Universal Peltier temperature module for UV-curing with LED lamp

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Keywords

(temperature controlled) UV-curing, HAAKE MARS 40 and 60 Rheometer models, radiometer

A universal Peltier temperature control module (TM-PE-C UV) is available for Thermo Scientific™ HAAKE™ MARS™ Rheometer models 40 and 60 (as well as predecessor models). The temperature control module allows for the rheological investigation of curing reactions initiated by UV light irradiation, as seen in Figure 1. While Figure 1 involves the use of a mercury lamp, this product note focuses on LED technology. Whether a mercury vapor lamp or an LED light source is the most suitable technology for the application is described in Figure 2.

Figure 1 shows the module mounted to HAAKE MARS 60 Rheometer, and in this example, it is connected to a DELOLUX 50 LED light source. Three different lamp heads are available with 365 nm, 400 nm, and 460 nm. The UV light source can be triggered automatically by the Thermo Scientific™ HAAKE™ RheoWin™ Rheometer control software.

Figure 2 shows a schematic drawing of the universal Peltier temperature module with the UV adapter for a LED lamp head. This setup is based on a Peltier temperature module for coaxial cylinders and allows a temperature-controlled UV curing reaction for temperatures up to 40 °C. This temperature limit is given by the temperature stability of a regular DELOLUX 50 lamp head. A setup for UV-curing measurements performed at higher temperatures is available on request.

The temperature module includes a special adapter that directs the UV light from the bottom through a borosilicate quartz glass plate directly into the sample. The adapter comprises a mirror and a collimator. The collimator guarantees a homogeneous distribution of the UV light intensity across the sample within a parallel plate geometry (different diameters available, up to 25 mm).

To set and control the desired UV light intensity, it is recommended to use a radiometer that is matched and calibrated to the light source. Always use the appropriate safety glasses when using a UV light source. In addition, we recommend a two-part sample cover to protect the operator from direct exposure to UV light irradiation as well as the sample from indirect exposure to environmental UV light.

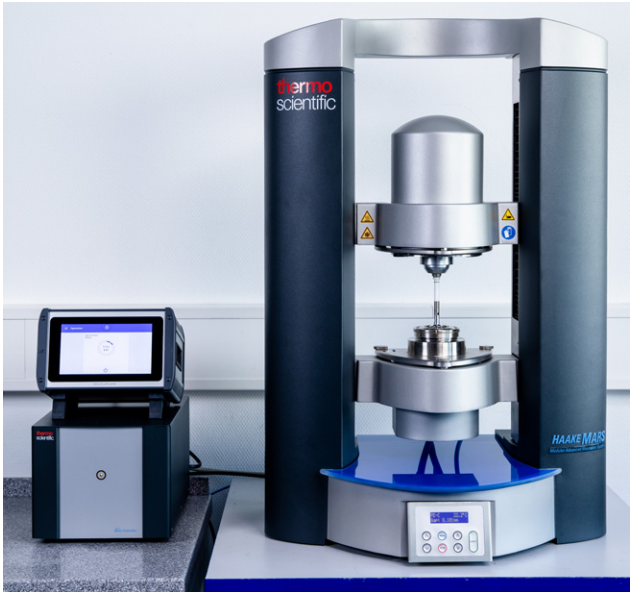

Figure 1: Universal Peltier temperature control module for UV-curing applications mounted to a HAAKE MARS 60 Rheometer and connected to an DELOLUX 50 UV light source.

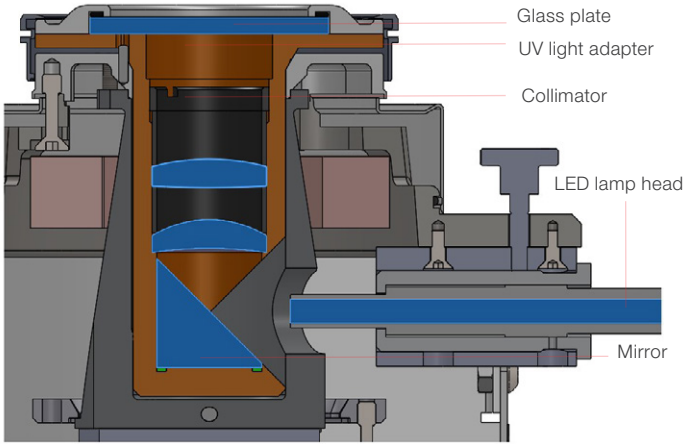

Figure 2: Schematic drawing of the universal Peltier temperature module with the UV adapter.

Ordering information

Product	Order no.
TM-PE-C UV universal Peltier temperature module for UV-curing and for coaxial cylinder geometries for HAAKE MARS Rheometer (UV light source, light guide or LED lamp head and adapter not included).	222-2331
Necessary accessories	
Heat exchanger HX R or circulator*	222-2339
Power supply	222-1897
UV light source: DELOLUX 50 incl. trigger cabel (222-2437) and safety glasses	222-2440
One of the following lamp heads is needed:	
Lamp head with 365 nm and lense	222-2441
Lamp head with 400 nm and lense	222-2442
Lamp head with 460 nm and lense	222-2443
Adapter for lamp head	222-2444
Recommended accessories	
Spare parts kit for TM-PE-C UV (borosilicate glass plates 5 pcs. and gaskets 5 pcs.)	222-2388
Radiometer DELOLUXcontrol	222-2445
Sample hood (PEEK)	222-2163

* The lowest available Peltier temperature depends on the temperature of the circulating heat sink fluid and the performance of the attached thermostat.

References

1. F. Meyer, Universal Peltier temperature module for UV-curing applications, Thermo Fisher Scientific Product information P064
2. Ph. Beutler, Mercury vapour lamp or LED?, Thermo Fisher Scientific Product information P072

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