GEL INSTRUMENTE AG

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GELNORM® – PDET-1

Curing process measurement.

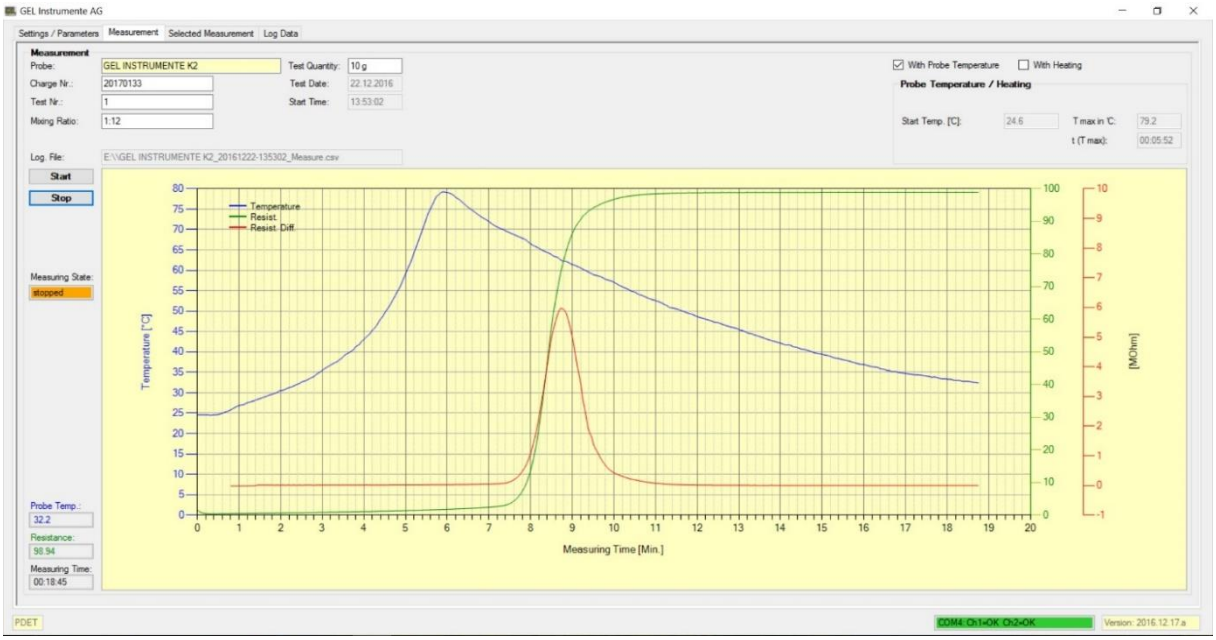
The GELNORM®-PDET-1 is a measuring device for the determination of the curing process of two-component resin systems. The measuring method is based on the determination of the electrical conductivity value, a function in which both the electrical resistance and the capacitance of the resin sample play a role. The conductance can be used to make statements about the chemical course of the hardening reaction. At the same time, the sample temperature can be measured.

Gelnorm® PDET-1 consists of:

- 1 x measuring channel for the conductance
- 1 x measuring channel for sample temperature
- Temperature control for the optional heating block
- USB interface with online software
- Online measured value acquisition software

Suitable samples:

- Epoxy resins
- Polyurethane resins
- Polyester resins
- Silicone rubber
- Polysulfide rubber



Measure, evaluate, compare and analyze measured values.

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The electrical measuring technique offers numerous advantages compared to the various mechanical methods. In contrast to the conventional rheological approach (based e.g. on rotation or shear viscosimeters), the polymer sample is in no way and at no time subject to any kind of mechanical forces. Thus, any kind of mechanical distortion of the polymer structure during the curing can be excluded.

Conductance sensor

The special design of the sensors (absolutely flat and thin, 17 x 55 x 0.04 mm) enables measurements to be made at almost any place. For example, it is possible to measure the hardening sequence of thin layers, large volumes of resin and also directly in a prepreg laminate.

Holder with sensor, 200.160.02

Sample temperature sensor

The exothermic temperature can be measured with the probe temperature sensor a thermocouple type K. The maximum temperature and the time up to Tmax are recorded. The thermocouple wire can be cut off and re-twisted after the measurement.

Thermocouple type K, 20.32

Thermostatic Control (Option)

A prerequisite for a high reproducibility of the experiments with GELNORM® - PDET-1 is an optimum thermostatic control of the sample. The measurements can either be carried out at room temperature or using the Electric Heating Block PDET-1 (Ref. 200.160.100a) designed for GELNORM® - PDET-1 to provide the desired thermostatic control for temperatures up to 200°C.The temperature controller is integrated in Gelnorm® PDET-1.

Heating block for DE sensors, 200.465H

UV activation

Resins which are activated by Ultraviolet can also be measured.
Very good reproducibility, reliability and ease of use and maintenance are attributes that characterize the device.

