ADVANCED AIR BEARING RHEOMETER SYSTEM

Advanced Air Bearing Rheometer Bohlin Gemini 2 (Malvern Instruments, UK) is used for scientific research related to the rheology of materials. Attachments available with the Rheometer are (i) Compressor with Air Drier (ii) External Temperature Controller (iii) Liquid Nitrogen Unit (iv) High Pressure High Temperature Controller.

ADVANCED AIR BEARING RHEOMETR

Features of Rheometer:

Bearing Type: Antifriction Low Inertia air bearing with Torque measuring facility.

Torque Range: Minimum 0.05 µNm ; Maximum 200 mNm.

Torque Resolution: 1nNm at the lowest torque.

Angular position resolution: 50 nrad.

Rotational speed range: Minimum 10^{-7} rpm ; Maximum 3000 rpm.

Temperature Range: -150C to 550C

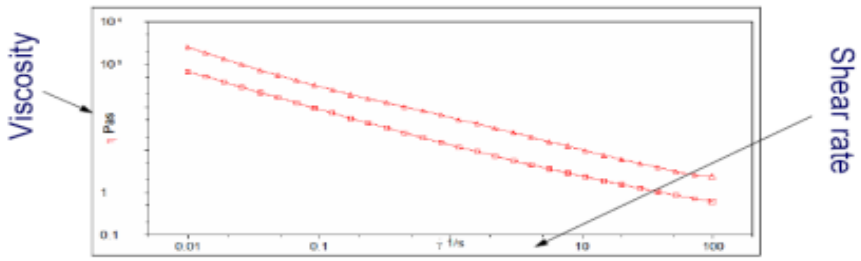
Pressure Range in High Pressure Cell: Upto 300 bar

Different Modes:

A. Viscometry Mode:

Viscosity values at different shear rates, shear stress at different temperature can be determined.

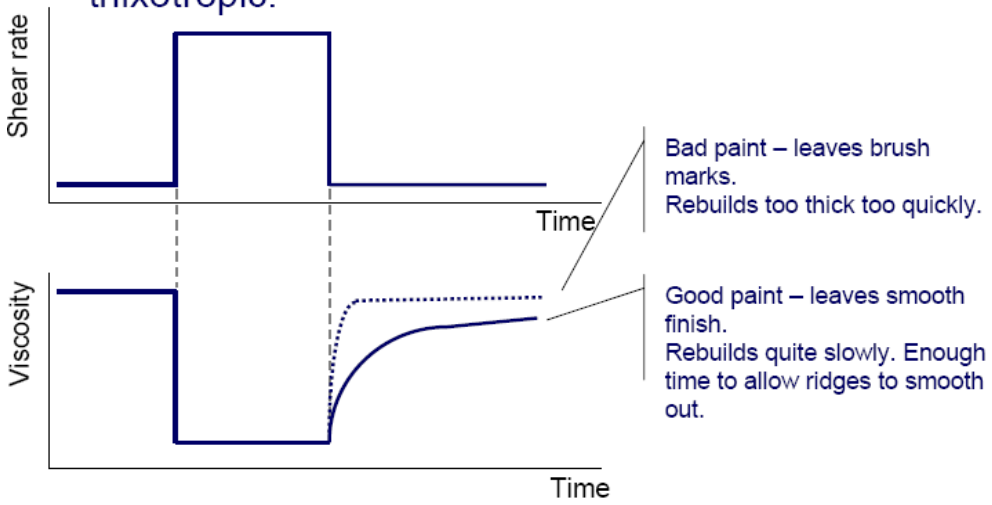
- Two different hand creams.



