GEL INSTRUMENTE AG

Bahnhofstrasse 28
CH-9242 Oberuzwil

www.gelinstrumente.com
info@gelinstrumente.com

Tel. +41 71 950 28 82
Fax +41 71 950 28 84

# GELNORM® – Geltimer and PST-1

## 1 Channel Control Unit with Temperature Measurement, incl. software


GELNORM®- Geltimer is an instrument for the automatic determination of the gel time of reaction resins. The design is based on DIN 16 945, DIN 16 916, EN 14022 method 5 and DIN EN ISO 9396.
The test with GELNORM® - Geltimer is very easy to perform and gives exceptionally good reproducibility. The automatically measurement can be performed for any reaction resin, for example:

- **Unsaturated polyester resins**
- **Phenolic resins**
- **Epoxy resins**
- **Polyurethane resins**
- **Acrylic resins**
- **Silicone resins**

Successor of ST-1, Thermbox and TC-4, for Online and Offline measurements

### Description

The GELNORM®– Geltimer PST-1 evaluates all factors which influence the gel time of reaction resins such as type and quantity of hardener, accelerator, inhibitor, filler, pigments, as well as temperature and moisture. The instrument is easy to operate and normally no maintenance necessary.
The principle of measurement of GELNORM®– Geltimer is simple: A stamper made of aluminium or stainless steel performs an up-down cycle in a test tube filled with resin. When the point of gelation is reached, the test tube is pulled up by the stamper. This stops the clock which was started at the beginning of the experiment and the gel time can be read of. With the probe temperature system the exothermic reaction can be measured. The electrical heating device, option heating block GT, can be controlled directly with the internal temperature controller.

The GELNORM® - Geltimer PST-1 consists of:

- Gel timer
- Sample temperature measurement system
- Temperature control for the electric heating
- Software for capturing and recording of all relevant data's

The device has a USB port and will be delivered with software. The system and the measurement can be configured directly on the PC. The recorded data are displayed graphically and can be processed as a csv-file in other programs.
The device can be used online or offline. In online mode, the measurements can be carried out comfortably, record and compare the measured data.

**This is a long-life measurement system!**

Bahnhofstrasse 28
CH-9242 Oberuzwil

www.gelinstrumente.com
info@gelinstrumente.com

Tel. +41 71 950 28 82
Fax +41 71 950 28 84

**Front view PST-1**

- Timer, LCD display with HH: MM: SS resolution
- Start button for the Geltimer
- Temperature controller
  With actual value and setpoint display
  Switchable to sample temperature display


**Rear View PST-1**

- Power connector with fuse and main switch
- Connection for electrical heating block
- Connection for sample temperature sensor, thermocouple type K
- USB port for on-line measurement on PC

GEL INSTRUMENTE AG

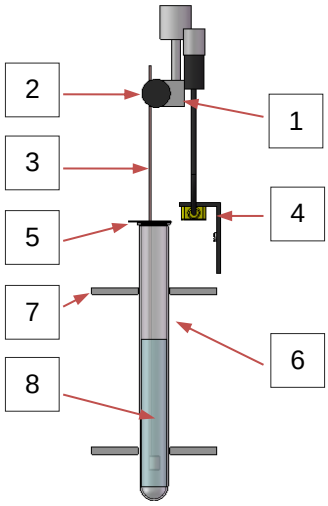
Bahnhofstrasse 28
CH-9242 Oberuzwil

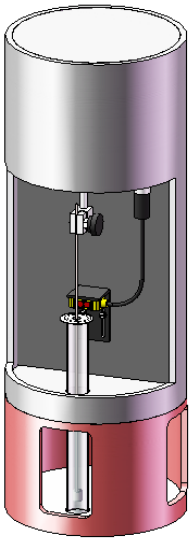
www.gelinstrumente.com
info@gelinstrumente.com

Tel. +41 71 950 28 82
Fax +41 71 950 28 84

**System Test Unit with optical Sensor**

1 Friction clamp
2 Machine screw
3 Measurement stamper
4 Opto sensor
5 Foam ring
6 Test tube
7 Test tube holder
8 Sample mixture



Stampers made of aluminium wire with a coiled head are used. This design provides the same gel time measurement as the glass stamper specified in the specification of DIN 16 945 but is more economical. The design of the aluminium stamper moreover provides a minimum of surface area, which leads to minimized air inhibition which is especially important for unsaturated polyesters.
It is also possible to use a glass stamper (Ø 3 mm, length 230 mm with fused base) according to DIN 16 945. (Please notice that another stamper attachment clamp is used in this case.) Test tubes are of 160 x Ø 16 mm with lip.

