



6th European Conference on Rheology in Erlangen, Germany, Sept. 1 - 6

The 6th European Conference on Rheology takes place this year in Germany. Several hundred rheologists and specialists from all over Europe will meet in order to report on the latest themes and trends in the world of rheology. The organiser of this event, Professor Helmut Münstedt, Head of the Interdisciplinary Research and Teaching Centre in Polymer Science and Technology, gave the following interview for "Thermo Haake Focus".

How important is this event at European level?

It will once again be the biggest rheology meeting of the year in Europe. It is thus a very important and interesting meeting for all rheologists.

Can you recognize any new trends from the papers already submitted?

Virtually all areas of rheology are addressed. We have received around 300 papers for submissions and this reflects the wide range of subjects that will be covered.

Will the event also be interesting for people involved with practical rheology applications?

Of course! A number of papers deal directly with application-related subjects. An exhibition of commercially available instruments gives an insight into the new product developments.

Further information on eurheo 2002 can be obtained by visiting:

www.lsp.uni-erlangen.de/eurheo2002/index.html



Professor
Helmut Münstedt

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Wacker relies on The Thermo Haake RheoStress RS 600

10 brand new RheoStress 600 rheometers have been ordered and, in part, already supplied to the company Wacker GmbH in Burghausen as part of an internal restructuring program for one of their business areas. These rheometers have been equipped with a fast cone & plate Peltier temperature control unit and the user-friendly RheoWin software package.

Wacker-Chemie GmbH is a globally active company with headquarters in Munich. It ranks among the top hundred industrial enterprises in Germany. Wacker-Chemie has production sites in Europe, America and Asia. Wacker-Chemie has four divisions covering the following product portfolio:

Polymers Division

Redispersible powders, solid resins, polyvinyl butyrals, specialty chemicals, catalysts and biotechnology

Silicones Division

Silicone fluids, rubbers and resins; silanes; fumed silica's

Semiconductors Division

Hyperpure silicon for semiconductor devices

Ceramics Division

Advanced ceramics, boron compounds, functional coatings, microporous insulation semiconductors, polymers, silicones and materials.

The RheoStress 600 guarantees that Wacker will achieve optimum product development as well as efficient Quality Control. This large order is a reinforcement that our product strategy is targeted correctly and that we continue to provide customer-oriented products.

More Info?

Send an Email to info@rheologysolutions.com and Quote No: 79 for the RheoStress 600

DISTRIBUTOR PROFILE ... FRANCE

Thermo Rheo is a sister company of Thermo Haake, and is one of the leading suppliers of analytical instruments worldwide, since 1998.

Thermo Rheo exclusively distribute a complete range of instruments intended for the optimum characterization of materials, including:

Viscometers, rheometers, texture analysers, torque rheometers with extruders and mixers, twin screw compounders for polymers technology, thermal analysis and circulators.

With a wide range of instruments, Thermo Rheo is a widely recognised partner for R&D labs, quality control, pilot plants, and process control applications and industries. In order to complement its range of instruments, Thermo Rheo offers high-end services, such as technical assistance, customer service, calibration, samples testing and training. The Thermo Rheo training center has been granted an official accreditation by government authorities. User Club meetings are held by Thermo Rheo and over 120 customers, among them prominent names from the industry, regularly attend.

Thermo Rheo is active and supports the following industries

- Food, pharmaceuticals and health-care
- Paints, inks, adhesives, resins, bitumen
- Plastics and rubber
- Ceramics, cements, catalysts

The major customers for Thermo Rheo are industry R&D Laboratories (80 %) and academics (20 %).

The Thermo Rheo team of four sales engineers markets all the instruments:

North East: Badi Triki

North West: Samir Oufir

South East: Sylvain Guibillon

South East: Frédéric Bar, acting also as Sales Manager.

Highly specialised technicians support the sales team: Sylvain Bouthors, and Brice Walter. This support team will be expanded to include a Service Manager in the first half of 2002.

Jacques Bouton, Scientific Adviser, brings his experience in major issues, such as normalisation and international development, in conjunction with Thermo Haake and the French Rheology Group.