VISCOSITY TEST

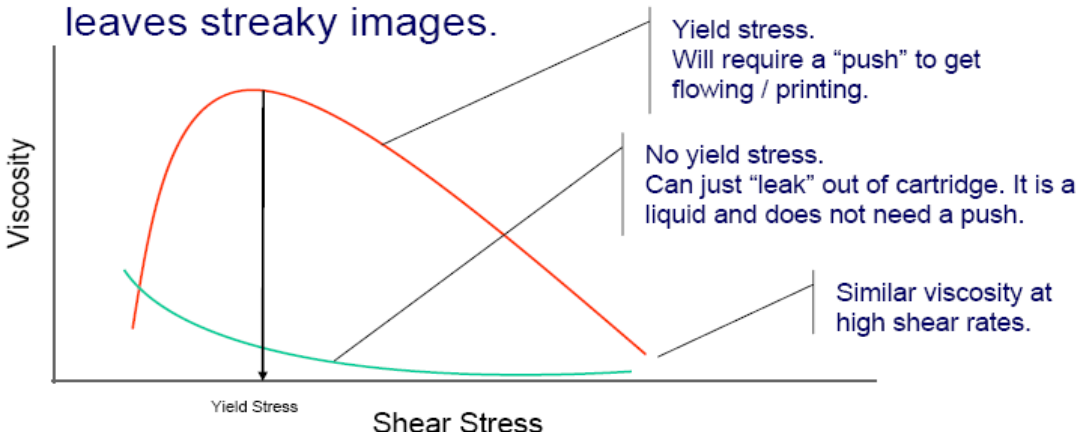
- One sample is four times thicker than the other!
- Really means different customer perception…

- Two samples… one very thixotropic, one not so thixotropic.

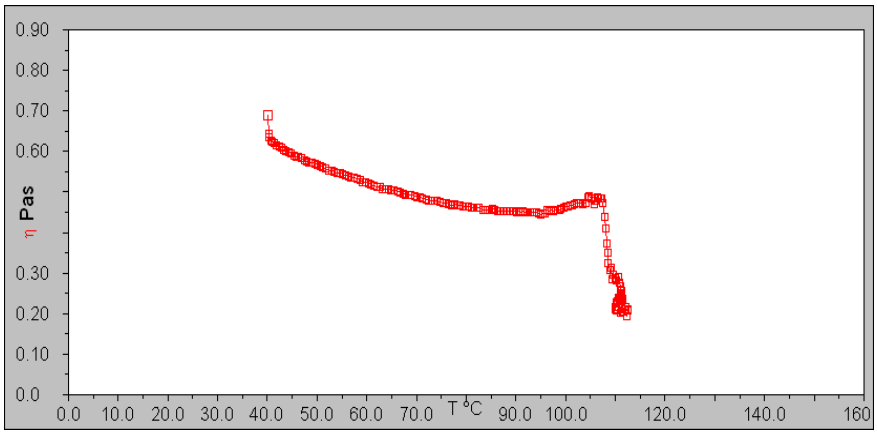


THIXOTROPY TEST

- The peak is the force required to go from solid to liquid.
- For example ink jet inks – one good, the other leaves streaky images.

