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Messtechnik GmbH

Figure 1: The SubCASE® LT is designed to measure the gelling and curing reaction at low and constant temperatures. The relative permittivity of a formulation can be measured simultaneously at different electric frequencies.

SubCASE® LT

Pot Life and Curing Monitor

Measurement under reduced and constant temperatures of

- **C**oatings
- **A**dhesives
- **S**ealants
- **E**lastomers

based on reactive

- **PU, EP, UP, and MMA formulations**

Measurement of the relative permittivity using variable electric frequencies

* Patent No. 102004001725

Pot Life Monitor

SubCASE® LT is a laboratory device for measuring the pot life and the curing behaviour of **C**oatings, **A**dhesives, **S**ealants and **E**lastomers (C.A.S.E.). The measurement device is especially designed for testing polyurethane, epoxy and polyester formulations. The compact mechanical design of SubCASE® LT combines the measurement of the relative permittivity by using a CMD-sensor (Curing Monitor Device) and the temperature measurement by a thermocouple and a PT transducer.

Low Temperature

The gelling and curing of many formulations needs to be tested under reduced and constant temperatures, e.g. to simulate outside winter conditions for construction applications. SubCASE® LT (Fig. 1) is connected to a refrigerated bath circulator, in order to keep its base plate at a reduced temperature (Fig. 2). The advantage of SubCASE® LT is, that it can dissipate the heat, generated by the exothermal reaction, from the test sample. This feature can be used to simulate the reaction behaviour of a formulation on surfaces with a high heat capacity, e.g. for coating applications.

Variable Electric Frequency

The relative permittivity of the reactive material depends on the frequency of the applied electric field. SubCASE® LT features a continuous scan mode of the electric field. This scan mode continuously varies the electric frequency while measuring the relative permittivity of the formulation during the reaction. Thus a better correlation of the relative permittivity and the macroscopic parameters can be established. The low frequency of 45Hz is the best choice for the PU coating formulation shown in Fig. 3.

Test Cycle

The user-friendly software SUBCASE controls the measurement cycle. It acquires, displays and evaluates the measurement data. Before starting a new test cycle a protection foil is rubbed onto the CMD-sensor. A new cardboard cylinder, which forms the test container is fixated with the clamp mechanism.

After completion of a test, physical values like pot life and curing are evaluated from the measured curves and are listed together with other input data in a parameter list. The pot life is evaluated from a percentage criteria of the maximum relative permittivity. The curing is calculated from the gradient of the relative permittivity.

When a test is finished, the cardboard cylinder containing the cured sample is pulled off the CMD-sensor. The protection foil sticking to the sample is also removed. The thermocouple can be pulled out of the disposable glass tube and can therefore be reused for further tests.
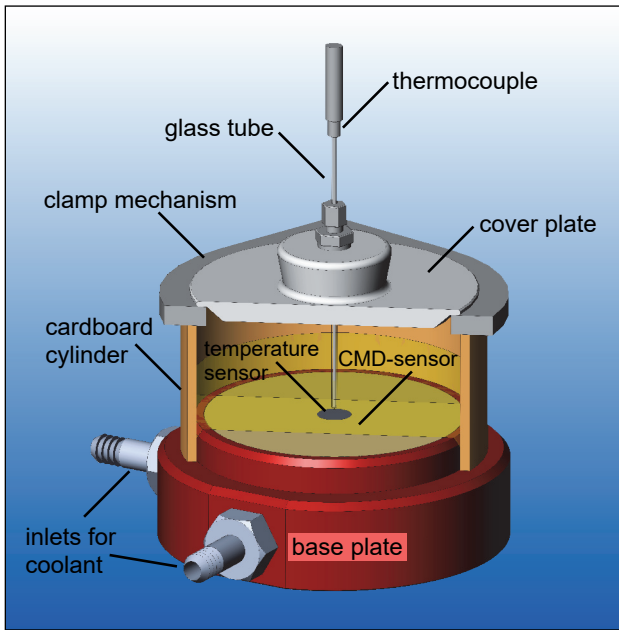
Figure 2: *Section view of SubCASE® LT and its test container. A refrigerated bath circulator is connected to the two inlets of the base plate. A test sample is cast into the disposable cardboard cylinder.*

