

HPHT 3-Phase Separator

The M9103 HPHT 3-Phase Separator is a high-precision video separator designed to segregate and measure the volumes of gas, oil, and water produced during core flooding experiments. It is specifically engineered to operate under high-pressure, high-temperature (HPHT) conditions that mimic actual reservoir environments.

Theory of operation

When using the M9103 HPHT 3-Phase Separator with a core flooding system, the gas-oil-water mixture from the core sample flows into the main cylinder, where gravitational forces separate the phases: gas rises to the top, oil occupies the middle, and water settles at the bottom. The fluids then enter a visualization cell featuring a sapphire tube with open slots in the metal jacket for clear observation. The tube's narrow diameter facilitates rapid phase separation and the formation of sharp interfaces.

The entire assembly is housed within a temperature-controlled oven. A high-resolution camera automatically measures the height of each layer in the visualization cell, enabling the system to calculate the precise volume of each phase. This configuration allows for continuous, non-intrusive monitoring of fluid volumes under in-situ pressure and temperature conditions without interrupting flow.

Specifications

- Maximum temperature: 302°F (150°C)
- Maximum pressure: 10,000 psi
- Phase volume change: 100 ml
- Phase volume resolution: 0.01 ml
- Wetted materials: Stainless Steel or Hastelloy
- Viewing cell material: Sapphire
- Include lighting and high-resolution camera included
- Temperature controlled oven with camera viewing window available upon request



*M9103 HPHT 3-Phase Separator's
cell assembly*

Operational features

- Separates two fluids and a gas through a gravity-based high-pressure separator.
- The implementation of 4K high-resolution imaging to monitor the column of produced fluids facilitates precise meniscus detection and accurate determination of volume fluctuations.
- Complete visibility of the produced phases permits the simultaneous acquisition of phase volume data and real-time imagery of water/oil and oil/gas interfaces. Consequently, empirical images can be cross-verified against calculated datasets.
- The separator is a compact instrument optimized for installation within core flooding air baths.