HELISOL® 5A – A NOVEL SILICONE-BASED HEAT-TRANSFER FLUID
Sunlight is key to sustainable energy production. New HELISOL® 5A from WACKER is key to high-efficiency, concentrated solar-power (CSP) systems. HELISOL® 5A is a silicone-based heat-transfer fluid intended especially for parabolic trough CSP plants. HELISOL® 5A can withstand temperatures up to 425 °C for long periods, and retains its low viscosity even at -40 °C.

When used in combination with parabolic trough collectors, the fluid delivers efficiencies and operational advantages unrivaled by conventional heat-transfer fluids.

**Maximum Efficiency, Reliability and Economics**

HELISOL® 5A heat-transfer fluid delivers maximum efficiency, reliability and economics as it powers its way through the 400 °C barrier:
- High thermal stability
- Good heat transfer
- Low pour point
- No critical degradation products
- Higher power-block efficiency
- Fewer environmental and health risks

**Conclusion**

HELISOL® 5A offers many advantages, withstanding temperatures of up to 425 °C for long periods and retaining its low viscosity even at -40 °C.

**Huge Savings Potential**

HELISOL® 5A delivers not only higher efficiency levels, but also greater cost effectiveness, while offering superior business benefits in terms of capital (CAPEX) and operating expenses (OPEX) compared to organic BP/DPO (biphenyl/diphenyl oxide):

**CAPEX**
- Lower energy-storage costs
- No freeze protection needed
- Can be filled at any time (irrespective of temperature )
- No ullage needed for viscosity control
- Higher vapor pressure needs to be taken into consideration

**OPEX**
- No circulation needed to provide freeze protection
- Maintenance at any time
- Less pumping energy (low viscosity)
- Shorter startup period
- Lower degradation/exchange rate at same temperature
- Less H₂ formation
- No fouling

**Lower LCOE with HELISOL® 5A**

*Simulation Performed at 430 °C by DLR*

HELISOL® is a registered trademark of Wacker Chemie AG.
High-Temperature Stability
HELISOL® 5A from WACKER is a low-viscosity polydimethylsiloxane, a multi-component mixture of molecules with various molecular weights. The new heat-transfer fluid features very high heat resistance and durability. Transparent and odorless, it withstood temperatures up to 425 °C in long-term pilot tests conducted in Inner Mongolia. Not only that, but its pour point of below -55 °C is far lower than that of conventional heat-transfer fluids.

### Safety & Reliability
HELISOL® 5A achieved good results in the TÜV fire test:
- HELISOL® 5A combustion products are not classified as hazardous
- Ignition on a hot surface occurred above 475 °C
- The heat of combustion of HELISOL® 5A is approximately 20% lower compared to BP/DPO.
- Release experiments performed at a demonstration plant to simulate leakages at working temperature with an outlet diameter of two inch show no self-ignition of HELISOL® 5A.

### Conclusion
Under specific test conditions, HELISOL® 5A offers greater heat resistance and durability than standard commercial products.

### Advantages of HELISOL® 5A at a Glance

<table>
<thead>
<tr>
<th></th>
<th>BP/DPO</th>
<th>HELISOL® 5A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature (CSP)</td>
<td>400 °C</td>
<td>425 °C</td>
</tr>
<tr>
<td>Freezing point / pour point</td>
<td>12 °C</td>
<td>&lt; -55 °C</td>
</tr>
<tr>
<td>Vapor pressure (400 °C)</td>
<td>11 bar</td>
<td>16 bar</td>
</tr>
<tr>
<td>H₂ formation</td>
<td>Reduced</td>
<td></td>
</tr>
<tr>
<td>Cp value</td>
<td>Higher</td>
<td></td>
</tr>
<tr>
<td>Fouling</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Specific cost of thermal energy storage (TES)</td>
<td>Lower</td>
<td></td>
</tr>
</tbody>
</table>

### Conclusion
HELISOL® 5A offers outstanding advantages over conventional heat-transfer fluids.
The data presented in this medium are in accordance with the present state of our knowledge but do not absolve the user from carefully checking all supplies immediately on receipt. We reserve the right to alter product constants within the scope of technical progress or new developments. The recommendations made in this medium should be checked by preliminary trials because of conditions during processing over which we have no control, especially where other companies' raw materials are also being used.

The information provided by us does not absolve the user from the obligation of investigating the possibility of infringement of third parties' rights and, if necessary, clarifying the position. Recommendations for use do not constitute a warranty, either express or implied, of the fitness or suitability of the product for a particular purpose.

Wacker Chemie AG
Hanns-Seidel-Platz 4
81737 München, Germany
Tel. +49 89 6279-1741
info@wacker.com
www.wacker.com
www.wacker.com/socialmedia