Thermo Rheo since it was founded in 1998 has installed more than 1,500 instruments in the French market.

More Info?

Send an email to info@thermorheo.com

Significance of Rheology in Asia

By Dr Seungrok Kim, Asia Pacific Regional Manager, Thermo Haake

Choosing a correct shear viscometer in the Asian industry was not a complicated issue in the past as one had specific goals with respect to comparing only stickiness (simple viscosity) of different samples. However, current rheological methods use rheology as a diagnostic tool to characterise microstructure, eg: the degree of association of colloidal systems or cross-link density of polymers. These are an accurate means of quality control as well as a means of challenging Asian rheology frontiers. For instance, rheometers are used as a mechanical titration tool to investigate gelling kinetics, reaction mechanism (eg: measuring change of rheological parameters as a function of molar ratio of two interacting materials to determine the end point) and to determine a materials internal microstructure by studying fundamental mechanical properties such as yield stress, modulus, compliance and relaxation time.

It is well known that the rheological properties of polymer melts depend strongly on the underlying molecular structure; specifically, molecular weight, molecular weight distribution and long chain branching. In recent years in Asia, there has been considerable interest in the area of relating the melt rheology of polymer to its molecular architecture. Many key Asian polymer research institutes are currently attempting rheological methods that will predict molecular architecture for a given polymer. There are a number of groups who are studying the effects of radiation and other external excitation on mechanical properties of polymer blends.

Aside from the fundamental interest in relating molecular architecture to polymer melt rheology; there are practical reasons for it in industrial applications such as polymer product development, catalyst and or process development, material characterization and quality control. Product quality in this respect is relevant to the extrudate swell, melt fractures of polymers, surface finish of extruded rubber strips, change of specific volume of polymer melts at different temperatures under various pressures and its significance to rheology, as well as optical quality and dimensional stability of blown film. Exxon Singapore has evaluated a creep and recovery method so that they can use this as a diagnostic tool for accurate quality control of PP.

In the case of the plasma display panels industries, (PDP, flat electronic display monitor) rheology is a key quality control factor. Rheological behaviour is associated directly with pastes quality such as flowability of the pastes through screen panel and the slumping behaviour of printed rib barrier. In this case, rheological characterizations turned out to be the most important research issue in the Asian office of Thermo Haake and LG Micron in Kumi, Korea. Flow predictions of various formulations through the printing screen panel became possible by measuring yield stress of each paste. Recoverable strain was related to the slumping behaviour of each paste after printing. Thermo Haake's controlled stress rheometers model RheoStress 1 is now the essential tool in the PDP research laboratories in Samsung Corning and LG Electronics in Korea.

NEC, Matsushita, Pioneer and FHP in Japan and CPT in Taiwan have conducted significant research activities relevant to PDP rheology. The goal is to

investigate processability and product performance of various formulations under various conditions. The rheological characterization of PDP pastes is currently (being) considered as providing important and valuable information for manufacturing processes. Aside from its popularity in the PDP industry, many people in the ceramic area also look at the relationship between the rheological properties of their samples and the relevant particle interactions. In many cases, their projects are associated with the electronic industry in such areas as coating pastes that are for the electrodes, which are built in the batteries used in laptop PCs, and mobile phones, multi layer ceramic components (MLCC) pastes for Li-ion battery and ferrous oxide pastes for coating. Many mineral companies in Australia consider a viscometer important to design the flow processes for easy transportation, and important to predict the storage and stability of mineral suspensions. Rheology is still a key quality factor in determining ink and paint stability and printing capabilities. There are a significant number of groups especially in Japan and Korea who are studying the impact of electric (ER) and magnetic (MR) fields on rheological properties of various materials aside from external spectroscopic radiation such as UV and are currently looking at its applicability for new product development.

Asia is an interesting blend of the old, planned industry, plus a rapidly emerging market economy, this is especially true in the food research area.

