



GELNORM[®] – RVN

Pot life measurement



GELNORM[®] - RVN is an instrument for the automatic determination of the pot life of reaction resins based on the measurement of the relative viscosity. Applications include:

- **Unsaturated polyester resins**
- **Epoxy resins**
- **Polyurethane resins**
- **Acrylate resins**
- **Silicone resins**

- **Polysulfide rubbers**
- **Silicone rubbers**

GELNORM[®] - RVN can be used for structurally viscous, thixotropic and very slow hardening reaction resins. Highly filled systems such as primers and fillers can be tested with this instrument as well as adhesives.

The measurement of the viscosity increase follows in general the DIN 16 945, page 1 point 6.1. According to this standard, the time is determined to reach an agreed upon viscosity limit. This limit is depending on the handling and working process of the resin and shall be determined by producer and user.

The tests with GELNORM[®] - RVN are performed automatically and under standardized and reproducible conditions. The change of viscosity in the sample is determined by the power increase required by a periodically rotating spindle probe. All results remain stored and can be reprinted until the next experiment is started. Using a special program, the data can be transmitted to a computer for further data analysis using MS-EXCEL. The new Online Software has more possibilities to describe your test and it shows also the graph directly

Five different viscosity limiting values can be preselected and, hence, individual pot life's or processing times can be determined simply and without plotting the whole curing experiment.

In order not to influence the structure of the sample during the measurement, the instrument operates with only short measurement cycles (3 sec) and interval cycles the length of which can be adjusted between 0 sec and 120 min.

For the simultaneous determination of the temperature in addition to the relative viscosity, the GELNORM[®]-Therm-Box I (ref. 160.70) with an attached Ni-Cr-Ni thermocouple is connected to the control unit. The thermocouple is inserted into the reaction resin together with the probe at the beginning of the test.

GELNORM[®] - RVN was especially developed for the determination of pot life. Its performance and accuracy is designed for this purpose.



Option Thermbox for RVN

On the control unit 30.01 you can connect this thermbox. With a thermocouple typ K you can also measure the temperature.



DESCRIPTION OF INSTRUMENT

GELNORM[®] - RVN (Ref. 30.05) consists of a control unit which is based on a process controlled measuring system and a probe drive with a rotating spindle, fig. 1. Two different probe drives with viscosity limits of 100'000 mPa · s (Ref. 30.10) and 400'000 (Ref. 30.11) are available.

A liquid crystal display is used to display all functions and parameters. All selections and inputs can be made by a menu-driven program.

All relative viscosities determined with GELNORM[®] - RVN can be calculated to absolute viscosities by the aid of newtonian calibration fluids. The limit viscosity for stopping the instrument can be determined by separate manual one time operations or with calibrations. (0 - 100%).

TEMPERATURE CONTROL SYSTEM

A prerequisite for an exact and reproducible determination of the pot life with GELNORM[®] - RVN is a high precision thermostatic system. For temperatures up to 120 °C we recommend a thermostatic bath, up to 200 °C our Heating Block GT in connection with our temperature controller TC-5.

1. Thermostatic Bath

By submersing the test tube (180 x Ø 20 mm) with the sample into a thermostatic bath, tests can be performed at defined temperatures between 20 °C ...120 °C. For special requirements there are baths for testing at temperatures between 20 °C ...180 °C available.



2. Electric Heating Block GT

At temperatures of 50 up to 200 °C our Electric Heating Block GT (Ref. 200.20.41) can be used. Temperature control of the heating block is performed with the temperature controller TC-5 (Ref. 70.07).





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TEST PROCEDURE

1. Preparing the test 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 mixing well for approx. 1 minute, place the sample in a test tube (180 x Ø 20 mm, Fiolax), up to a height of 45 ± 2 mm. If necessary, tests can also be made directly in a cup of 100 g or a bigger container.