**Time Measurement and Measuring Cycles**

The control units are provided with digital LCD clock-modules. The automatic digital time measurement gives a reading of 1 second for test durations up to 99 hours. By starting a new measurement the clock is automatically reset to zero.
The continuous up-down motion cycle of the stamper is set to 10 seconds as our standard. For individual needs, test units with other motion cycles are available upon request.

**Required periodic calibration work**

- Timer with reference stopwatch
- Sensing distance 6mm with reference scale
- Heating block with reference thermometer
- Thermocouple input with type K thermocouple simulator

GEL INSTRUMENTE AG

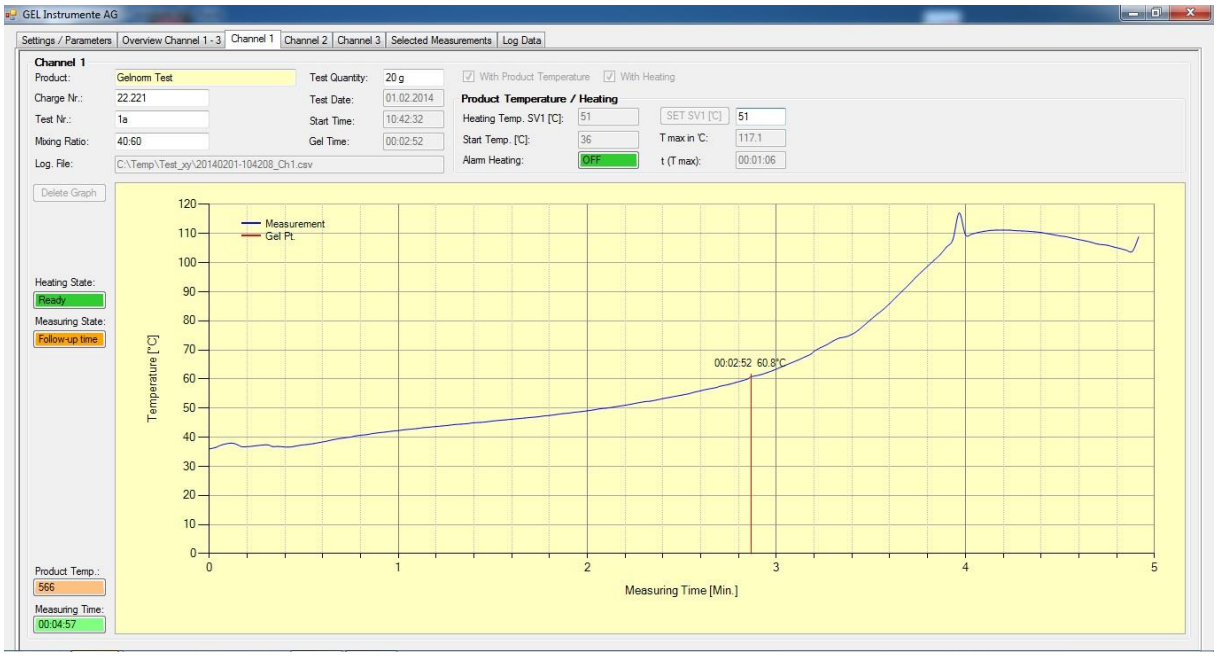
Bahnhofstrasse 28
CH-9242 Oberuzwil

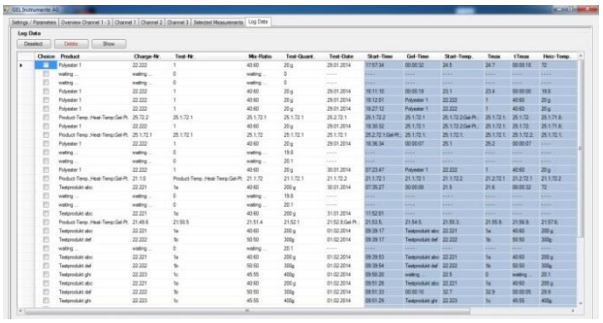
www.gelinstrumente.com
info@gelinstrumente.com

