

Gas Condensate Well Deliverability Prediction

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The flow of gas and condensate in reservoirs has been studied at Heriot-Watt University since 1986, using flow visualisation, core tests, mathematical modelling and numerical simulation. Our current research efforts are concentrated on development of efficient and reliable methodology for estimating/improving the productivity of a gas-condensate well over its production life.

A generalized gas-condensate relative permeability correlation has been developed, which is based on relative permeability ratio and not the conventional fluid saturation, hence, suitable for near-well pseudo-pressure calculations. The correlation that accounts for the inertial and coupling effects does not require any measurements at reservoir conditions as its parameters are either universal or can be determined from petrophysical measurements. The correlation provides reliable estimates for the rock matrix as well as propped fractures, as evaluated by comparing the predicted values with measured data in this laboratory. A mathematical model describing gas-condensate flow in perforated regions has also been developed and applied to generate flow data, which have been used for developing mechanical and two-phase skin factor correlations. These correlations will help the engineer to simulate the well performance without a need for explicit and expensive fine-grid reservoir simulation or complex core flow measurements.

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