2. Performing the test

Before starting the measurement, the duration, interval cycle and desired limiting values are to be selected. Having finished the sample mixture, the start button is pressed and the measurement starts. The stirring probes is inserted to the sample.

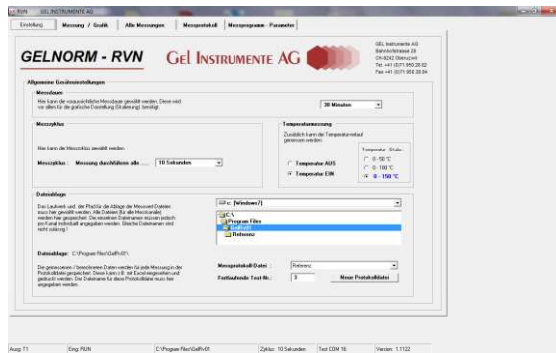
In order not to disturb the structure of the sample, it is recommended to have a rest phase after each measuring phase as long as possible. Note: The longer the hardening time, the longer the recommended rest phase.

3. **Offline measure, and data analysis later with (Software Geltrans)**

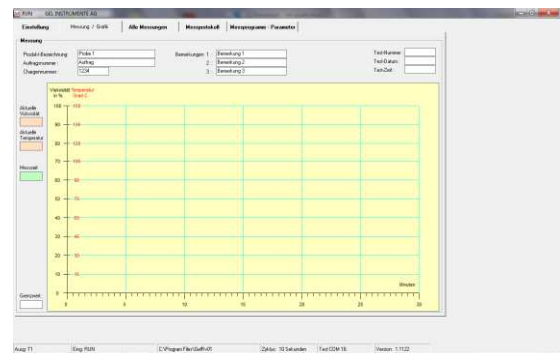
All measured data's will be stored on the RVN Unit. You can use the RVN as a data logger on the machine, and read out the values later in your office. You need the read out every test. The RVN has only space for one test report. Use the RS232 cable and the Geltrans software for read out. For the data analysis you can use Microsoft Excel.

4. **Online measure (Software RVN Online)**

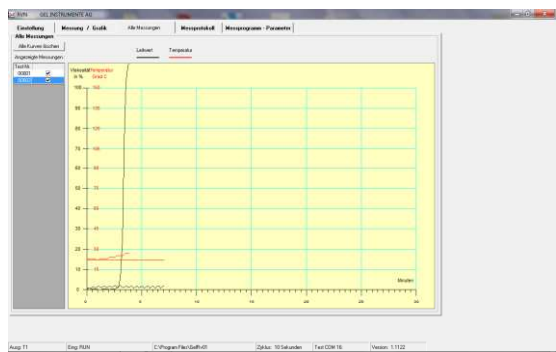
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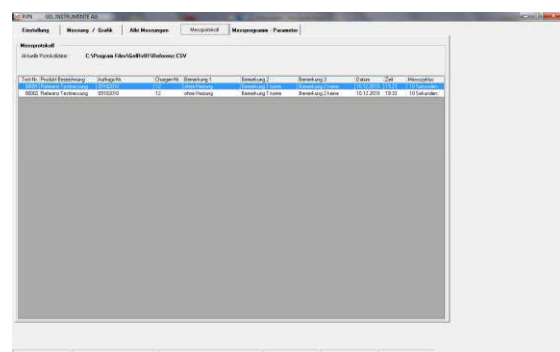
Space for comment tot he probe



compare measured probes



Protocoll overview



This new software is tested with W7. It is easy to use.



Evaluation of the data

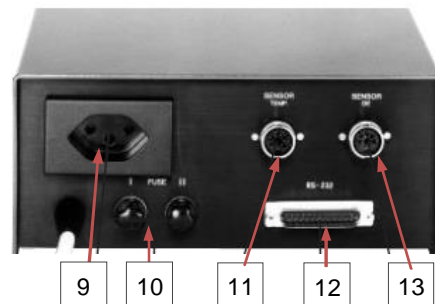
The data can simultaneously be stored and printed later. When reaching the selected limiting values, the system marks the point in question and the desired signal is switched on (optically or acoustically). The data remain stored until a new measurement is started. Furthermore, using a special program, the data can be transmitted to a computer for further processing with MS-EXCEL.

