GELNORM®–Geltimer GT-S – the SLIM LINE

The GT-S Slim Line Geltimer with integrated control and time measuring equipment is a compact solution for geltime measuring.
The Geltimer is mechanically, and from the point of view of the measuring technology, identical with the standardised Gelnorm® Geltimer model of which 1000 are in operation.
The compact design, the LCD lighting for the background and the blinking green button with the coloured running light in the test stamper spiral, make up a simple and conveniently arranged solution.

As a result of the modular layout the lower part of the housing can be extended to incorporate electric heating or a thermostatically controlled oil or water bath. The voltage used is 24 VAC 50 / 60 Hz obtained via a safety transformer.

The GELNORM®- Geltimer is intended for the measurement of Gelation time of reaction resins in accordance with DIN 16 945 Page 1, DIN 16 919 and DIN EN ISO 9396. Measurement on the GELNORM®- Geltimer is performed under controlled conditions, is automatic and extremely simple to perform. It features exceptionally good reproducibility. Measurements can be made on any desired reaction resin such as:-

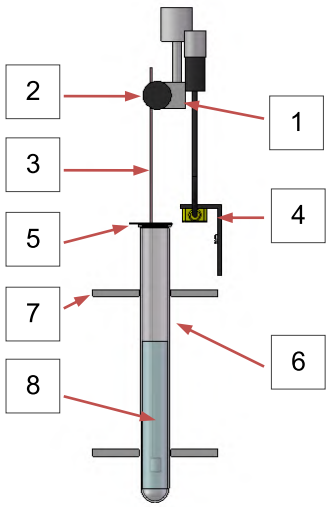
- Unsaturated polyester resin
- Epoxy resin
- Polyureathane resin
- Acrylic resin
- Silicon resin
- Phenolic resins

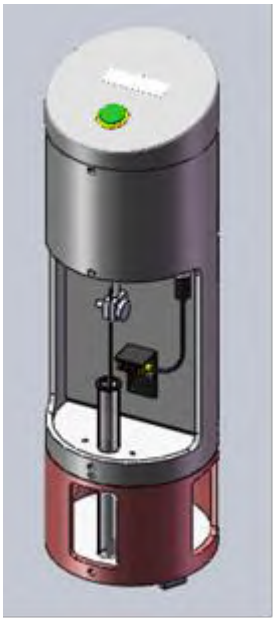
All factors that influence gelation time of reaction resins such as the type and quantity of hardener, accelerators, inhibitors, fillers, pigments, as well as temperatures and humidity can be investigated with the GELNORM®– Geltimer. The instrument is extremely easy to operate and functions virtually maintenance-free. A measuring stamper of aluminium, or steel for aggressive materials, is moved down and up in the reaction resin which is held in a test tube. When the reaction point is reached the test tube with the resin mixture and the measuring stamper is drawn upward in the reciprocating motion and an optical sensor stops the clock which was set in motion at the commencement of the test. The gelation time can then be read off directly on the clock.

DESCRIPTION OF THE INSTRUMENT

The GELNORM® – Geltimer GT-S consists of the well-established and proven Geltimer measuring head contained in a housing in the top of which the control gear is fitted. The model GT-S is supplied only with optic type sensor.

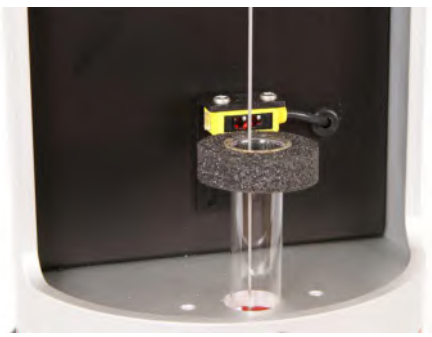
1 Holding clamp
2 Knurled head screw
3 Measuring punch
4 Optical sensor
5 Foam material ring
6 Test tube
7 Test tube holder
8 Specimen mixture





PE Foam ring

For some specimen release of vapour is improved by using the foam ring. The specimen with the test tube and foam ring must weigh precisely 22 grams. If it is desired to prevent the escape of vapour it is possible to employ cardboard discs 35 mm with a 1 mm central hole



For economic reasons DIN 16 945 specifies the use of a measuring stamper made of aluminium wire in the form of a small spiral. For measurements on acidic or alkaline resins which could corrode an aluminium stamper, steel measuring stampers are available. The stamper which is to dip into the reaction resin has a small surface area to minimise the air inhibiting effect. This is particularly important in the case of unsaturated polyester resins. 160 x Ø 16 mm test tubes with beaded edge are used.

Time measurement and the reciprocating cycle

The control unit GT-S employs a time measuring instrument illuminated from the rear using an LCD system and a start button with optical indicator. Time measurements up to 99 hours 59 minutes 59 seconds can be conducted.

The reciprocating movement of the measuring stamper is set to 10 seconds on the standard unit. On request other reciprocating cycles and movements can be provided.