Food companies in Asia used to respond to demonstrated acceptance in other countries before endorsing a new technique. However, key food research centres are currently employing state of the art research technologies. Peo-

ple are aware of the importance of food rheology, eg: palm oil research in Malaysia, research on sea weed extract (Carragena) in the Philippines (especially near the Cebu area), research on bio-extracts in Australia, Korea, Japan and Thailand. The Thailand government has committed to developing the food area as a key strategic industry.

Rheological measurements provide useful and meaningful information about predicting the storage stability of emulsion based food products and in the estimation of spreadability and other flow properties.

Rheological methods are widely applied in various fields of medical work such as testing in Australia of the rheological characteristics of teeth cavity-filling material, Hyaluronates in Australia and Korea, and blood rheology in Seoul National University, and the pharmaceutical and cosmetic industries look at the spreadability of ointments and creams and the shelf life of drugs. The demands for rheology in Asia have been significantly increased and the relevant knowledge has also advanced and continues to increase.

The awareness that the rheological characterization of materials provides important information for engineers and formulation scientists to improve and optimise the quality of products and manufacturing processes continues to grow the demand and application for materials characterization.

Today, many formulators in Asia count on rheological measurements to develop customer-favoured products and gain a competitive edge in the marketplace.

Customer Profiles

Users of any Thermo Haake or Thermo PRISM products are invited to submit a story on their specific application and or use of the Thermo Haake or Thermo PRISM product.
Interested? Send an email to info@rheologysolutions.com with a brief overview.

Distribution Network.

All Thermo Haake distributors are listed on our website. Visit www.thermohaake.com>AboutUs>OurRepresentatives
You can Email direct or call your local supplier to discuss your application needs.

The New Line of Water Recirculators from Thermo Haake

The new TC line of water recirculators have been given a modern design and a greatly extended specification range compared to the predecessor models of the UWK and Kryo-Thermat ranges.

The exterior design was adapted to match the Phoenix range of circulators and the unit interior features innovative technological advances.

- Digital temperature value settings with a resolution of 1/10 °C
- Adjustable high- and low-limit temperature alarm values
- Temperature accuracy ±0.1 °C for TC100/200, ±0.15 °C for TC300/400/500
- Adjustable pump pressure with integrated pressure gauge
- Tank isolation valves for use in closed loops
- Integrated particle filter
- Direct filling level control by transparent reservoir tank

Advanced Version

The units are additionally available equipped with a special safety and communication package that further increases the application spectrum.

Equipped like the standard version, but with special security and communication package (alarm for low level and low flow, Pt100 sensor connection for external temperature control, RS232C-interface and 24V connector).

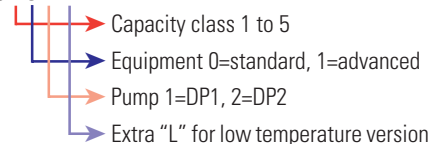
Accessories

UWK/Kryo-Thermat accessories cannot be used completely. Full details of the new accessories are detailed in the brochure.

Model Type Names

Name:

TC101 L



Which TC is substitutes the UWK and Kryo-Thermat?

TC-models are equipped with 300 to 600 W more cooling capacity than the old models. The high-capacity recirculators TC400 and TC500 are new.

Old Pump	BP1	BP2	TP1/TP2
UWK45	TC101	TC101	no real alternatives for water recirculators with pump types "TP" (low pressure, high flow) are available
UWK90	TC201	TC202	
UWK140	TC301	TC303	
KT45	TC111 or TC111 L	TC111 or TC111 L	available
KT90	TC211 or TC211 L	TC212 or TC212 L	
KT140	TC311 or TC311 L	TC312 or TC312 L	

More Info? Send an Email to info@rheologysolutions.com and Quote No: 80

The TC-Line



The TC Line of Water Recirculators

Cooling Capacity: 5 capacity classes

Model type	Cooling capacity at 20°C
TC 100	900 W
TC 200	1300 W
TC 300	2450 W
TC 400	3700 W
TC 500	4900 W

The user can choose between 5 different unit types (TC100 to TC500) with power capacities between 900 and 4900 watts cooling capacity enabling the selection of the suitable cooler for the respective application.

