Counterrotating Set-up

The counterrotating is a special designed rheometer by Paar Physica, based on the MCR and DSR 300, with two rotating drives instead of one. A stereomicroscope and a camera, with some complementary optical components, are also installed so observations in a stationary plane (because of the counterrotating drives) in a shear flow can be made.

Geometry

There is a parallel plate geometry available made of glass (∅ 50). Because measurements are made with gap widths of only a few 100 µm to as much as 5 mm, a cup which surrounds the bottom plate and holds the sample in place has been made.

Temperature control

The set-up is located in an air-thermostated room so temperature can be controlled.

Specifications rheometer

The specifications of the MCR 300 and DSR 300 units are given elsewhere. The software is based on the usual US 200 software, modified to operate for both MCR and DSR at the same time.

The microscope and camera

The microscope is a WILD M5A stereomicroscope. A stereomicroscope is necessary for the long working distance. The camera is a BASLER A301fc color camera. StreamPix software makes it possible to control the camera and make digital pictures. The microscope can practically be used to observe particles as small as 10 µm. The set-up is as such that observations in the velocity gradient as well as in the vorticity plane can be made.

Typical measurements

Measurements of drop deformation in steady shear flow, or during start-up or relaxation, in various media; solid particle rotations in various media; hydrodynamic interactions between two particles; drop dynamics in confinements; migration effects,... can be made with this set-up.

Due to the good control one has over the rotation speed and gap width between the plates, accurate quantitative measurements are possible with a wide variety of conditions.