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Description

GELNORM® - PDET-1 consists of a control unit with process-controlled conductance recording, to which a special measuring sensor can be connected. With this sensor, the conductance of the resin sample is determined. For an electric heater, an optimized thermostat is installed. The electric heater is connected directly with a cable from PDET-1. The parameters from PDET-1 can be controlled by the software.

Online

For the acquisition of measurement data is a software available. The measurement data is displayed digitally and plotted on the connected PC.
If necessary, we also provide a low-cost notebook with software installed and tested. The acquired data can be analysed, compared and evaluated with adjustable tangents. Since the data is saved in csv format, further analysis can be implemented in a spread sheet program.

View of the front panel

Indicator Conductivity / Impedance
It shows the resistance of the Probe

Temperature Controller
Controller for external heating device

Switch to Probe temperature

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View of the rear side of the panel

Power supply,	main switch and fuses
Heater,	Connector for external heater
DE Sensor,	Connector for the conductivity sensor
Thermocouple K,	for the Probe temperature sensor
USB	connector for the PC

Measuring Procedure

1. Preparation of the Specimen Mixture

Weigh 100 g of reaction resin (deviation of 1 %permitted according to DIN 16 945) in a beaker.
Weigh hardener and accelerator according to instructions, accurate to 0,01 g.
After thorough mixing (approx. 1 minute) the specimen mixture can be applied to the sensor, or the sensor can be dipped into the mixture.

2. Measurement process

Configure your system, enter sample data in the software,
Probe temperature yes / no
Heating System Yes / No
apply the test mixture to the sensor,
start the measurement
The measuring end can be specified with a defined time in minutes of 1 ... .9999.
Or be stopped by hand

3. Data evaluation

With the online data acquisition, the data can be displayed and recorded directly to the PC.
The sensor is thrown away at the end of the test. Cleaning is not necessary.

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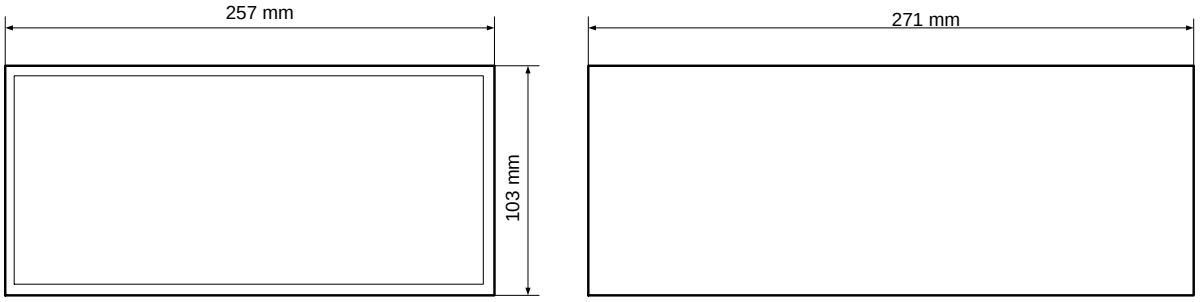
Technical Data GELNORM® – PDET-1

Item number	200.165
Operating voltage	115VAC / 230 VAC, switchable, 50 / 60 Hz
Interface	USB 2
Probe Temperature	Thermocouple Typ K, 0 … 300°C
DE sensor	Conductance sensor PDET-1 Ref. 160.25 up to 100°C
	Alternative Ref 160.25HT up to 200°C
Measuring range	0 – 100 MΩ
Option electric heater	
Connector for Heatblock GT	30 °C …200 °C

Dimensions	257 mm x 103 mm x 271 mm
Weight	~ 2. 8 kg



Electrical Data

Voltage	115 VAC or 230 VAC, 50 / 60 Hz, switchable
Power	20 VA, with heating 650 VA
Connection heating block	8 Pol, N, P, PE and Pt100 2 Leiter, type Binder
Conductance Sensor	5 Pol DIN connector
Main switch	on the back side
Fuses	2 pcs., F 3.15A L 250 VAC
Electrical security, CE	2014/35/EU , EN 61010-1:2001, EN 61010-2-010:2014, EN 61326-1:2013
Interface	USB 2.0, plug type A

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Code, Item Number

GELNORM® - PDET-1:	**200.165**
Measure- and controller unit with software	
Operating voltage: 115/230 VAC (switchable), 50 HZ / 60 Hz	

Accessories

Package (50 pcs) of DE sensors - up to 100°C	160.25
Package (50 pcs) of DE sensors up to 200 °C	160.25HT
Thermocouple type K (5 m)	20.32
Holder with connection cable for DE sensors	200.160.02

Option:

Heating block PDET-1 for measuring procedure up to 200 °C, control is provided by the integrated controller in PDET-1, Operating voltage: 230 VAC / 50 Hz or 115 VAC / 60 Hz	200.165H