2 different Pump Capacities

Pump Type	Max. Flow	Max. Pressure
DP1	5.3 L/min	4 bar
DP2	12.5 L/min	4 bar

The water recirculators are available with two different pump capacities

- DP1 can be used with the TC100, TC200 and TC300
- DP2 is available for the TC200, TC300, TC400 and TC500.

Two Temperature Ranges

- Standard range +5 °C to +35 °C
- Low temperature range -15 °C to +35 °C

A standard version with a temperature range of +5 to +35°C is available for the most common application of replacing expensive tap water cooling. A special low temperature version for temperatures of down to -15°C also enables operation below 0°C.

Two Equipment Packages

Standard Version

The main highlights include the LED display for easy operation and the integrated manometer, which shows at a glance if the connected system is operating correctly. The water recirculators can be easily filled via an opening at the top and, thanks to new technological advances, it only requires two litres of cooling liquid.



Display of the TC-line

Enter the Young Scientists Award 2002

Thermo Haake is pleased to present in 2002 the "Young Scientists Award".

With this award, young academics are encouraged to present their application oriented research work. This award is open to all young scientists (at the beginning of their careers or with less than five years experience) worldwide who are either in academic or industrial careers within the sphere of material characterization.

From February to August 2002, participants are invited to submit their scientific papers. An international jury board and experienced scientists from industrial environments will select the most innovative contributions.

The winners will be invited to give a plenary lecture at RheoFuture, the international forum for material characterization, in Karlsruhe, December 2-3, 2002. The papers of all candidates will be published in the RheoFuture proceedings and on the internet.

More Info? Visit www.rheofuture.de > Young Scientists Award 2002

Looking for Application Information?

Thermo Haake provides application support worldwide. If you would like to discuss your particular application and find out where Thermo Haake can offer technical product support contact your local distributor or Email info@rheologysolutions.com

Reader Comments

Contributions to this newsletter are welcomed. Please send an Email to info@rheologysolutions.com

Application Articles & Technical Papers

Vane Sensor System in Small Strain Oscillatory Testing

Silvara Junus¹ and Jenni L. Briggs²

To overcome difficulties (slip, sample disturbance) associated with traditional sensors, a semi-empirical method was developed to allow the use of a four bladed vane sensor in small strain oscillatory testing. It was assumed that the vane sensor acted as a bob with an acting radius, R_v , different from the actual radius of the vane (0.02005 m). To solve for R_v , the complex modulus obtained using a concentric cylinder sensor from reference viscoelastic fluid, was set equal to the complex modulus equation for vane sensor. R_v values were grouped into three phase shift ranges from 5° to less than 16°, from 16° to less than 60°, and from 60° to 90° and they were 0.01883, 0.01869, and 0.01850 m, respectively. These values were used in the calculation of viscoelastic properties of eight commercial food products, which resulted in complex modulus values within 15% of those obtained using a concentric cylinder sensor.

Results showed that this particular vane and cup system can be used to directly measure the storage and loss moduli of viscoelastic material and phase shift within the upper frequency value of 6.28 rad/s. Above 6.28 rad/s, there is an inconsistency in phase shift angles measured using vane method.

This method is ideal for testing thixotropic food systems because disturbance is minimal during sample loading, giving more accurate viscoelastic measurements.

¹ Department of Agriculture & Biosystems Engineering

² Department of Food Science & Human Nutrition
Iowa State University, Ames, USA

More Info?

To receive a copy of this article Send an Email to info@rheologysolutions.com and Quote No: 81

Laboratory Evaluation of In-Situ Gelled Acids for Carbonate Reservoirs

KC Taylor, SPE, and HA Nasr-EI-Din, SPE.

