

Use of paraffinic diesel fuel according to DIN EN 15940:2023-07 for heating units: Thermo | Thermo E | Thermo E+ | Thermo S | Thermo plus

There are various types of liquid fuels and combustibles that are not derived from fossil crude oil.

A generic term is "XTL", where the "X" stands for any source material from which a liquid fuel is produced using defined processes (TL = "To Liquid").

Fuels produced in this way originate from synthesis or hydrogenation processes with various starting materials, e.g.

- Natural gas (*Gas-to-Liquid; GTL*)
- Coal (*Coal-to-Liquid; CTL*)
- Biomass (*Biomass-to-Liquid; BTL*)
- Plant-based oils (*Hydrogenated / Hydrotreated Vegetable Oils; HVO*)

For use in diesel engines and motor vehicles, such fuels are specified in DIN EN 15940:2023-07 (Fuels - Paraffinic diesel fuel from synthesis or hydrogenation). These fuels are also used in the fuel-fired Spheros heaters.

Thanks to adapted production processes, more and more residual and waste materials can now be used as raw materials, which increases the overall CO₂ savings, i.e. the balance between production and emissions during combustion.

It should be noted that although these types of fuels comply with the DIN EN 15940:2023-07 standard, they are subject to a range of chemical and physical properties. Since combustion in heating appliances is fundamentally different from combustion in internal combustion engines, the use of these fuels cannot be unconditionally equated in both systems.

Spheros has carried out a series of tests with such fuels and found differences in flame detection, cold suitability and lubricity in particular.

Releases

Spheros grants general approval for operation with XTL fuels in accordance with DIN EN 15940:2023-07 for the heaters mentioned in this document.

Spheros will continue to test the suitability of various fuel brands for our heaters in the future.

Only the following heaters - including the associated Spheros fuel hoses and fuel filters - can be operated with the approved XTL fuels from the production date 01/2017 if the required conversions are complied with:

- **Thermo | Thermo E | Thermo E+ | Thermo S | Thermo plus**

NOTE

If your heaters are operated with non-approved fuels, Spheros cannot assume any responsibility for the proper functioning of the heaters.

No approval is given for heaters in the “DBW” and “DW” series.

Retrofitting for heater operation with XTL fuels

The use of a dust protection tube is prescribed for the above-mentioned heaters. See also the installation instructions “Dust Protection Kits 11137558_”.

Due to optimized software for the older Thermo heaters (before 06/2018), the respective control unit must be replaced - only for this series (see appendix, Tab. 1 Overview - Programmed control units).

Conversion from:

- conventional diesel (according to DIN EN 590 and equivalent) and in particular from biodiesel (in accordance with DIN EN 14214 and equivalent)
 - to paraffinic fuels in accordance with DIN EN 15940:2023-07,
- may result in shrinkage of the seals inside fuel-carrying parts.

For heaters, fuel filters and fuel hoses prior to 01/2017, a conversion of hoses and filters is necessary when converting to fuels in accordance with DIN EN 15940:2023-07 for the first time.

All external attachments and components must be approved for these fuels. Spheros must be informed of the material and serial number of the heaters used (see type plate) so that the parts and components to be converted can be determined.

Please contact the Spheros Service Helpline at service@spheros.com.

NOTE

Heating operation with the above-mentioned fuels is permitted within a fuel temperature range of -20°C to +45°C. The operating temperature of the heater can be found in the respective installation instructions.

Specifications

The following points must be observed when using approved XTL fuels:

- The fuels approved by Spheros must comply with DIN EN 15940:2023-07.
- The fuels approved by Spheros must meet the climatic requirements (CFPP classes). It is recommended that the CFPP (Cold Filter Plugging Point) is of winter quality all year round.
- The DIN EN 15940:2023-07 standard permits a BioDiesel / FAME content of up to 7% by volume. However, in the interest of the storage life and stability of the fuels, a maximum BioDiesel / FAME content of 0.5% by volume is recommended. Many fuel dealers offer these fuels in their own interest.

See “en2x Recommendation of a specification for counter-supply agreements and joint storage for paraffinic diesel fuel sulphur-free according to DIN EN 15940 (2023-07)”.

- The CO₂ value must be checked when changing the fuel and during annual maintenance and adjusted if necessary (see TI Heaters_Diagnosis_Measure_CO2-Level DOK70127). The same values must be set as for diesel operation.
- Mixed refueling/mixed operation of the fuels approved by Spheros is permitted with diesel fuels according to DIN EN 590 (and identical standards) in any mixing ratio.
- Mixed refueling/mixed operation of the fuels approved by Spheros is only permitted with biodiesel in accordance with DIN EN 14214 (and identical standards in terms of content) up to a maximum of 7% BioDiesel / FAME by volume.
- Use of nozzle block preheating is mandatory from temperatures ≤ 0 degrees Celsius.
- Use of a filter heater is mandatory from temperatures ≤ 0 degrees Celsius (except Shell GTL).
- Use of a filter heater is recommended from temperatures ≤ 0 degrees Celsius for Shell GTL (note filter scorching due to Cloud Point).
- Fuel pump must be equipped with FKM ("Viton") seals; "NBR" must be excluded (see TI fuel pump DOK70102).
- Fuel lines must be resistant to paraffinic fuels (in accordance with DIN EN 15940:2023-07); FKM ("Viton") is specified; "NBR" must be excluded..
- Replace the fuel pump and fuel lines every five years at the latest.
- Replace the fuel filter annually. When changing the fuel / operating alternately with approved fuels, we recommend changing the filter every six months..
- Observe the maintenance work according to Spheros specifications.
Operate the heater at least every four weeks, even in summer.
- The use of fuel stored beyond its use-by-date must be ruled out.

NOTE:

Operation of the heater in two-line operation (fuel suction and return line) is recommended.

The use of a fuel that is not approved by Spheros or does not comply with standards may result in smoke formation and malfunctions!

Attachment

Optimized control units (CU) for Thermo heaters		
not suitable	suitable (from 06/2018)	suitable* (from 07/2024)
63482F	97821A	97821B
63859E	63859F	67981G
67981D	67981E	67981F
96775B	96775C	96775D
97806B	97806C	97806D
97808C	97808D	97808E
97810C	97810D	97810E
97812A	97812B	97812C
97814C	97814D	97814E
97818A	97818B	97818C
97820A	97820B	97820C
97823A	97823B	97823C
* Control units with integrated flame detector		

Tab. 1: Overview - Programmed control units