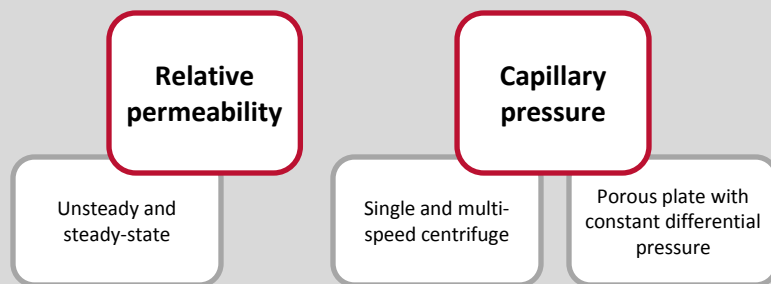


Sendra is a two-phase core flow simulator based on the black oil model, specially designed to replicate and verify SCAL experiments. Sendra determines relative permeability and capillary pressure for a well or field through an automated history matching approach, referred to as estimation.

POWERFUL ANALYSIS TOOL

Sendra estimates and makes recommendations for all standard flow scenarios performed in the laboratory based on core sample properties and standard flow correlations. Using Sendra to simulate time consuming lab analysis, reliable data can be acquired in a fraction of the time and be used for designing the actual experiment.

Estimated SCAL Experiments



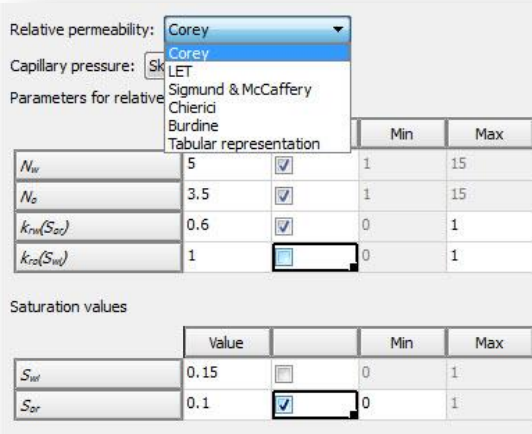
Using estimated data, Sendra is optimized for:

- Quality control and verification of experimental data and analysis
- Recommendations for the flow properties for field applications
- Planning tool for experiment design

IMPROVED USABILITY

Sendra is Windows based and incorporates a hierarchical structure allowing for several core samples and experiments to be used within the same project. Sendra can be used to perform single experiments or utilized for an entire project.

Shown are the standard relative permeability correlations included in Sendra.



The screenshot shows the software interface for setting relative permeability and capillary pressure. A dropdown menu for 'Relative permeability' is open, showing options: Corey, LET, Sigmund & McCaffery, Chierici, Burdine, and Tabular representation. The 'Corey' option is selected. Below, a table lists parameters for relative permeability with their values and checkboxes for Min and Max.

Parameter	Value	Min	Max
N_w	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
N_o	3.5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
$k_{rw}(S_{or})$	0.6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
$k_{ro}(S_{wi})$	1	<input type="checkbox"/>	<input type="checkbox"/>

Below this, 'Saturation values' are set in another table:

Parameter	Value	Min	Max
S_{wf}	0.15	<input type="checkbox"/>	<input type="checkbox"/>
S_{or}	0.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>

ESTABLISHED INDUSTRY SOFTWARE

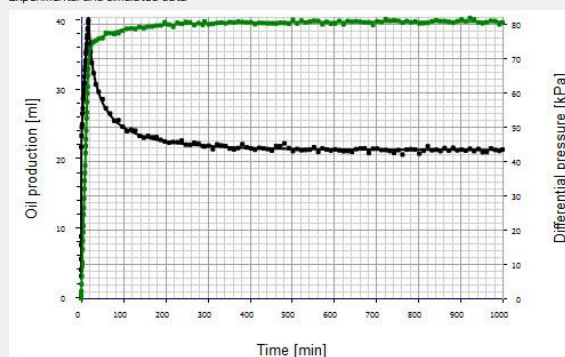
Sendra has been developed and tested with collaboration from the petroleum industry and leading universities over the past 20 years. These partnerships have provided recommendations and key insights, leading to the creation of state-of-the-art software preferred among the petroleum industry and education system alike.