Optional features

Thermoblock GT with Control unit TC-5 for 30 °C … 200 °C

The Temperature Control TC-5 uses modern measuring and control gear. The actual and intended values are compared using a 7 segment LCD for a resolution of 0.1°C. For temperature correction the offset from the actual value is established to provide the basis for the calibration of the regulating system. The instrument can be used within the temperature range from 30°C to 200°C. All necessary steps are taken to achieve optimum monitoring. The following points are checked continuously:

Security:

- Exceeding of the intended value by +10°C
- Safety limit temperature at 270 °C in the heating block
- Short circuit at the sensor
- Interruption at the sensor

Temperature Controller TC-5

Actual value display	- Range: 0.0 ... 250.0 °C adjustable
	- Accuracy ± 0.3% of the scale range ± 1 digit
Set value	- Range: 30.0 ... 200.0 °C
	- Resolution: 0.1 K
Voltage	- 100 … 240 VAC, 50 / 60 Hz
Power output	- Max. power – resistance: 600 W

Electric heating GT

Power input	100 VAC … 240 VAC, 50 / 60 Hz
Power rating	500 Watt
Stability	± 0.2 °C
Range	30 °C…200 °C (on request 250 °C)

Oil filled thermostat bath for 30 °C … 150 °C

By dipping the individual measuring heads with the specimen in a thermostatically controlled bath, the measurements can be conducted at precisely defined temperatures. The thermostatically controlled bath is supplied with a special holder with cover. The quantity of fluid for the temperature control in the thermostatically controlled bath is chosen to ensure that the surface of the fluid is at least up to the filling level of the reaction resin in the test tube. It should be noted that variations in the driving forces can result in errors in the test result.

Note: according to DIN EN ISO 9396 the use with a bath requires a coating weight of 10g for liquid resins and 20g for solid- resp. powder resins.

Procedure for a gelation time measurement with the GT-S

Preparation of the test mixture

Place 100 g reaction resin (deviations of 1 % are permissible according to DIN 16 945) in a beaker. Add hardener in accordance with the supplier's specification and also, if applicable, accelerator, measuring each accurately to 0.01 g. Stir thoroughly (approx. 1 minute) and pour specimen mixture into a test tube (160 x Ø 16 mm with edge bead, weighing approx. 10 g) in order to achieve a total weight - incl. foam ring - of 22 g after filling. Filling height approx. 70 mm
The total weight of the test tube with the resin mixture should be 22 g. In order to ensure good reproducibility of measuring results we recommend always to keep an eye on this total weight. The time interval between completion of mixing the specimen and the start of the measurement must not exceed 1 minute.

Measurement

Place the test tube with the weighed specimen mixture, the foam covering in position and the measuring stamper in the holder of the measuring head. Fix the measuring stamper in the holding clamp. The blinking light shows in the ring around the START button. Operate the START button. The green light lights up.
As a result of the raising of the test tube when the gelation point is reached the time measurement is stopped by the optical sensor. The green START button now shows a winking light.
The height to which the test tube needs to be raised in order to stop the measurement can be set accurately by adjusting the holder for the optical sensor. This is set initially at 6 mm.

The test tube and measuring punch are disposed of when the measurement has been completed. These parts are not cleaned for re-use.

Technical data

Geltimer GT-S

Time measurement	0 … 99h 59min 59s
Accuracy	± 1 second / 2 hours
Reciprocating cycle	10 secs. On request other reciprocating cycle times can be offered
Dimensions	∅ 130 mm, H = 420 mm
Total weight	~ 2.7 kg
Housing material	Eloxed aluminium
Operating voltage	24 VAC
Power used	5 VA
Operating temperature	0 °C … 50 °C
Storage temperature	-30 °C … 50 °C
Relative humidity	< 85 %, not condensing
Place of use	only indoors
Height, up to max.	2000 m
Degree of dirt contamination	2
Supply voltage variations	+/- 10 %
Access voltage category	category II

Ordering code, Article number

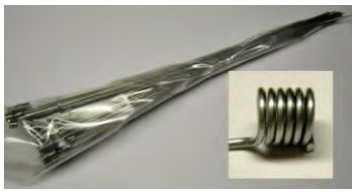
Gelnorm® Geltimer GT-S, incl. power supply 230 VAC / 24 VAC	100.10

Spares material

PE foam rings for the optical switch off — 80.50

Set of 10

Holding clamp for measuring stamper — 20.48



Measuring stamper made of aluminium — 20.30

for aggressive substances:
Measuring stamper made of steel — 20.36

Length = 235 mm / set of 500

Test tubes 16 x 160 mm, 100 per pack — 20.55

Optional extra for the single channel measuring system

Electric heating

Thermoblock GT up to 200 °C, 230 VAC or 115 VAC, 50 / 60 Hz	200.16.41
Temperature regulator TC-5, 30 °C ... 200 °C, 100 ... 240 VAC	70.07
Thermostatic bath for 1 measuring head (without thermostatic oil)	20.50
Holder and cover for the thermostat	20.50HC