

Drop Shape Analyzer DSA100HP



Drop Shape Analyzer – DSA100HP
(DSA100HP690 configuration)



Wetting and surface tension under extreme pressures and temperatures

The Drop Shape Analyzer – DSA100HP is our high-quality solution for the precise measurement of contact angle as well as surface and interfacial tension under high pressures and temperatures, primarily for tertiary oil recovery. The DSA100HP combines the Drop Shape Analyzer – DSA100 for optical drop shape analysis with a measuring cell for high-pressure applications up to 1750 bar. It determines the surface tension and analyzes the wetting of oil-bearing rock by surfactant solutions under the extreme pressure and temperature conditions found in reservoirs. The results help in the extraction of oil from layers of rock in the most effective manner using enhanced oil recovery (EOR) methods such as steam or surfactant flooding and thereby increase the yield. The instrument also reliably measures the wettability of gases which liquidize under pressure, for example for the optimization of extraction processes with carbon dioxide.

Tasks and applications

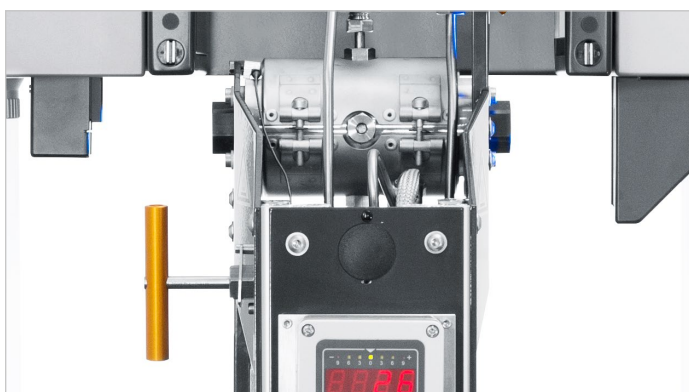
- Surface tension of flooding solutions and their interfacial tension with oil under reservoir conditions
- Wettability and extraction of oil from oil-bearing rock
- Pressure extraction by means of liquefied gases, e.g. carbon dioxide
- Development of surfactants for liquid gases
- Optimization of hydrogen storage

Measuring methods and options

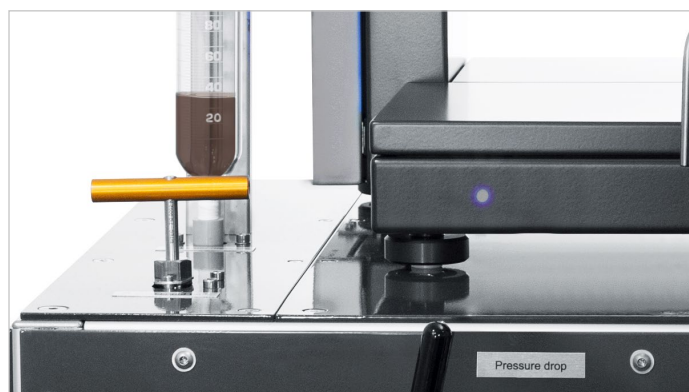
- Contact angle measurement using a sessile drop
- Surface tension of a liquid in gas or interfacial tension between two liquids using a pendant drop
- Upside-down pendant drop measurement of an oil drop in water
- Measurements at pressures up to 1750 bar and temperatures between -10 and 250 °C

Versatile options for dosing and measuring

With the aid of the dosing units of the DSA100HP, the drop liquid and the surrounding phase easily reach the inside of the high pressure cell. Rock samples can be positioned from the outside to measure the wettability at different positions while maintaining the pressure. The flexible design also allows contact angle measurements in a surrounding liquid phase. Precise temperature control up to 250 °C is achieved by means of an electric heater.



Sample positioning with closed pressure chamber.



Either a gas or a liquid can be added as surrounding phase.

Reliable drop shape analysis thanks to high imaging quality

The DSA100HP features a high-resolution camera and a quality zoom lens for accurate display of the drop with optimum size. The high image quality that this achieves leads to a precisely measured contact angle or surface/interfacial tension. Combined with the intelligent image evaluation algorithm of the ADVANCE software, drop shape analysis with the instrument provides exact results.

Specifications

Camera system

Connection	USB 3.0
Performance	CF04: 2.3 Mpix, up to 2300 fps CF10: 5.3 Mpix, up to 3450 fps

Optics

Zoom	7× zoom, manual
------	-----------------

Pressure control

Maximum pressure	40 to 1750 bar (580 to 25 000 psi)
------------------	------------------------------------

Temperature control

Range	up to 250 °C
-------	--------------

Pressure chamber

Material	stainless steel, Hastelloy®, or Inconel®
----------	--

Contact angle

Range	0 to 180°
Resolution	0.01°

Interfacial and surface tension

Range	0.01 to 2000 mN/m
Resolution	0.01 mN/m