GEL INSTRUMENTE AG

GELNORM® – PVN-1

Single Channel Measuring System – with Windows Software

The "GELNORM – PVN-1" equipment consists of a control unit, a stand and a motor driven test rod. The instrument is used to measure Gel Time using two measuring methods based on DIN EN ISO 2535. When method 3 is selected the curing process can be monitored whilst the test stress is built up, which can be done either continuously or in a series of pulses – as on the earlier GELNORM Model RVN. Using the provision for continuous monitoring of the temperature, the point in the cycle when the maximum temperature is reached in the specimen can be established. The temperature monitor built into the PVN-1 can be used to control the heating equipment for the specimen.

Description

The instrument is used to measure the time required for a defined formula material (resin, accelerator, initiator), to reach a viscosity of 50 Pa*s under defined conditions. A rod made of glass, delrin or aluminium, immersed to a defined depth is rotated in the specimen. The procedure is provided with an automatic release device for the specimen, which is held in a beaker or in a test tube. The system can be used employing any one of 3 measuring methods.

Method 1:   with test tube

Method 2:   with beaker

Method 3:   with test tube, or beaker for rotating either continuously - or pulsating.

The method 3 is provided for the users of the Gelnorm RVN (previous device). It is recommended to make an initial trial measurement when a new mixture is to be tested, in order to establish the characteristics of the mixture.

The GELNORM® – Geltimer PVN-1 consists of:

▪ The Control unit (with connections for the measurement of the specimen temperature, the motor on which the rotating test rod is mounted, and a connection for electric heating, is an option)

▪ The Stand with movable mounting for the motor

▪ The motor with test rod holders

The control unit for the PVN-1 has a USB port and is delivered with Windows software based on the "dot net" system. The software can be copied easily and no installation is necessary beyond this. It requires only an EXE File running with INI data.

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 in online mode only!

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Front view PVN-1 Control Unit

- Display of force
- Temperature controller for an external heater and display of the specimen mixture temperature by pressing the ↑ button

Rear view PVN-1 Control Unit

- Power input connection with fuse and main switch
- Connection for the electric heater
- Connection for sample temperature sensor, thermocouple type K
- USB port for on-line measurement using a PC
- Connection for the motor

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Stand with motor driven rotating test rod

Available are two different types of test rod holders:

On the left: with strap clamp for 6-7mm diameter glass rods
On the right: with mounting for delrin or aluminium test rods 10 mm diameter
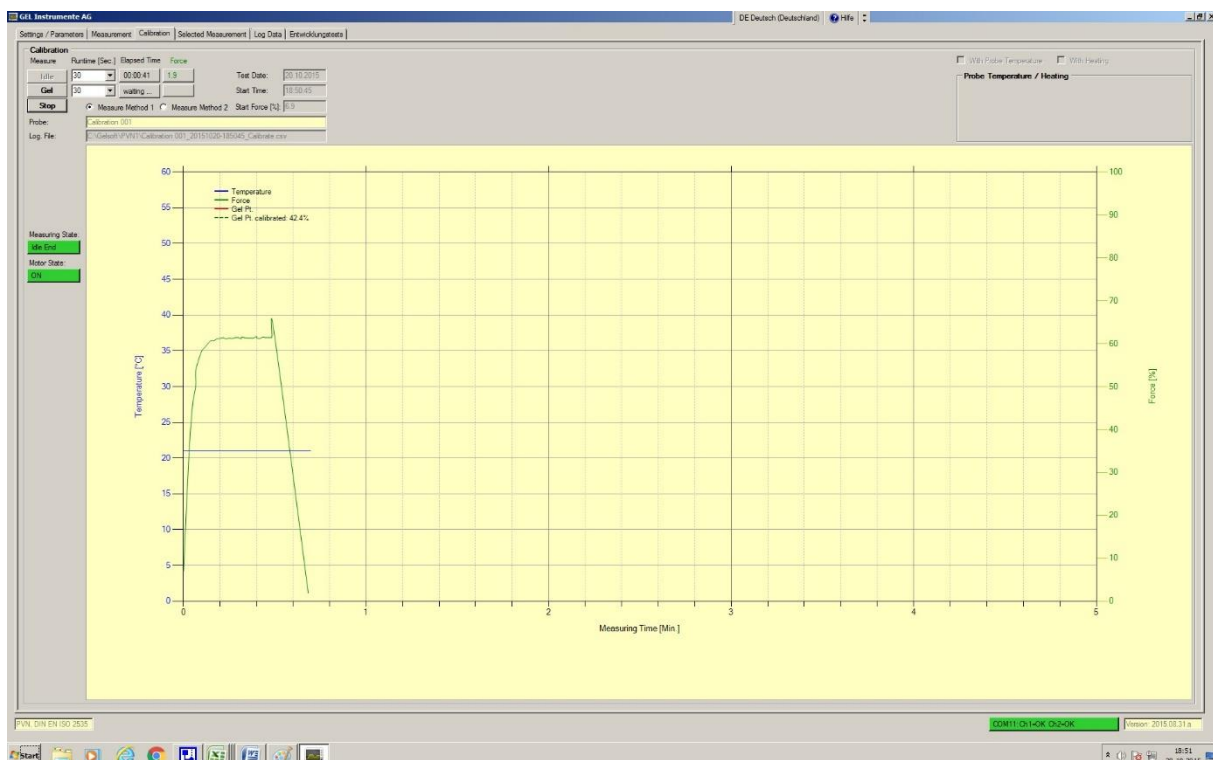
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Software for PVN-1