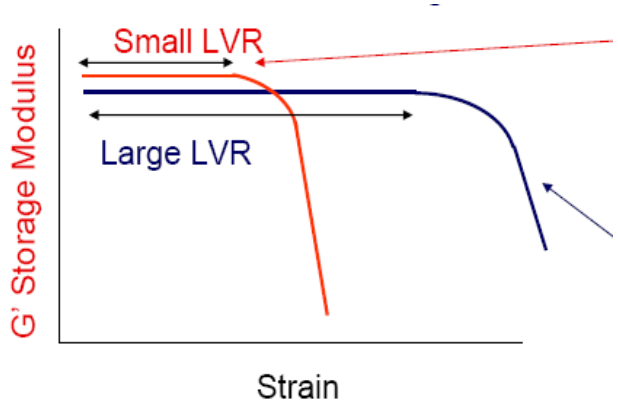


YEILD STRESS TEST

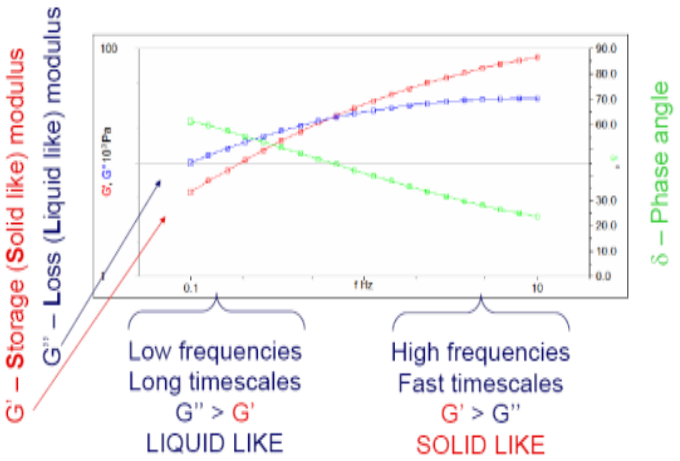


TEMPERATURE SWEEP TEST

B. Oscillation Mode: Complex Modulus values (G' and G") can be recorded at different strain, frequency and temperature.

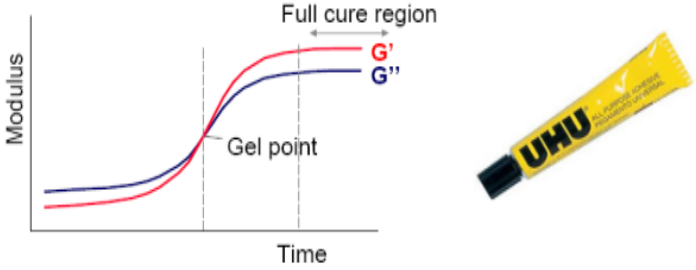


AMPLITUDE SWEEP



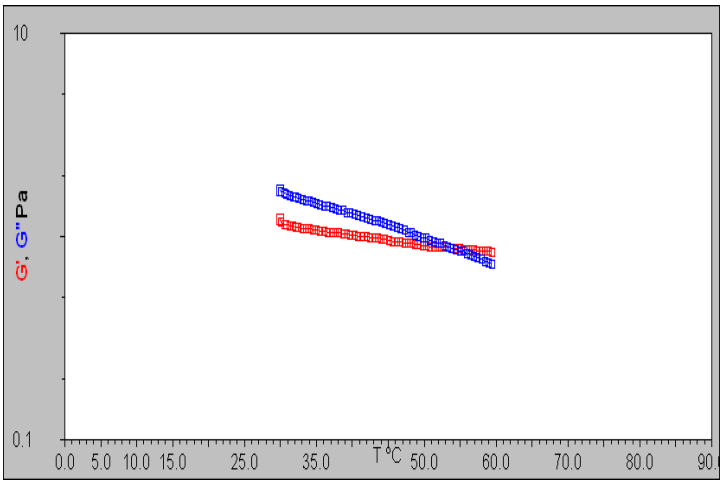
FREQUENCY SWEEP

- Characterises how a glue sticks.



- Viscously dominated at the beginning – easy to apply.
- Elastically dominated at the end to bond strongly.

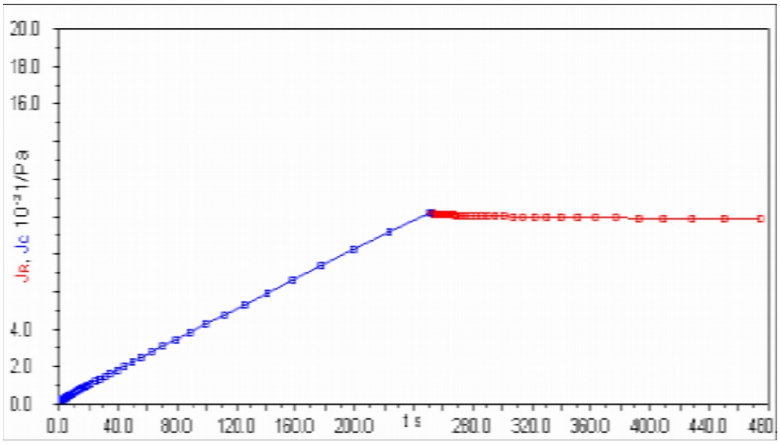
TIME SWEEP

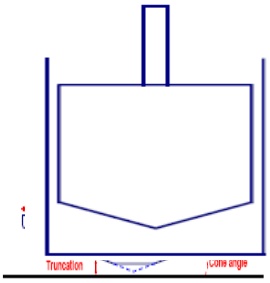


TEMPERATURE SWEEP

C. Creep/Creep Recovery Mode:

Viscoelastic nature of the sample can be studied using Creep Test

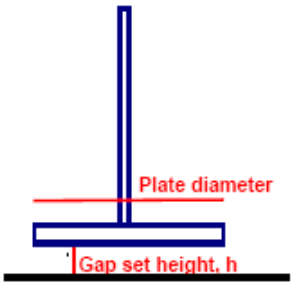




CREEP TEST

Different Measuring Geometries:

Parallel Plate (e.g ETC PP 25; ETC PP 08)
Used for any gel samples with viscoelasticity



Cone and Plate (e.g ETC CP 2.5/25mm; ETC CP 2.5/15mm)
Used for any gel samples with viscoelasticity

Cup and Bob
Used for liquid samples with Newtonian & non-Newtonian behavior