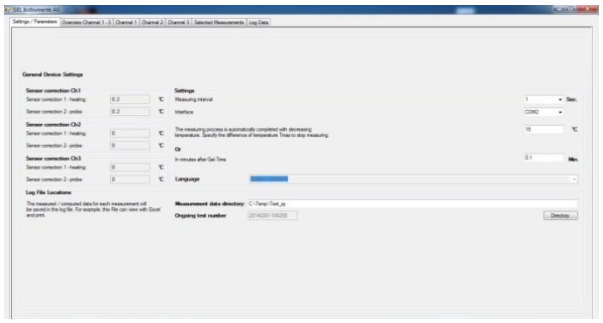
Tel. +41 71 950 28 82
Fax +41 71 950 28 84

**Online gel time and temperature measuring with temperature control of the heating block**

Overview of all parameters and settings





Pictures of easy-to-use software from PST-1

The captured data are available for direct comparison with the reference curve and further processing for Excel. The specifications of the heating, sample identification and sample temperature are recorded (for Microsoft Windows 7 and 8).

Bahnhofstrasse 28
CH-9242 Oberuzwil

www.gelinstrumente.com
info@gelinstrumente.com

Tel. +41 71 950 28 82
Fax +41 71 950 28 84

## Electrical data from the Control Unit PST -1

### Electrical Specifications

| | |
|---|---|
| Power supply | 115VAC / 230 VAC, 50/ 60 Hz (internally switchable) |
| Power consumption | 20 VA, 650 VA with heating |
| Connector | 8 pole, N, P, PE and Pt100 2 wires, plug type Binder |
| Main switch | on the rear panel |
| Fuses | 2 pieces, F 3.15A L 250 VAC |
| Electrical conformity | EMV 2014/30/EU, EN 61010-1:2010,<br>EN 61010-2-010:2014, EN 61326-1:2013 |
| Interface | USB 2.0 type A connecter |
| Connection Geltimer | M12 8 pole, 24 VAC, 10 VA |

### Temperature control for the electrical heating block GT

| | |
|---|---|
| Actual value (Pt100) : | Range: 0.0 °C ... 250.0 °C , adjustable and calibrated |
| Accuracy: | ± 0.3 % of full scale ± 1 digit |
| Set value: | Range: 0.0 °C ... 200.0 °C |
| Resolution: | 0.1 K |
| Load output | power max. - Resistive load: maximum 600 W<br>self-optimization |

### Temperature measurement for the sample

| | |
|---|---|
| Sensor | Thermocouple Type K (Ni-CrNi), EN 60 584 |
| Connector | Mini connector type K thermocouple, EN 60 584 |
| Range | 0.0 °C 400.0 °C ... |
| Accuracy | ± 1.5 °C including cold-junction compensation<br>Adjustable and calibratable |

### Time

| | |
|---|---|
| Display | LCD, 12mm |
| Start | Button with status indicator |
| Stop | Optical switch |
| Range | up to 99HH: 59MM: 59SS |
| Accuracy | ± 1 second / 2 hours |

### Test Unit with optical Sensor

| | |
|---|---|
| Motor | 24 VAC, 50/ 60 Hz, 6 rpm |
| Switch | optical sensor, standard! |
| Sample temperature | Thermocouple type K for installation in the test tube to the sample |
| Stroke | 25mm, 10 seconds for an up and down motion |

GEL INSTRUMENTE AG

Bahnhofstrasse 28
CH-9242 Oberuzwil

www.gelinstrumente.com
info@gelinstrumente.com

Tel. +41 71 950 28 82
Fax +41 71 950 28 84

**Electric heating for the sample, thermal block GT (Standard) Art. No 200.16.41**

The integrated control system controls the temperature of the heating block temperature for the sample. The actual and set-point temperature is displayed digitally with a background lighted LCD. About the display colour of the control difference is optically very visible represented.
To ensure high reliability, the controller switches at a value exceeding from the power supply for the heater. In the heating block GT, an irreversible safety thermostat which switches off at 270 °C is installed. This heating block can be installed as an option later at any time on Geltimer.

Security:

- Exceeding controller alarm temperature set point +10 °C
- Safety temperature limiter at 270 ° C
- Short circuit of the sensor
- Interruption of the sensor

Using the software, activate the heater and adjust the set point. The release for the measurement takes place only when the set point has been reached. The heater can be adjusted with an actual value offset.

**Thermostatic control**

Prerequisite for accurate and repeatable measurement is a precise temperature control of the sample. Using a water or oil bath, the buoyancy force of the immersed sample must be considered!

