

GELNORM® - RVN



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
- Silicone resins
- Epoxy resins
- Polysulfide rubbers
- Polyurethane resins
- Silicone rubbers
- Acrylate resins

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. Test results can be plotted simultaneously by either a line recorder or a X-Y-plotter. All results remain stored and can be replotted 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.

Five different viscosity limiting values can be preselected and, hence, individual pot lives 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 with an attached Ni-Cr-Ni-thermopile is connected to the control unit. The thermopile 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.

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 x 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

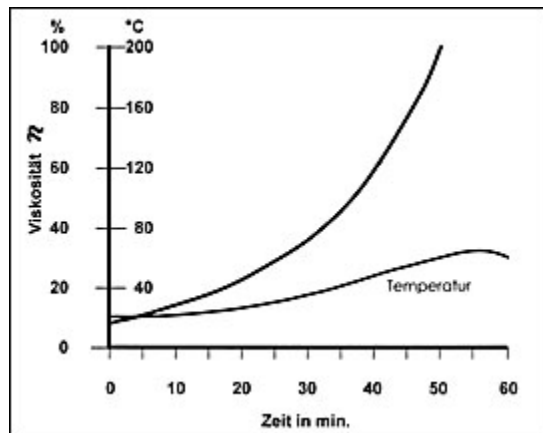
A prerequisite for an exact and reproducible determination of the pot life with GELNORM - RVN is a high precision thermostatic system. For temperatures up to 120 °C we recommend a thermostatic bath, up to 200 °C our Heating Block GT in connection with our temperature controller TC-2.

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 and 120 °C. For special requirements there are baths for testing at temperatures between -20 and +180 °C available.

2. ELECTRIC HEATING BLOCK GT

At temperatures of 120 up to 200 °C our Electric Heating Block GT (Ref. 20.41) can be used, fig. 4. Temperature control of the heating block is performed with the temperature controller TC-2 (Ref. 70.01).



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, desired limiting values and plotter settings (simultaneous/off) 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. EVALUATION OF THE DATA:

Plotter: The data can simultaneously be plotted and stored or stored and plotted later. When reaching the selected limiting values, the plotter 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.

Line recorder: The data are simultaneously plotted (Output voltage 0 - 1 VDC).

TECHNICAL DATA

Power supply	220 V / 50 Hz oder 110 V / 60 Hz, ± 10 %
Plotterconnection	RS-232, 9600 Baud, D-Sub Stecker
Plot-Data-Format	HPGL
Recorderconnection	Line recorder 1- or 2-channel, 0 - 1 VDC Output temperature: 0 - 200°C = 0 - 1 VDC
Fuses	I = 500 mA; II = 2 A
Mains output	for alarm, line recorder or plotter
Probes	Typ 7811: for low visc. Typ 7835: for high visc.
Measuring principle	Process controlled measuring system
Program-Memory	Eprom
Data memoy	Batterie-RAM
Time/Date	Actual time module