- 1 Control unit
- 2 RVN probe
- 3 Display for data measurement
- 4 Setup button
- 5 Selection module buttons (arrow-keys)
- 6 Main power switch ON/OFF
- 7 Enter button
- 8 Start button
- 9 Wall-Socket (230V) for signal
- 10 Fuse
- 11 Connection for Thermbox
- 12 RS-232 Interface
- 13 Connection to probe

Description of GELNORM[®] – RVN



GELNORM[®] – RVN back side



TECHNICAL DATA

Power supply	230 V / 50 Hz or 115 V / 60 Hz, ± 10 %
PC	RS-232, 9600 Baud D-Sub Plug
Fuses	I = 500 mA; II = 2 A
Probes	Typ 7811: for low visc. Typ 7835: for high visc.
Measuring principle	Process controlled measuring system
Program memory	Eprom
Data memory	Battery-RAM
Time/Date	actual time module



Code, Item Number

GELNORM® - RVN:		30.05
1 control unit	(30.01)	
1 RVN-stirring probe 7811	(30.10)	
1 stand for RVN-stirring probe	(30.20)	
5 spare spindle heads, plastic (Delrin)	(30.31)	

Electrical supply: 230 VAC / 50 Hz or 115 VAC / 60 Hz

Accessories

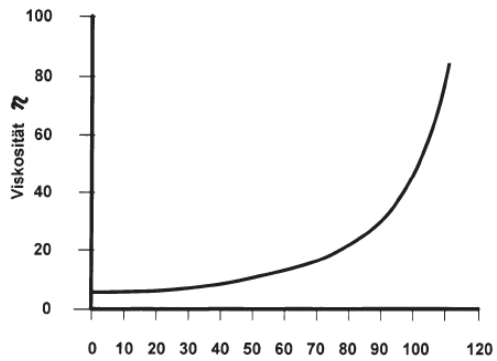
1 RVN-stirring probe 7811 for medium a. high viscosity		30.10
1 Package of spare spindle heads (Alu) (100 pcs.)		30.21
1 Package of spare spindle heads (Delrin) (100 pcs.)		30.31
1 Package of test tubes 180 x 20 mm for RVN-stirring probe (100 pcs.)		30.22
1 Coupling for impeller mixer		30.27
1 Impeller mixer, made of precious steel		30.28
1 Coupling for spindle heads		30.30
1 Package of spindle heads M8 x 75 mm (Delrin, 100 pcs.)		30.32
1 Measuring lead for computer connection		30.34

Option

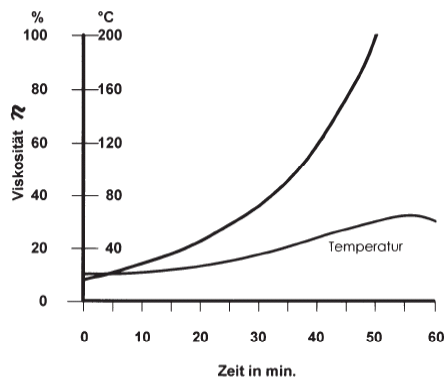
1 Thermbox for RVN, thermocouple type K		160.70
1 Electrical heating device typ GT for test tube Ø 20 mm range up to 200 °C		200.20.41
as control unit we recommend TC-5 Electrical supply: 230VAC / 50 Hz		70.07
1 Package of spare O-rings (5 Stk.)		30.50



Trace of the viscosity of an epoxide – amine resin system, cured at 20 ° C



Trace of the viscosity and temperature of a polyurethane resin



Trace of the viscosity of an epoxideamide resin system