Sauid Armaco

This paper was prepared for presentation at the 2001 SPE (Society of Petroleum Engineers) Annual Technical Conference and Exhibition held in New Orleans, Louisiana, 30 September – 3 October 2001

Three different commercial formulations (A, B, C) of in-situ gelled acids are compared in detail at temperatures up to 150 °F and at acid concentrations from 5 to 20 wt% HCl. In-situ gelled acids are claimed to work by a gelation mechanism that occurs at the rock surface as the acid is neutralised. These acids contain a polymer, a crosslinker, and a breaker in addition to other additives. Detailed viscosity measurements of each in-situ gelled acid were made as a function of pH. A new experimental procedure was developed to partially neutralize the in-situ gelled acid, and then the viscosity was measured as a function of shear rate in the range 1 to 3000s⁻¹. Relative reaction rates were compared at 100 °F. Coreflood experiments were conducted with small acid volumes so that injectivity could be measured before acid breakthrough occurred.

In-situ gelled acids significantly retard the rate of acid reaction with reservoir rock. Results showed that acids B and C had similar behaviour. Results showed that only with acid C was significant viscosity maximum occurred at a value of approximately 2.2 with 5 wt% HCl at 100 °F. In the absence of breaker and cross linker, acids A and B were very similar, while acid C showed as little as a tenth of the viscosity at low shear rates. Coreflood experiments showed that in some cases, the in-situ gelled acids irreversibly reduced the permeability of reservoir rock.

More Info?

To receive a copy of this article Send an Email to info@rheologysolutions.com and Quote No: 82

Rheological Behaviour of Automotive Paint Systems ...

Modern characterization methods shows good correlations to observable effects.

Michael Osterhold

Dr Michael Osterhold, born in 1959, read physics at Ruhr University, Bochum, Germany. Since the beginning of 1989 he has been working with the research department of DuPont Performance Coatings, formerly Herberts, in Wuppertal, where he is head of the Central Physics & Quality Testing Department.

In this paper the most important measuring methods for studying the rheological behaviour of modern paint systems (oscillation tests, determination of low yield points) are described. These methods were at first used to describe the rheological/physical properties of model polyurethane microgels. The measured values for storage modulus, phase shift and yield point in waterborne pearlescent/coloured pigment systems were compared with flop-index values.

The results show good correlations between the observable effect and the rheological parameters of the liquid paint. Also measurements of powder and electrodesposition coatings and clearcoats with the oscillation technique to determine the viscosity-temperature behaviour correlate well with technical properties of the final films.

In view of the increasing use of modern paint systems (eg. waterborne basecoats or powder coatings) their physical/rheological characterization is becoming more and more important to guarantee a constant product quality and to develop new products.

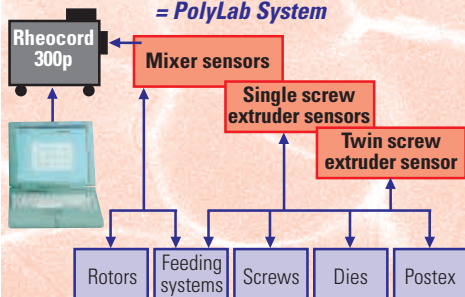
More Info?

To receive a copy of this article Send an Email to info@rheologysolutions.com and Quote No: 83

Characterisation of PVC Compounds using the PolyLab System

The PolyLab System is a torque rheometer that consists of a drive unit where the different measuring sensors are connected. Torque rheometers are scaled-down production machines that are equipped with measuring sensors like an exact torque sensor, mass temperature sensors and mass pressure sensors.

Rheocord 300p + Mixer/Extruder sensor = PolyLab System



Utilising the **Laboratory Mixer** with the PolyLab System will provide information about:

- the melting behaviour,
- the viscosity behaviour
- and the degradation behaviour of the sample.

By comparing different rheograms the effects of production and quality variations, changes of recipes and the effects of additives on a product can be tested.

More Info?

Send an Email to info@rheologysolutions.com and Quote No: 84 for information on the PolyLab System and laboratory mixer

The **Laboratory Extruder** can be equipped with pressure sensors along the extruder tube. By comparing pressure profiles along the extruder it can be determined whether a sample melts earlier (higher pressure profile) or later (lower pressure profile). The extrudate can also be utilised for further sample testing.

More Info?