Sendra is fully tested and consists of an optimization routine which has been extended for comparison and recommendations of flow properties for field applications using a well designed plotting feature.

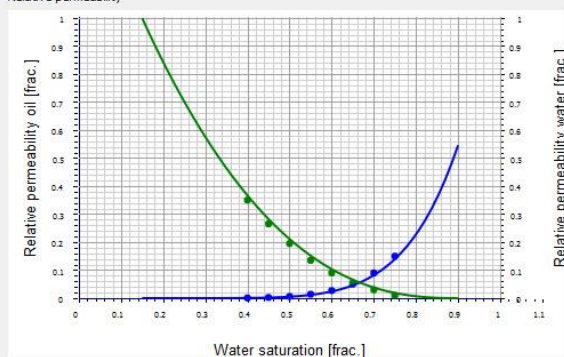
SYSTEM FEATURES

- **Step-by-step wizard** – set up projects with ease
- **Quick estimation of experiments** – Results in a matter of minutes
- **Powerful graphing tool** – Advanced options produce a variety of graphs and allow for side-by-side comparison
- **Store multiple experiments in one file** – Maintains integrity of larger projects
- **Possible for database integration** – Easily import and export data

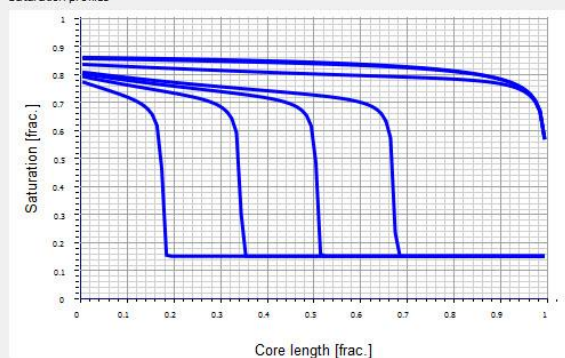
Experimental and simulated data



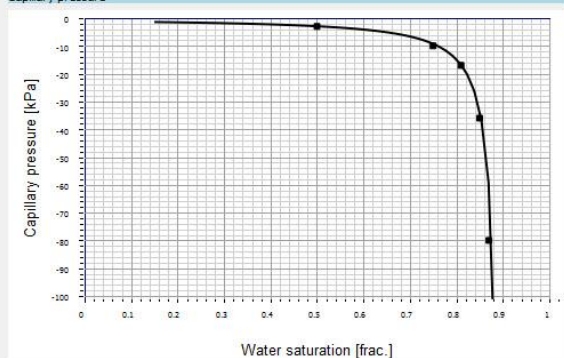
Relative permeability



Saturation profiles



Capillary pressure



Advanced Plotting Package

Shown here are the most common graphs in an unsteady-state, relative permeability experiment. Depending on what type of experiment is performed, other combinations of the data are viewed (e.g. injection rates vs. time).

Sendra can display up to six graphs at a time for reviewing and comparing results. During the optimization routine you can watch your experimental data being matched up to the curves.

SCAL SERVICE

Weatherford offers a SCAL Service that employs Sendra to estimate, verify and interpret core experimental results. This process includes collecting and sorting data which is then analyzed by Sendra to quality assure previous experimental results for further use in programs such as Eclipse or Petrel. Sendra can also be customized to integrate with your database, providing seamless importing and exporting of data. We offer a database solution, ResBase, for clients who are looking to digitally store and manage their data.

Through partnering with Weatherford, Sendra can be tailored to suit your needs and implemented into your current work flow.

This process includes:

- Data collection, verification and interpretation
- Data organization and storage
- Software customization and integration



OUR WORK METHOD

Development is carried out with close cooperation and communication with our clients. Our focus is on flexibility and responsiveness, taking into account the uncertain nature of software development. Updates are released frequently allowing the client to see the direction of the project and providing the opportunity to make adjustments along the way.

For more information contact:

✉ marianne.berge@wftpc.com

☎ +47 95 73 34 83

Weatherford Petroleum Consultants AS
www.wftpc.com