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labtech solutions

high measuring accuracy in emulsification testing

automatic adjustment of the gap between propeller spindle and cup bottom

fast and accurate water balance test method for lithographic inks

automatic emulsification tester

LITHOTRONIC IV

better lithographic inks by emulsification testing

Introduction

Many printing problems are associated with the ink/water balance on the press. Ideally the fountain solutions keep non-image areas totally free from ink in order to obtain a clean print. However, excessive ink/water emulsification can affect ink properties and cause loss of image sharpness and colour, reduced transfer, misting and poor setting. The LITHOTRONIC IV high speed emulsification tester is the first computer controlled testing device for accurate determination of the emulsification behaviour of lithographic inks and raw materials used for these inks.

Emulsification testing of

- sheetfed inks
- heatset inks
- UV offset inks
- newspaper inks
- solvent-based binders
- fountain solutions

Features

- high measuring accuracy in emulsification testing: 1% in intra-laboratory and 2% in inter-laboratory accuracy
- results show a fingerprint of ink behaviour as the test results provide information on max. Amount of water uptake, rate of water uptake, emulsion stability and emulsion quality
- accurately controlled test conditions such as shear rate, temperature and amount of water
- automatic adjustment of the gap between propeller spindle and cup bottom
- powerful thermoelectric cooling system based on Peltier technology
- test method requires only 25 grams of ink and requires very little cleaning
- fast and accurate test method for lithographic inks; data acquisition and data evaluation supported by powerful Windows based software
- torque calibration with reference oil can be carried out by the user

Typical applications

- development of new ink formulations
- selection of the correct fountain solution and/or reduction of IPA
- quality assurance in ink manufacturing
- trouble shooting of printing problems
- rheological characterization of ink and varnish emulsions
- study the effect on ink viscosity by adding UV initiators, monomers, oligomers and emulsifiers
- testing of different solvents such as mineral oils, vegetable oils or blends
- study of shear thinning or thickening of inks and emulsions

Description

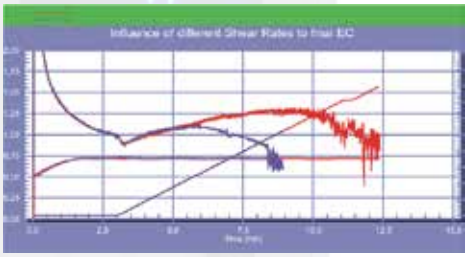
In principle, the high speed LITHOTRONIC IV emulsification tester acts like a controlled shear rate rotational viscometer. It offers viscosity measurement at controlled shear, temperature and water content. A built-in microprocessor controls all functions and automatically captures and transfers measured data to a computer. A typical result from the LITHOTRONIC is a plot with up to 4 different parameters versus time:

- Torque curve
- Emulsion-Capacity curve
- Standard-Deviation curve
- Temperature curve

After preconditioning, fountain water is automatically dispensed into the ink sample in the cup. The flow rate can be adjusted over a wide range by the operator. A precision propeller spindle, which is automatically adjusted to provide an accurate gap between the spindle and the bottom of the cup, is used as a torque sensor. The three blades of the spindle are set to an angle of 10° to produce a torque that is proportional to the shear stress in the test sample. The rotational speed can be varied from 0 to 2800 rpm which corresponds to a max. shear rate of 0-6000/s at a standard gap of 1 mm.

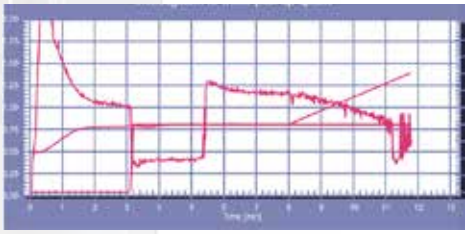
EC-Test Method

The max. amount of water that an ink can absorb divided by the weight of the sample is the emulsification capacity of an ink. In the EC-test method water is titrated into the sample under controlled conditions. The flow rate can be varied between 1 and 10 g/min. At the EC-point the torque will dicrease rapdily and the corresponding increase if the standard deviation can be used to stop the test automatically.



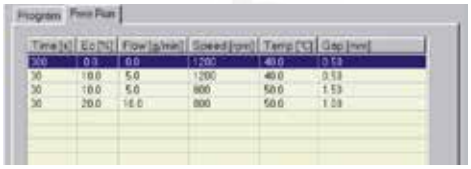
S-Test Method

The S-test method complies to the Surland method. The LITHOTRONIC III instrument has been equipped with a motor driven precision syringe with a large dispension range of 1-100g/min. The piston is made of durable ceramic material. By dispensing a large amount of water into the sample the torque reduces suddenly (water shock). The time until the torque recovers is an indication for the water absorption rate of the sample.

