

The optimum light-ends removal in thermal oil systems

NESS Wärmetechnik offers systems for the removal of light-ends in thermal oil – tailored to the heating systems and the oil used; for large and for small systems; for open and for closed systems with nitrogen blanket; for mineral and synthetic thermal oils.

They allow:

- to maintain a high flash point of the oil (online)
- to keep a high system safety level
- to achieve a long operational lifetime of the thermal oil.

Light-ends boil and ignite at lower temperatures and reduce the flash point of the thermal oil (fire hazard). In addition they can lead to cavitation in thermal oil pumps (operational problems).



Water-cooled passive system

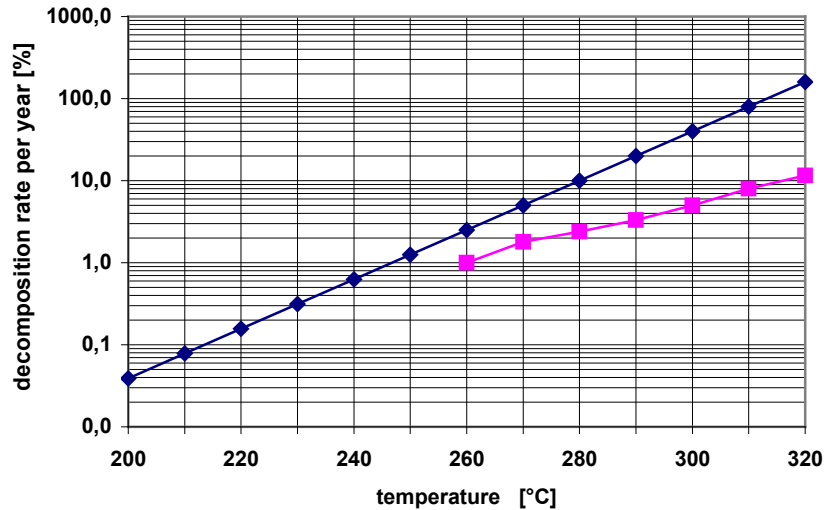


Diagram 1: Temperature-dependent light-ends production of mineral thermal oils (blue diamonds) and alkylated aromatics, synthetic oil (pink squares).

Light-ends are volatile thermal oil components which are generated at high operating temperatures.

The higher the temperature, the more light-ends are generated. The bindings of the hydro carbon chains break and the short-chained light-ends are produced. The rate of light-ends production depends on the oil type and the temperature (diagram 1)

Light-ends generation should not be confused with cracking (overheating of the oil and creation of oil coal particles) or oxidation ageing with oxygen from ambient air.



Air-cooled passive system



Light-ends should be removed from the thermal oil system continuously.

Most of the light-ends are generated in the hot flow line, in the heater, and to a lesser extend in the cooler return line. For typical thermal oil heating systems with mineral oil and a flow line temperature of 280 °C, the decomposition rate is 3,5% per year (diagram 2) – for 30.000 l of thermal oil this is 1.000 l per year!

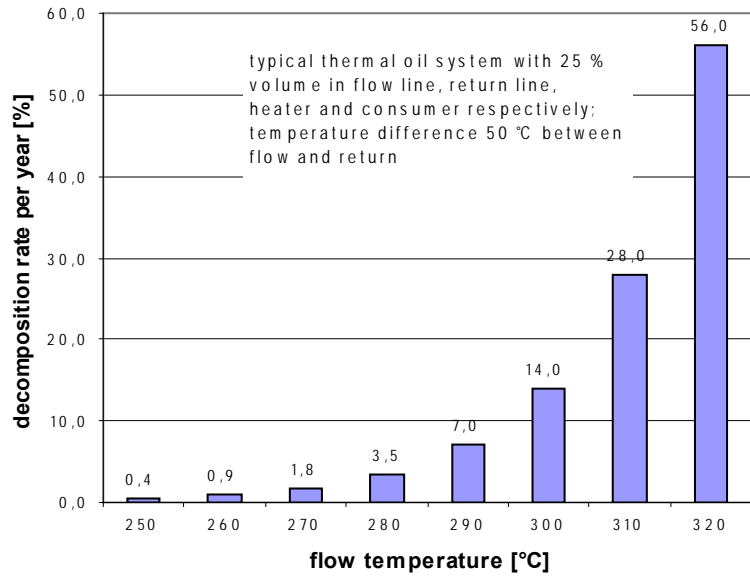


Diagram 2: Light-ends production in mineral oil depending on system flow



Water-cooled active system, side view



The NESS light-ends removal system for continuous light-ends removal can be used in thermal oil systems with or without nitrogen blanket.

Part of the hot thermal oil in the system flows through the distillation vessel and its special spray-type evaporator. The gaseous light-ends are collected in the liquid phase in the condenser. They are drained automatically or manually from the thermal oil system. The system is not as open to the atmosphere as a hot expansion tank would be. This protects the oil against oxidation ageing.

Small or large; air-cooled or water-cooled; automatic or manual venting and draining; passive (using gravity) or active (using a pump): The modular NESS system is always the right solution.



Water-cooled active system, front view



Control cabinet, water-cooled active system

The distillers come in different sizes for systems with a thermal oil volume of 2000 l to systems with more than 100.000 l.

The condensators can be water-cooled (for hot climates or environments) or air-cooled when cool ambient air can be used.

The venting and draining of the condensators can be done manually in small systems or with automatically operated valves in large systems.

The system can use gravity to return the oil to the circuit or a frequency-controlled pump.

For large systems, light-ends collector vessels with level control and operator alerts are offered.

The electrical control system can be stand-alone or integrated into the PLC of the thermal oil primary system.

Available PLC's are Siemens S7-300 or Allen-Bradley CompactLogix, both with Touchpanel 7".



Allen-Bradley , PLC Touchpanel

The NESS light-ends removal systems can be fitted to new or existing thermal oil systems. For large or very hot thermal oil systems it should be considered right from the beginning.



Hermann Kassens (left) and Dietmar Ness at the LIGNA 2015 in Hannover in front of a NALD 250



"...with our Ness NALD we maintain a high flashpoint all the time (since 2014)" (Hermann Kassens, Manager Mechanical Maintenance, Glunz AG, Meppen)

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