**Thermostatic Bath with silicon-oil, 30 °C … 150 °C**

It is possible to perform tests at defined temperatures by submersing the portion of the test tube with the reaction resin into a thermostatic bath. The amount of the liquid in the bath should be adjusted such that its level is about 1 cm higher than the level of the reaction resin in the test tube. (Please note, that the volume excluded by the test tube influences the experiment and, hence, it has to be constant in order to reach an optimal reproducibility of the results.)

**Note that the buoyancy forces distort the measurement!**

A balancing weight on the test tube must be attached.
Note:
According to DIN EN ISO 9396 the use of the bath requires a coating weight of 10 g and 20 g for liquid resins for solid or powder resins.

GEL INSTRUMENTE AG

Bahnhofstrasse 28
CH-9242 Oberuzwil

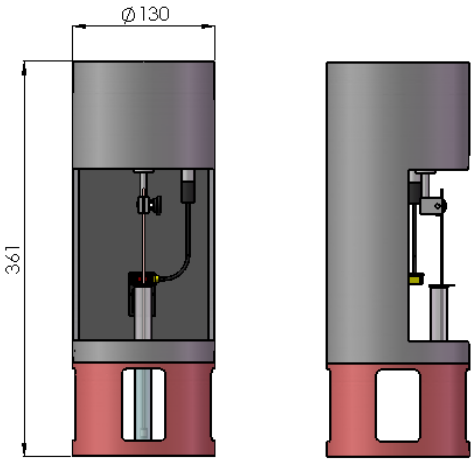
www.gelinstrumente.com
info@gelinstrumente.com

Tel. +41 71 950 28 82
Fax +41 71 950 28 84

## Technical Data

### Test Unit with optical sensor 200.20.18

| | |
|---|---|
| Time | 99h 59min 59s |
| Cycle<br>(on request other cycles are possible) | 10 sec |
| Dimension | ∅ 130 mm, H = 361 mm |
| Weight | ~ 2.5 kg |
| Material | aluminium anodised |
| Environment temperature | -30 °C… 50 °C |
| Power | 24 VAC |
| Connection cable | 0.5 meters |




### Variants of Geltimer Test Units:

1 Test unit with electric heating block

2 Standard model

3 Test unit for Water- / Oilbath


**1** **2** **3**

### PST-1 – 1 Channel control unit

| | |
|---|---|
| Housing frame | die-cast aluminium |
| Base and lid | coated sheet |
| Ventilation | slots in base plate |
| Front and rear walls | aluminium anodized |
| Dimensions | W x H x D = 257 mm x 103 mm x 271 mm |
| Weight | ~ 3.3 kg |

GEL INSTRUMENTE AG

Bahnhofstrasse 28
CH-9242 Oberuzwil

www.gelinstrumente.com
info@gelinstrumente.com

Tel. +41 71 950 28 82
Fax +41 71 950 28 84

## Order code, item numbers

**GELNORM® - Geltimer for one channel measurement**:

| | | |
|---|---|---|
| 1 | piece control unit PST-1<br>(incl. software, USB- and power cable) | 200.13 |
| 1 | piece Test Unit with optical sensor | 200.20.18 |

**Options for the 1 channel measuring system**

- **Electric Heating**

| | |
|---|---|
| Thermo block GT for Ø 16 mm glass tubes | 200.16.41 |
| Thermo block GT for Ø 20 mm glass tubes | 200.20.41 |
| K-type thermocouple, 5 meters, ready for use | 20.32 |

- **Thermostatic bath**

| | |
|---|---|
| Thermostatic bath for 1 measuring head (without thermostatic oil) | 20.50 |
| with holder and cover for the thermostat | 20.50HC |

**Consumable materials for GELNORM® - Geltimer**

| | |
|---|---|
| Stamper aluminum1 x 235 mm, package with 500 pcs | 20.30 |
| Stamper steel (for aggressive specimen mixture), D = 1 mm x 235 mm, package with 500 pcs | 20.36 |
| Test tubes 16 x 160 mm, package with 100 pieces | 20.55 |
| PE Foam Rings, set with10 pcs | 80.50 |
| Holder for Alu-stampers, 3 pieces | 20.48 |

**Our Gelnorm® Devices are supplied with a factory calibration certificate.**
Our reference measuring instruments are provided with an internationally recognized Calibration.


Gel Time Measuring


Temperature Measuring


Temperature Controlled


Geltimer