GELNORM® - Gel Timer

is an instrument for the automatic determination of the gel time of reaction resins. The design is based on DIN 16 945 and DIN 16 916.

Devices for:

- Research and development
- Chemical industry
- Construction chemistry
- Paste industry
- Colour industry and varnish industry
- Plastic industry
- Speciality chemistry
- Synthetic resin industry
- Fever glass industry, u. v. a.

The test with GELNORM - Gel Timer is very easy to perform and gives exceptionally good reproducibility. The automatical measurement can be performed for any reaction resin, for example:

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

With GELNORM - Gel Timer it is possible to evaluate 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 extremly easy to operate and normally needs no maintenance. The principle of measurement of GELNORM - Gel Timer is simple: A stamper made from aluminium or glass performs an up-down cycle in a thermostatized 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.
B-Timing Plate
according to DIN 16 916

GENERAL
B-time determination on the B-Timing Plate provides information on the curing behavior of resins capable of heat-hardening, namely the reaction time at a given temperature after which resins (solid, liquid, or solvent containing resins of a known concentration) change to the B-state.

This B-Timing Plate according to DIN 16 916 is mainly used for

• Phenolic resins

Our standard B-Timing Plate has four depressions in the heating plate, accepting one sample each. Plates without depressions are also available. The temperature is precisely controlled with our temperature controller TC-2 (ref. 70.01).

Measuring Procedure

The B-Timing Plate has to be protected against draughts with a cabinet open to one side. Place resin sample of 500 mg in to a depression on the plate and start stop watch. Use a tapered glass rod (Ø 3 mm, reduced to Ø 2 mm at one end) to impart short circular stirring motions to resin, directed from edge to center of the depression. In case of extended B-times, stir for one minute, followed by 10 seconds of stirring, spaced at one-minute intervals. Stir constantly when resin gets a tougher consistency toward the end of the test. Pull out glass rod briefly to check if resin is still stringy. The B-point is reached when no strings result as the rod is pulled up and the resin tears off in a rubber-like fashion. Stop the watch at this stage and read elapsed time. Indicate elapsed time in minutes and seconds. Record testing temperature at which test has been done.

TECHNICAL DATA

Operating current 230 V / 50 Hz or 110 V / 60 Hz, ± 10 %
Heating capacity 60 W
Dimensions Ø 220 x 80 mm
Weight 6.7 kg

B-Timing Plate with 4 depressions ref. 40.01
B-Timing Plate without depressions ref. 40.02
Temperature-Controller TC-3 ref. 70.01
Pt-100 sensor ref. 70.05

Important !!
The heating plate is hard-chrome plated. Use only brass spatula or brass/copper brush for cleaning.
GENERAL

According to DIN 55 990, the gel time of powder coatings is the time required to melt a specimen at a laid down temperature, using a specific test apparatus, and to achieve a gel-like consistency.

For the determination of the gel time of powder coatings, our Heating Block PL in accordance with the German Standard DIN 55 990 (ref. 30.45) with a spherical depression (mould) is used.

The temperature is precisely controlled with our temperature controller T-32.

Test Procedure

The Heating Block is heated to the agreed test temperature, preferably 180 °C (but other temperatures suitable for the specimen can also be used), but the value selected should be an integer multiple of 10. 200 mg of the specimen material are put into the depression of the heating block.

Simultaneously, a stop watch is started and the specimen is stirred steadily until a gel-like consistency is achieved. The end point is reached when by sudden withdrawal of a glass rod (approx. 20 mm upwards), the "string" of material that is picked up, tears, or when the generally globular specimen breaks away from the surface of the mould.

The stop watch is stopped and the time in minutes and seconds is read off. To test or to calibrate the temperature of the mould in the Heating Block GT, melting salts are employed (e.g. temperature indicators of MERCK).

Technical Data:

Main power supply 230 V / 50 Hz or 110 V / 60 Hz, ± 10 %
Heating power 500 W
Gelnorm - DE

is a novel measuring instrument for establishing the curing reaction of two-component reaction resin systems (thermoset resins). The new instrument is based on the determination of a function of electrical conductivity as well as the capacitance of a resin sample. This electrical function enables to trace the curing process over the whole regime of the chemical reaction. The instrument provides new possibilities to investigate the curing reaction of reaction resins such as:

- Epoxy resins
- Polyurethane resins
- Polyester resins
- Silicone rubbers
- Polysulphide rubbers

The electrical measuring technique offers numerous advantages compared to the various mechanical methods. In contrast to the conventional rheological approach (based e.g. on rotation- or shear viscometers), the polymer sample is in no way and at no time subject to any kind of mechanical forces. Thus, any kind of mechanical distortion of the polymer structure during the curing can be excluded.