Send an Email to info@rheologysolutions.com and Quote No: 85 for information on the PolyLab System and laboratory extruder

When the extruder is equipped with rheological measuring dies such as slit or rod **Capillary Dies** and a balance in place of profile dies, absolute viscosity data can be determined. These dies provide the data to calculate Shear Stress and Shear Rate. From this the viscosity of the melt can then be calculated. The flow behaviour of the sample being tested under different shear rates can be determined from the viscosity curve.

Quote No: 86 for information on the Capillary Dies

Further information about the processability of the PVC a Laboratory Report detailing the characterisation of PVC compounds is available.

More Info?

Send an Email to info@rheologysolutions.com and Quote No: 88 for a copy of this Laboratory Report

Extruder for Pharmaceutical Applications

The PHARMALAB System ...

Is a GMP standard, stainless steel, bench-top, twin-screw compounding system for the Pharmaceutical Industry with a comprehensive range of purpose built ancillary equipment.



PHARMALAB 16 mm Extruder

- 16mm twin-screw compounder in stainless steel
- Segmented barrel design 25:1 or 40:1 L/D
- Clamped barrel with lift-off opening
- PLC control with hygienic touch screen operator interface
- Recipe storage as standard and data-logging facility
- Strand pelletising with air or water cooling
- Throughputs from 0.5 to 10 kg/h
- Bench and floor mounted change-bowl mixers
- Single and twin screw feeders and liquid metering pumps
- Chill roll or sheet or film options

Applications

- Biomedical polymers
- Melt granulation
- Moisture sensitive products

More Info? Send an Email to info@rheologysolutions.com and Quote No: 89 for The PHARMALAB System

Evaluation of an Instrumented Lab-Scaled Extruder for Melt Extrusion

Incorporation of an active pharmaceutical ingredient (API) in a lipophilic matrix is a well-known way of preparing sub-stained-release dosage forms. To this end, the API is blended with lipophilic excipients and the mixture either directly compressed into tablets or

granulated prior to compression. Melt granulation can be performed either in a jacketed high-shear mixer or in an extruder.

Melt extrusion offers the advantage of a cost-effective, continuous process. Thus, less handling is required during manufacturing. Additionally, melt extrusion is a reproducible process providing uniform embedding of the API in the lipophilic excipients.

Extrusion is a high-throughput operation, however, in early stages of the development of new chemical entities, the availability of the active pharmaceutical ingredient is often limited. There is a need for small-scale extrusion equipment for formulation and process development as well as clinical manufacturing, which allows measurement of process parameters and

monitoring of process conditions by means of sophisticated instrumentation.

An instrumented parallel twin-screw extruder Rheomex PTW16/25p was used for melt extrusion.

More Info? Send an Email to info@rheologysolutions.com and Quote No: 91 for a copy of the Laboratory Report Quote No: 92 for the PolyLab and the PTW16/25p

EUROLAB System

... Intelligent Twin Screw Extruder Ancillaries



EUROLAB 16 mm Extruder

More Info? Send an Email to info@rheologysolutions.com and Quote No: 90 for The EuroLab System

Laboratory Scaled Mixers for Rubber Compound Qualification ... Electrical Conductivity

Laboratory-scaled mixers such as the PolyLab System have been in use in the rubber industry for a long time. They treat small rubber samples and allow the testing of elastomers with respect to their behaviour during mastication and the impact of various compound ingredients and how this changes the processability.

By combining traditional methods with new technologies we have developed a modified laboratory scaled mixer with integrated conductivity sensor.

The conductivity measurements of rubber compounds provide information about the dispersion of carbon black.

High quality standards of Elastomers, their compounds and final products have to be realised at the lowest possible price, because the competitive situation and the requirements have increased during the recent years. This leads to the necessity of optimising the development process from the compound design to the presentation of the new products. As a result more and more manufacturers have started to bring compound-development and processing closer together and are actively looking for methods to link laboratory-scaled test results with production experience.

To meet these requirements test methods and development tools have to be meaningful and process-related. The documentation of test results and the comparison to accepted standards and tolerance levels is a must in order to meet the requirements stipulated by different quality standards like e. g. SPC, ISO 9000.

A test method that provides ideas about how torque rheometer test results can solve production problems is now available.

