



## The Rheology Workshop 23rd - 24th November 2011

The workshop is aimed at those who are either new to rheology or those that have been involved for some time and would like to learn more about this fascinating subject. The workshop will involve seminars covering both theoretical and practical aspects of rheology as well as practical and informal sessions. A programme for the meeting is shown on the following pages.

Our aim is that, by the time you leave the rheology workshop you will be able to :

- Understand the basic theory associated with rheology.
- Design meaningful experiments to characterise your materials.
- Appreciate the potential problems and pitfalls in making a measurement.
- Interpret the resulting data.

Delegates will also receive a copy of the "Rheology Handbook" which is a practical guide to rheology written by course leader Dr. Thomas Mezger.

The workshop will be held at the University of Bradford , which is situated just outside Bradford city centre and is convenient for road, rail and Leeds/Bradford airport.

Places will be limited to ensure a good ratio of delegates to tutors during the workshop.

To reserve your place please complete the following form and fax to our office in Hertford.

(Places can be secured by either including an order number below or by sending a cheque to Anton Paar Ltd.).

**Steve Goodyer**

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Name : ..... Company : .....

Address : .....

Postcode: .....

Telephone : ..... Email:.....

Please reserve me a place on the 2011 Rheology Workshop as detailed below :

- Day delegate rate  
(includes course, book, lunches + coffee/tea in mornings and afternoons) **£399 +VAT**
- 24 hour delegate rate  
(as above plus evening meal on 22/11 and 23/11 plus 2 nights accommodation) **£599 +VAT**

Order Number.....

Will send cheque payable to Anton Paar Ltd. ( )

Anton Paar Ltd | Tel: 01992 514730 | Fax: 01992 514739 |

13 Harforde Court | John Tate Road | Foxholes Business Park | Hertford SG13 7NW



## Seminar Programme 23rd November 2011

|               |  |
|---------------|--|
| 9:00 h        | <b>Rheology</b><br><b>Part 1: Viscous materials</b><br>- definition of the terms: shear stress / shear rate / shear viscosity<br>- law of Newton<br>- shear load dependent flow behaviour of viscous fluids:<br>ideal viscous behaviour (according to Newton),<br>shear-thinning (pseudoplastic), zero-shear viscosity |
| 10:30 h       | Coffee break   |
| 10:45 h       | shear-thickening (dilatant),<br>yield stress (applying the shear load in form of a ramp)   |
| 11:45 h       | short break (5-minutes)  |
| 11:50 h       | - time-dependent flow behaviour:<br>structure decomposition and recovery ("thixotropy"),<br>gelation, hardening, curing<br>- temperature-dependent flow behaviour:<br>heating, melting, hardening, curing process  |
| 12:30 h       | Lunch time 1   |
| 13:30 h       | <b>Rheometry</b><br><b>Part 1: Viscous fluids</b><br>- rotational tests: controlled shear rate (CSR), controlled shear stress (CSS)<br>- measuring systems (cylinder, cone-and-plate, parallel-plate, special geometries)  |
| 14:30 h       | Coffee break   |
| 15:00 h       | <b>Practical work</b><br>- flow and viscosity curves (CSR and CSS)   |
| about 17:00 h | End of the seminar   |

  

|         |                                   |
|---------|-----------------------------------|
| 19:30 h | Course Meal for 24 hour delegates |
|---------|-----------------------------------|



## Seminar Programme 24th November 2011

|               |  |
|---------------|--|
| 8:30 h        | <b>Rheology</b><br><b>Part 2: Viscoelastic materials</b> <ul style="list-style-type: none"> <li>- definition of the terms: deformation (strain) / shear modulus</li> <li>- law of Hooke</li> <li>- shear load dependent deformation behaviour of viscoelastic materials: VE-fluid according to the Maxwell model, VE-solid according to the Kelvin-Voigt model</li> </ul><br><b>Rheometry</b><br><b>Part 2: Viscoelastic materials</b> <ul style="list-style-type: none"> <li>- Creep test (shear stress step), creep compliance</li> <li>- Relaxation test (shear strain step), relaxation modulus, relaxation and retardation time spectrum</li> </ul> |
| 10:00 h       | Coffee break   |
| 10:15 h       | <ul style="list-style-type: none"> <li>- Oscillatory tests: <ul style="list-style-type: none"> <li>- definition of the terms: storage modulus / loss modulus / loss or damping factor, complex viscosity</li> </ul> </li> <li>- Amplitude Sweep, linear viscoelastic (LVE) range</li> </ul>  |
| 11:15 h       | short break  |
| 11:30 h       | <ul style="list-style-type: none"> <li>- Frequency Sweep</li> <li>- time-dependent behavior: structure decomposition and recovery ("thixotropy"), gelation, hardening, curing process</li> </ul>   |
| 12:30 h       | Lunch time   |
| 13:30 h       | <ul style="list-style-type: none"> <li>- temperature-dependent behaviour: glass-transition, melting, crystallization, freezing temperature, gelation, hardening, curing, sol/gel temperature</li> </ul><br><b>Application examples</b><br><b>Discussion</b>  |
| 14:30 h       | Coffee break   |
| 14:45 h       | <b>Practical work</b> <ul style="list-style-type: none"> <li>- Oscillatory tests, creep and relaxation tests</li> </ul>  |
| about 16:30 h | End of the seminar   |