The special design of the sensors (absolutely flat and thin, 17 x 55 x 0.04 mm) enables measurements to be made at almost any place. For example, it is possible to measure the hardening sequence of thin layers, large volumes of resin and also directly in a prepreg laminate. Experiments with GELNORM - DE can generally be made under standard conditions both at room temperature and also at elevated temperatures up to 200 °C. The instrument is very sensitive and the results show a high level of reproducibility. It offers reliability in operation and is easy to use and maintain. Hence, GELNORM - DE is not only suitable for research and development, but also in many areas of quality control.

GELNORM®-Med

is a measuring instrument for the hard setting sequence of two component systems, which either have a high initial viscosity or in which the viscosity rises to very high values during the hard setting process. The instrument is also suitable for systems that have a filler type starting viscosity: the viscosity of such systems cannot be measured with conventional rotational viscometers.

DESCRIPTION OF EQUIPMENT

GELNORM®-Med consists of a compact control unit with stand, in which the measuring equipment is incorporated. At the heart of this measuring unit is a force sensor, on the end of which the test body is attached. This is dipped into the reactive resin based substance at a defined speed, e.g. 0.01mm/sec. In this process, the increasing viscosity is displayed as a force, measured in Newton, against time. Provision is also made to measure, simultaneously with the force, the change in temperature in the resin specimen, and to record this. The measuring data is displayed on a PC using software included in the scope of supply, and this can be further evaluated using MS-Excel®. The parameters needed for the measurement (speed, force range, countdown, data name, etc.) are preset directly on the PC before measurement commences. When measurement has been completed the lower part of the test body is left in the reaction resin and is thrown away with the resin specimen. The part is not Cleaned.
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. 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.
The automatic GELNORM®-Gel Timer TC for the measurement of gelation time under standardised conditions is easy to use and the results show exceptionally good reproducibility with all reaction resins such as:

- unsat. Polyester resins
- Epoxid resins
- Polyurethane resins
- Acrylic resins
- Silicone resins etc.

The instrument incorporates a switch-off mechanism that responds to pressure: the gelation time limit is reached when the measuring stamper meets a defined reaction force in the reaction resin. As a result of this automatic switch-off system, the size of resin sample employed is not limited. The disposable stamper of stainless steel wire carries out a defined reciprocating movement as soon as the instrument is set in operation and, when the change in viscosity is reached, a built-in timer is stopped and the gelation time can be read off.

By the way

We have the balance for you also for weighing your samples in the program!
Gelnorm - Therm
Reactivity measurement of reaction resins

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Reactivity measurement of reaction resins

GENERAL INFORMATION

GELNORM-Therm is a new measuring instrument for the automatic, standardized measurement of the hardening by precipitation of reaction resins on the basis of a time temperature diagram. The instrument is appropriate for a binary application in research laboratory and production analytics and is outstanding suitable for the development and quality control of a broad pallet by polymers in particular, as for example:

- Insatiated polyester
- resins of epoxy
- resins of PU
- resins of acrylate resins

The general measuring method is in the standards DIN 16'945, EN ISO 584, and ISO 14848 described in detail. The measurement principle is based on the basis of the calorimetry, with which the heat development of the reaction resin sample is pursued as function of the time. In contrast to the dynamic thermal analysis, with which the sample goes through a pre-programmed temperature program, measurements with GELNORM-Therm under isotherms conditions are accomplished. The sample is brought to it in a thermostat bath or - at higher temperatures - in an appropriate heating block rapidly on the ambient temperature, with which the hardening by precipitation is to be pursued. The exothermic of the polymerization reaction is evaluated over the time temperature relationship noted by the equipment. Contrary to expensive dynamic difference heat flow calorimetry (DSC) the automated Bestimung of the gelierpunktes with GELNORM-Therm offers a economical alternative to rheologic testing methods to devices, which are suitable due to their technical complexity badly for routine quality control.