On the "Setting/Parameter" the data path, the measuring interval of 1…30 seconds, the motor interval for method 3 of 0….60 seconds, the defined end for the test and the maximum shutdown force are set
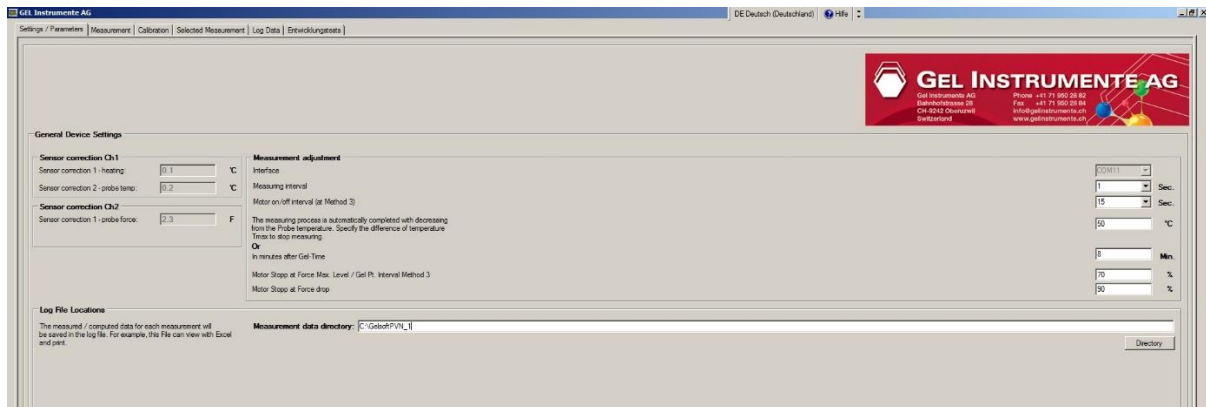

To set the running of the motor, the value running idle is measured and the motor is set to the lowest value. A measuring time of 30 …120 seconds is selected for this. The software then corrects the measurement electronics accordingly

