone fluids specifically designed for high-temperature and heating/cooling applications. They provide excellent economic benefits – efficient operation, low maintenance, and precise temperature control.

Maximum efficiency, reliability and economics

With a recommended operating temperature range of –40 °C to 425 °C and versatility due to their chemical structure, HELISOL® heat transfer fluids have an outstanding property profile, which sets them apart from organic materials such as mineral oils and aromatic heat transfer fluids. Properly handled and maintained HELISOL® heat transfer fluids can be operated for many years before they need replacement.

Conclusion

HELISOL® heat transfer fluids deliver maximum efficiency, reliability and economics as they power their way through the 400 °C barrier.

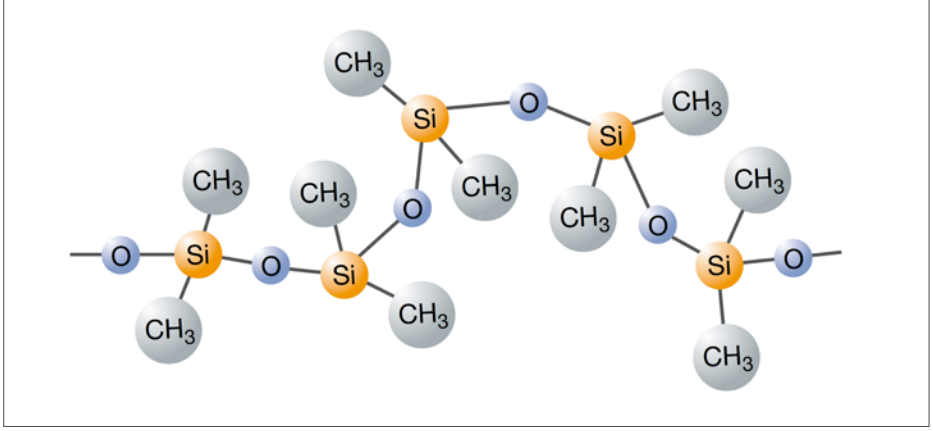
Operating temperature of HELISOL® heat transfer fluids

Recommended working temperature: –40 °C to 425 °C
Suggested applications: CSP (concentrated solar power), process heat, heating/cooling applications

Advantages of HELISOL® heat transfer fluids at a glance

Benefits	Features
Exceptional thermal stability	Ideally suited for very high-temperature applications above the 400 °C barrier. Users can expect many years of reliable operation, even when operating continuously at the recommended upper temperature limit.
Very low pour point	Provides sufficient pumpability at cold temperatures especially suitable for year-round use in colder climates. No freeze-protection needed.
Very broad temperature range	Efficient and dependable performance in a wide optimum use range.
Fewer environmental and health risks	HELISOL® heat transfer fluids are polydimethylsiloxanes and do not contain any hazardous ingredients. No hazardous reactions known if properly stored.
Low fouling potential	In general silicone-based fluids resist solids formation and system fouling providing long-term, reliable service and potential reduction of maintenance costs.

Molecular structure of HELISOL® heat transfer fluids



Safety and reliability

To address safety issues, WACKER has conducted laboratory tests and industrial-scale trials which have been performed and assessed by internationally recognized safety experts (e.g. the German Aerospace Centre (DLR), TÜV Nord GmbH, Bundesanstalt für Materialforschung und -prüfung (BAM)) in order to gain a detailed understanding of associated risks and subsequently design counter measures.

The safety and risk assessment of HELISOL® heat transfer fluids include the following trials and experiments:

- Analysis of combustion products and burning behavior
- Material compatibility with steel grades
- Critical reactions with water and molten salt
- Detailed analysis of potential hazards in combination with leakages and pipe ruptures

Conclusion

HELISOL® heat transfer fluids offer many advantages compared to organic heat carriers. Most notably the main combustion products are not classified as hazardous and the heat of combustion is significantly lower.

Property profile

HELISOL® heat transfer fluids are transparent clear, odorless and non-reactive polydimethylsiloxanes with a viscosity range of approx. 5 to 35 mm^2/s at room temperature. This has far-reaching effects on the stability and resistance to various influencing factors.

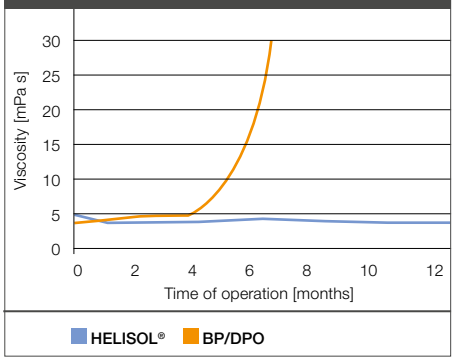
- Recommended for use as heat transfer fluids in closed systems under inert conditions
- The maximum recommended film temperature is 450 °C.
- Different applications:
  - Solar thermal applications
  - Wood and metal processing
  - Oil refineries
  - Chemical, polymer and other industries

Technical data of HELISOL® heat transfer fluids

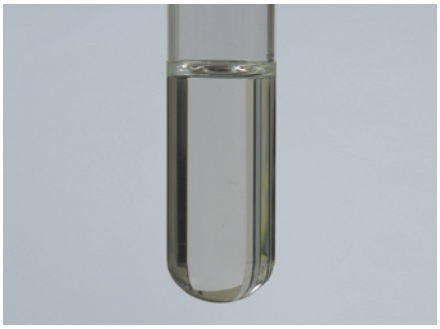
	HELISOL® 5A	HELISOL® 10A	HELISOL® XA	HELISOL® XLP
Pour point – in use*	< – 55 °C	< – 55 °C	– 36 °C	– 45 °C
Density at 25 °C	0.92 g/cm³	0.93 g/cm³	0.94 g/cm³	0.95 g/cm³
Vapor pressure at 425 °C – in use*	20 bar	16.3 bar	15.9 bar	12.6 bar
Viscosity at 25 °C	~ 5 mPa·s	~ 10 mPa·s	~ 20 mPa·s	~ 35 mPa·s
Flash point (ISO 2719)	120 °C	175 °C	225 °C	222 °C

These data are based upon samples tested in the laboratory and are not guaranteed for all samples.
Contact your WACKER representative for further information or complete sales specifications of HELISOL®.
* in use = 720 hours at 425 °C

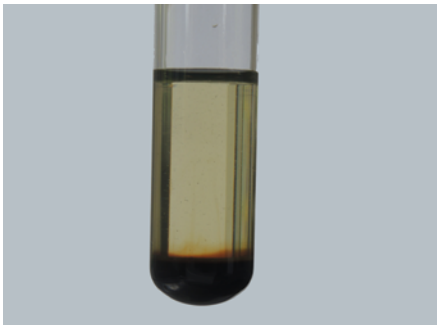
Thermal stability evaluation of HELISOL® heat transfer fluids



HELISOL® heat transfer fluids compared to organic heat carriers



HELISOL® heat transfer fluids operated at 425 °C



Organic heat carrier operated >400 °C

Conclusion

HELISOL® heat transfer fluids offer many advantages compared to organic heat carriers, withstanding temperatures of up to 425 °C for long periods and retaining its low viscosity even at -40 °C.

WACKER

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