Technical Data

Pot Life Monitor

measurement rate	10 Hz
serial interface	RS 232 C, USB
dimensions	270x205x185 mm
test cup diameter	100 mm
mass	4.1 kg
external power supply	12 VDC, 5.5 A

CMD-Sensor

diameter	90 mm
polarization frequency	10 … 1000 Hz

Heater / Cooler Range 5 … 90 °C
an external refrigerated bath circulator is required

Temperature Probe

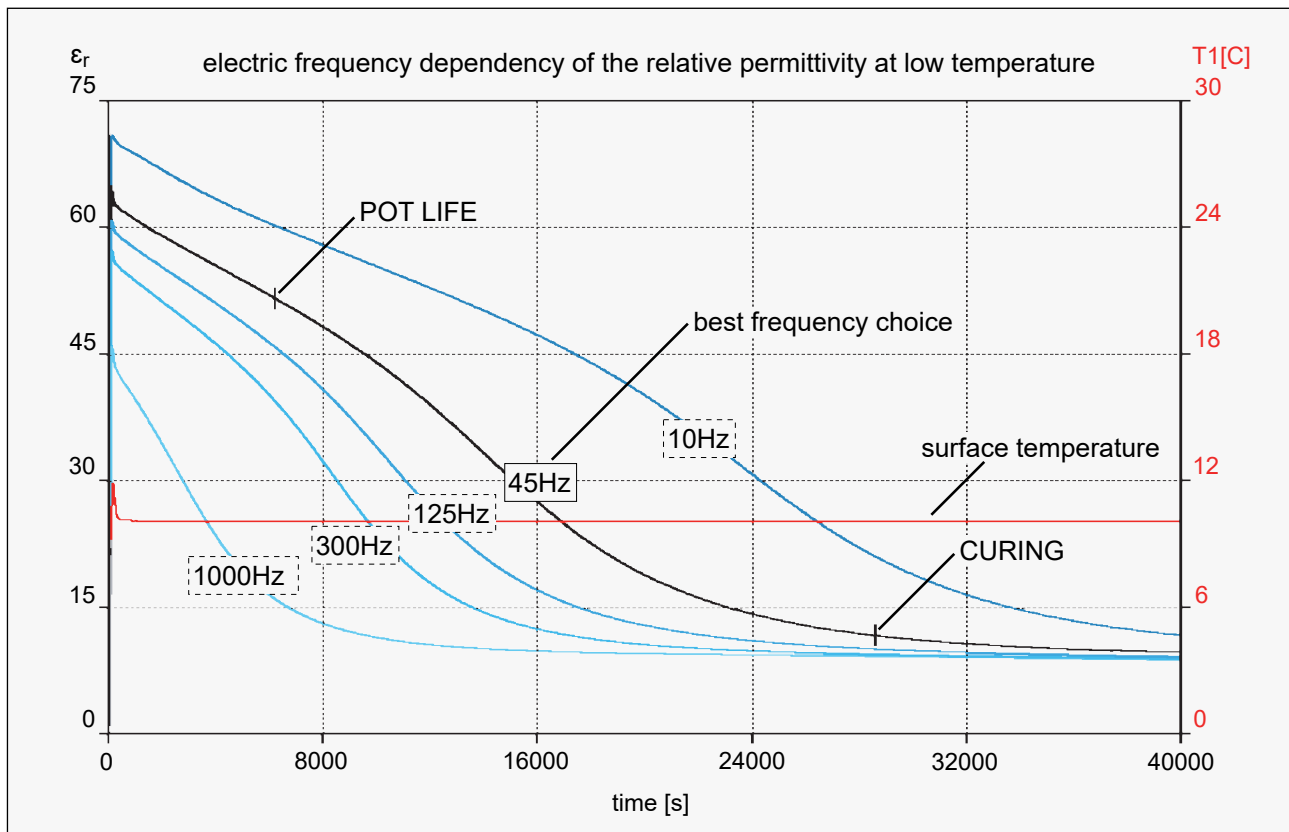|	
thermocouple	Type K (NiCr/Ni)
range	0 … 300°C

Order No. **300140**

Figure 3: *SubCASE® LT measurement curves of a PU coating formulation. The relative permittivity is measured at five different electric frequencies. The formulltation is tested at 10°C base plate temperature.*