

Orifice Plate Expansibility Factor @ model

[@wikipedia](#)

A ratio between compressible fluid [volumetric flowrate](#) and incompressible fluid [volumetric flowrate](#) through the ideal [orifice](#):

$$(1) \quad \epsilon = \frac{q_{\text{compressible}}}{q_{\text{incompressible}}}$$

where

$$(2) \quad q_{\text{incompressible}} = \frac{\pi d^2}{4} \cdot \sqrt{\frac{2 \cdot \Delta p}{\rho \cdot (1 - \beta^4)}}$$

and

Δp	pressure drop on the choke , $\Delta p = p_{in} - p_{out}$
$\beta = \frac{d}{D}$	orifice narrowing ratio
d	orifice diameter
D	pipe diameter

For [incompressible fluids](#) and [slightly compressible fluid](#) ([water](#) and most types of [oil](#)) the [expansion factor](#) is $\epsilon = 1$.

For [Strongly Compressible Fluid](#) (condensate, steam and gases) the [expansion factor](#) is $\epsilon < 1$.

The most popular engineering correlation covering various tapping arrangements is given by [ISO5167](#):

$$(3) \quad \epsilon = 1 - (0.351 + 0.256 \beta^4 + 0.93 \beta^8) \cdot \left[1 - \left(\frac{p_{out}}{p_{in}} \right)^{1/\kappa} \right]$$

where

p_{in}	intake pressure
p_{out}	discharge pressure
$\beta = \frac{d}{D}$	orifice narrowing ratio
κ	Isentropic exponent (), in express analysis can be taken as ~ 1.3

See also

[Physics](#) / [Fluid Dynamics](#) / [Pipe Flow Dynamics](#) / [Pipe Flow Simulation \(PFS\)](#) / [Pipeline Choke @model](#)

[[Orifice Plate Discharge Coefficient](#)]