More Info? Send an Email to info@rheologysolutions.com and Quote No: 92 for a copy of this Test Method.

Quote No: 93 for PolyLab with Electrical Conductivity Sensor.

Editors Note:

There is no guarantee that comments or feedback received will be published. However, we will answer all communications direct.

More Info?

Send an Email to info@rheologysolutions.com and quote the Item no for the section of interest.

Application Note

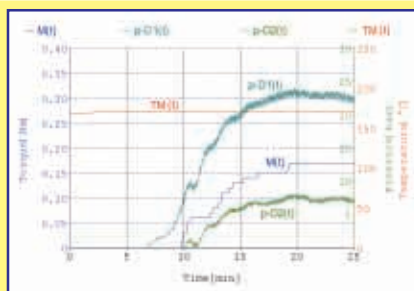
The MiniLab – to monitor reactive systems

The MiniLab combines two areas of application: mixing and rheological recording of melt characteristics. In this application report mixing processes as blending, compounding, and adding of additives are described in detail. As a conical twin-screw extruder with a back flow channel the MiniLab can be operated as a circulation reactor and thus uses the advantages of both extruder and mixer. Co-rotating as well as counter-rotating pairs of screws can be used.

MiniLab as a reactor

Monitoring a reaction over time with the MiniLab is explained. Polymers of organic molecules such as lactic acid can be processed as strong and adaptable implants today. For instance, broken components of bones or missing bone structures can be joined together and replaced by such implants. Inside the body, particular modifications of those materials resolve into their single components that can be brought into metabolism.

The required reaction times can only be reached with difficulties in conventional extruders. By running the reaction mixture (monomer and catalyst) in a circulation loop, the required reaction times can be set. At the end of the test the polymer is extruded as cord. This cord can be used in sample bodies for decomposition tests in different media.



Monitoring the reaction time online, polymerization of L-lactid biodegradable polymers

This shows the graph of the MiniLab monitor software, which has been used for running the test. The reaction starts at 7.5 min with a pressure signal at pressure transducer 1 (p-D1). An increasing torque and pressure signal at the second pressure transducer (p-D2) can be noticed (the back flow channel is now filled completely with polymer). The reaction is finished after 20 min, another increase of torque cannot be noticed. The pressure drop of 15 bar correlates to the viscosity of the melt in the back flow channel.

The graph shows the sensitivity of the instrument. Although torque signal is only about 3% of the whole measuring range (maximum: 5 Nm) and is suitable for

evaluation, the reaction can be monitored with the more sensitive pressure signals. In contrast to conventional glass reactors, the temperature (TM) of the highly viscous melt can also be controlled exactly, because of the large relation of the metal extruder block compared to the small amount of sample. It acts like a heat sink and ensures isothermal test condition.

Summary

In this application note tests are reported which can be run by the basic version of the unit using the standard control panel. Standard polymers can be tested without problems. Powdery fillers and liquids can be used if the filling speed and the loading procedure are optimised in a pre test. Monitoring chemical reactions is also possible. The increase of the pressure signal was found as the most sensitive value. A comparison via a relative viscosity is also possible.

We hope to have given helpful hints, tips and ideas for further work with the MiniLab in this application note.

More Info? Send an Email to info@rheologysolutions.com and

Quote No: 94 for a reprint of this application note

Quote No: 95 for the MiniLab

Meltflixxer^{HT} ... Performing Multiple MVR Measurements

The additional feature of measuring with 3 different weights in the one run is now achievable.

To perform multiple MVR measurements with one amount of sample the following items are required:

- Meltflixxer^{HT}
- Decreasing weight magazine option
- Meltflixxer 2000 software V4.6

A document is now available which describes how to prepare the software Meltflixxer 2000 to perform measurements with the Meltflixxer^{HT} automatic weight magazine option.

More Info? Send an Email to info@rheologysolutions.com and

Quote No: 96 for a copy of this How To Perform Multiple MVR Measurements Method.

Quote No: 97 for Meltflixxer^{HT} and Meltflixxer 2000 Software set up in Page Maker.