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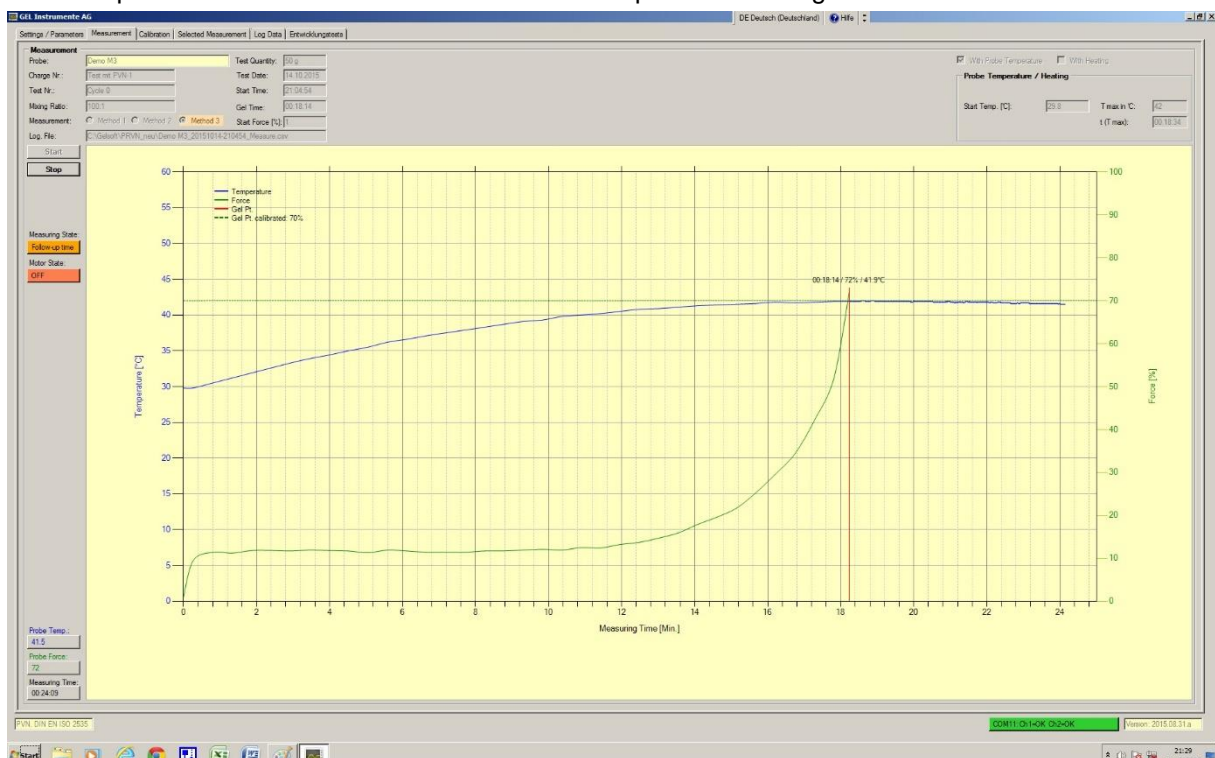Tel.   +41 71 950 28 82
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A 50 Pa*s calibrated test oil is used to set the Limiting Gel Parameter. The temperature of the oil can be recorded alongside. This limit value is used later for the determination of the gel time.
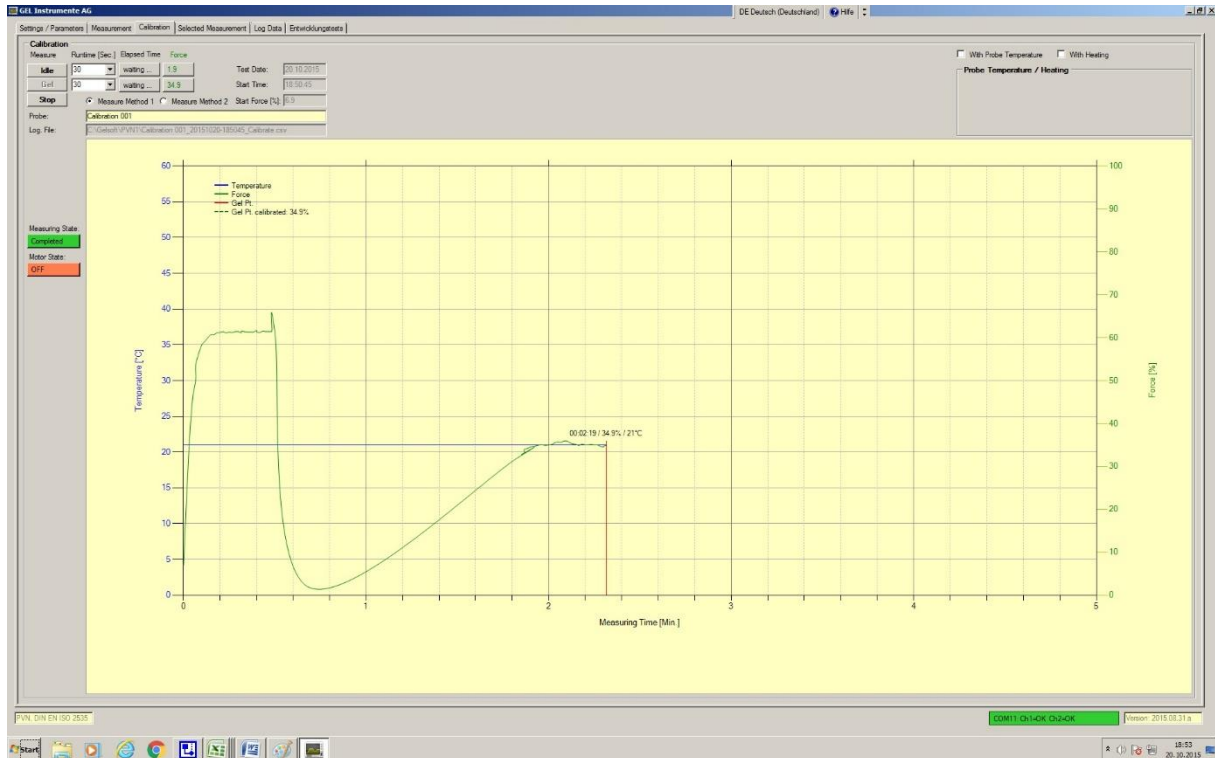
Example of a measurement

