

5.8 Multi-phase flow: liquid with dissolved gas

Valve data-sheets from Refineries as well as from upstream gas- and oil fields sometimes specifying hydrocarbons named gas oil in combination with other liquid hydrocarbons or pure fluids.

Surprising is often, that at moderate low temperatures $\ll 100$ °C the vapor pressure of gas oil p_v is identically with higher upstream pressures 10 to 60 bar. Does that mean, that gas oil is a boiling liquid?

The answer is that gas oil is a type of oil with dissolved gas under the max. pressure p_1 . As far the pressure is released specific fractions of dissolved gas versus pressure and temperature recovers to a liquid – gas mixture. Even small mass fractions of gas will dominate in the valve throttling area “vena contracta” and therefore the flow sizing result to an acceptable larger C_v -value if setting $p_v = p_1$ for the total mass flow.