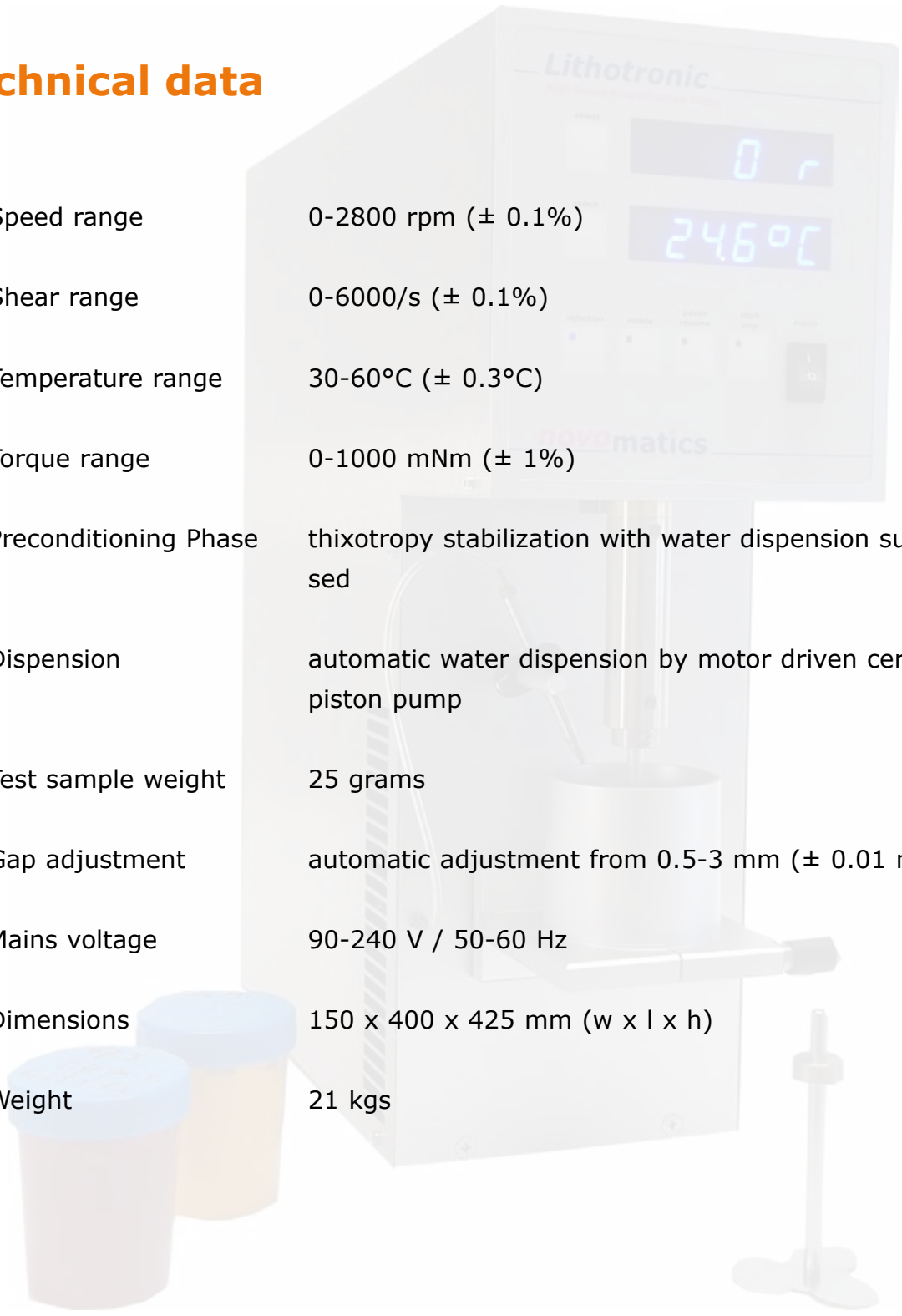


Free run program

The LITHOTRONIC is fully controlled by Windows software with measuring and plotting programs matched to applications in both printing ink laboratories and at printing presses. The measurement results are presented as an on-line curve. An overlay function is included with the possibility to compare curves and insert a standard curve of a reference ink-water sample for quality control applications.



Technical data



Speed range	0-2800 rpm (± 0.1%)
Shear range	0-6000/s (± 0.1%)
Temperature range	30-60°C (± 0.3°C)
Torque range	0-1000 mNm (± 1%)
Preconditioning Phase	thixotropy stabilization with water dispension suppressed
Dispension	automatic water dispension by motor driven ceramic piston pump
Test sample weight	25 grams
Gap adjustment	automatic adjustment from 0.5-3 mm (± 0.01 mm)
Mains voltage	90-240 V / 50-60 Hz
Dimensions	150 x 400 x 425 mm (w x l x h)
Weight	21 kgs

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