

Definition specifics on formation pressure (Pe) and productivity index (PI)

Despite of terminological similarity there is a difference in the way [Dynamic Modelling \(DM\)](#), [Well Flow Performance \(WFP\)](#) and [Well Testing \(WT\)](#) usually define [formation pressure](#) and [productivity index](#).

The most typical definitions (although they do not cover the full variety of definitions referred in petroleum literature) are summarised in the table below:

	Formation pressure, p_e	Flowrate, q	Productivity Index, J
WFP	Drain-area formation pressure estimate within the drainage area A_e (1) $p_r = \frac{1}{A_e} \iint_{A_e} p(x, y, z) dS$	Surface flowrates: Oil surface flowrate q_o Gas surface flowrate q_G Water surface flowrate q_w Liquid surface flowrate q_L	Drain Productivity Index J_r
WT	Drain-boundary formation pressure estimate along the boundary of drainage area A_e (2) $p_e = \frac{1}{L_e} \int_0^{L_e} p(x, y, z) dl$ where L_e is the boundary of drainage area A_e	Total sandface flowrate: $q_t = q_w + q_o + q_g$	Total Productivity Index $J_t = \frac{q_t}{p_e - p_{wf}}$

DM	9-cell formation pressure $(3) \quad p_{e9, i, j} = \frac{1}{9} \sum_{k=i-1}^{i+1} \sum_{l=j-1}^{j+1} p_{k, l}$ $(4) \quad p_{e9, i, j} = \frac{1}{9} (p_{i, j} + p_{i, j+1} + p_{i, j-1} + p_{i-1, j} + p_{i-1, j+1} + p_{i-1, j-1} + p_{i+1, j+1} + p_{i-1, j+1} + p_{i+1, j-1})$ for each fluid phase individually: $p_{e9, o}, p_{e9, g}, p_{e9, w}$	Sandface Flowrates: Oil sandface flowrate q_o Gas sandface flowrate q_g Water sandface flowrate q_w	Sand Prodi
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Sometimes the wrong estimations of flowrate stem form the wrong inputs (J or p_e).

See Also

[Petroleum Industry / Upstream / Production / Subsurface Production / Well & Reservoir Management](#)

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