The viscosity curve and the specimen mixture temperature are recorded. The gel time (red line), the max. temperature and the time to reach the max. temperature are registered

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Electrical data of the PVN-1 control unit

Electrical Specifications

Power supply	115VAC / 230 VAC , 50/ 60 Hz (with changeover switch)
Power consumption	20 W, 650 W (with heating)
Connector	8 pin , 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, EN 61010-2-010:2014, EN 61326-1:2013
Interface	USB 2.0 type A connector
Motor power connection	M12 8 pin, 24 VDC, 10 W

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
Value, pre set:	Range: 0.0 °C ... 200.0 °C (on request 250.0 °C)
Resolution:	0.1 K
Load output	power max. - Resistive load: maximum 600 W self-optimization

Temperature measurement for the sample

Sensor	Thermocouple Type K (Ni- CrNi), EN 60 584
Connector	Mini connector type K thermocouples, EN 60 584
Range	0.0 °C to 400.0 °C
Accuracy	± 1.5 °C including cold-junction compensation Can be adjusted and calibrated

Time

The time is set on the connected PC. A slow action PC cannot be used. It is advantageous to activate a time server configuration.

Test rod drive motor

Motor voltage and power	24 VDC, 10 W
Power connection cable	1.5 m, with M12 plug

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Thermostatic control

Precise temperature control of the sample is a prerequisite for accurate and repeatable measuring results. Suitable equipment for this function is:

GELNORM Thermal Block GT, Art. No. 200.20.41(example heater)

The control system integrated with this equipment controls the temperature of the heating block for the sample. The actual and set-point temperature is displayed digitally on an LCD with background lighting. The control difference is very clearly optically displayed by means of a colour display.

To ensure high reliability, a monitor switches the heater off automatically if the correct input power supply for the heater is exceeded. The heating block GT incorporates a securely preset safety thermostat which switches the heater off if a temperature of 270 °C is reached.

Safety features/fail safe features:

- Monitor to switch the heater off automatically if the preset temperature is exceeded by +10 °C
- Additional maximum value cut out safety switch fixed at 270° C
- Short circuit of the sensor
- Interruption of the sensor

Using the software, activate the heater and set the desired cut-out point. Measurement is activated when the set activation point has been reached. The heater can be adjusted/calibrated with an actual value offset

Alternatively a Thermostatically controlled silicon-oil bath

can be used for temperatures from 30 °C … 150 °C

The design of the mounting for the beaker holding the specimen mixture is individual .

GELNORM®
GELTIMER

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Technical Data

PVN-1 – Control Unit

Housing frame	die-cast aluminium
Base and top	coated sheet
Ventilation	slots in base plate
Front and rear walls	aluminium anodized
Dimensions	B x H x T = 257 mm x 103 mm x 271 mm
Weight	~ 3.0 kg
Temperature range	0 °C … 50 °C
Storage temperature	-30 °C … 50 °C
Relative humidity	< 85 %, no condensation
Usage	for indoor use only
Height max.	2000 m
Pollution degree	2
Voltage fluctuations	+/- 10 %
Overvoltage category	Kat. ll

Motor

Rotation	1…2 Hz	
Dimensions	Test rod:	$\varnothing$ 60 mm / height with test rod 360 mm
	Stand:	base plate 300 x 200 mm / height 540 mm
Weight total	~ 3.7 kg	
Housing material	anodized aluminium	
Power	24 VDC	
Power consumption	10 W	

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Ordering code, item numbers

GELNORM® - PVN-1 complete, consists of**:**		**200.30.05**
1 piece	Control unit PVN-1 with. software	200.30.01
1 piece	Motor for PVN-1	200.30.10
1 piece	Stand	300.20

Options:

Electric Heating

Thermo block GT for Ø 20 mm test tubes	200.20.41
Other heating systems on request	

Thermostatic Bath

Thermostatic bath for 1 measuring head (without thermostatic oil)	20.50

Consumable material for GELNORM® - PVN-1

Spare motor shaft heads, aluminium, package with 100 pcs.	30.21
Spare motor shaft heads, delrin, package with 100 pcs.	30.31
Stirring rods for PVN-1, AR-Glass, 200 x 6 mm, package with 100 pcs.	200.30.80
Thermocouple type K, 5 meters, ready for use	20.32
Test tubes 20 x 180 mm, package with 100 pcs.	30.22

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

GELNORM®
GELTIMER