Relative Permeability = RelPerm

@wikipedia

Formation permeability to a given fluid α-phase normalised to the reference value, usually to air permeability k_{air}:

(1) $$k_{r\alpha} = \frac{k_\alpha}{k_{air}}$$

Units = dimensionless

The concept of relative permeability implies that different phases sweep through the same rock and under the same pressure gradient at different pace even if their viscosities are the same.

It is closely related to Wettability.

The relative permeability depends on the current rock saturation:

(2) $$k_{r\alpha} = k_{r\alpha}(s = \{s_\alpha\})$$

For 3-phase Oil + Gas + Water fluid model this is going to be:

(3) $k_{rw} = k_{rw}(s_w, s_g)$	(4) $k_{ro} = k_{ro}(s_w, s_g)$	(5) $k_{rg} = k_{rg}(s_w, s_g)$

Mathematical models of relative permeability are often abbreviated RPM.

The usual practice is to build 2-phase RPM based on SCAL data and then use 3-phase RPM correlations (see table below).

In case the 2-phase SCAL data is insufficient or highly diverse one can use 2-phase RPM correlations (see table below), calibrated to whatever SCAL and production data available.

2-phase RPM correlations	3-phase RPM correlations
RPM Corey @model • Oil+Water RPM Corey • Oil+Gas RPM Corey • Gas+Water RPM Corey	Baker Stone I Stone II Ternary Phase Diagram

See also

Physics / Fluid Dynamics / Percolation

Petroleum Industry / Upstream / Subsurface E&P Disciplines / Field Study & Modelling

[Petrophysics] [Basic reservoir properties] [Wettability] [Permeability] [Absolute permeability] [Relative permeability]

Reference

Fekete – Relative Permeability Correlations