

Reservoir boundary flow condition @model

(1) $F_{\Gamma}(p, \mathbf{u}) = 0$

where

Γ	reservoir boundary
p	reservoir pressure
$\mathbf{u}$	fluid velocity
$F_{\Gamma}(p, \mathbf{u})$	some function

The popular form of the [Reservoir boundary flow condition @model](#) is:

(2) $F_{\Gamma}(p, \mathbf{u}) = \left[a \cdot (p(\mathbf{r}) - p_0) + \epsilon \cdot \mathbf{n} \cdot M (\nabla p - \rho \mathbf{g}) \right]_{\mathbf{r} \in \Gamma} = 0$

where

$p(t, \mathbf{r})$	reservoir pressure	t	time
$\rho(\mathbf{r}, p)$	fluid density	$\mathbf{r}$	position vector
$M = k/\mu$	phase mobility	∇	gradient operator
k	formation permeability to a given fluid	$\mathbf{g}$	gravity vector
μ	dynamic viscosity of a given fluid	$\mathbf{u}$	fluid velocity
$\mathbf{n}$	external normal to the reservoir boundary Γ	$\epsilon \in \{0, 1\}$	a binary value

The two extreme cases of (2) are:

Constant Pressure	No flow
$p(\mathbf{r})_{\mathbf{r} \in \Gamma} = p_0 = \text{const}$	$\mathbf{n} \cdot \mathbf{u} \Big _{in\Gamma} = \mathbf{n} \cdot M (\nabla p - \rho \mathbf{g}) \Big _{in\Gamma} = 0$

The other examples of [Reservoir boundary flow condition @model](#) are provided by [Aquifer Drive Models](#) and [Gas Cap Drive Models](#).

See Also

[Petroleum Industry / Upstream / Subsurface E&P Disciplines / Petroleum Geology / Reservoir boundary](#)

[[Infinite reservoir boundary](#)] [[Reservoir flow boundary](#)] [[Multiwell Retrospective Testing \(MRT\)](#)]

[[Aquifer Drive Models](#)] [[Gas Cap Drive Models](#)]