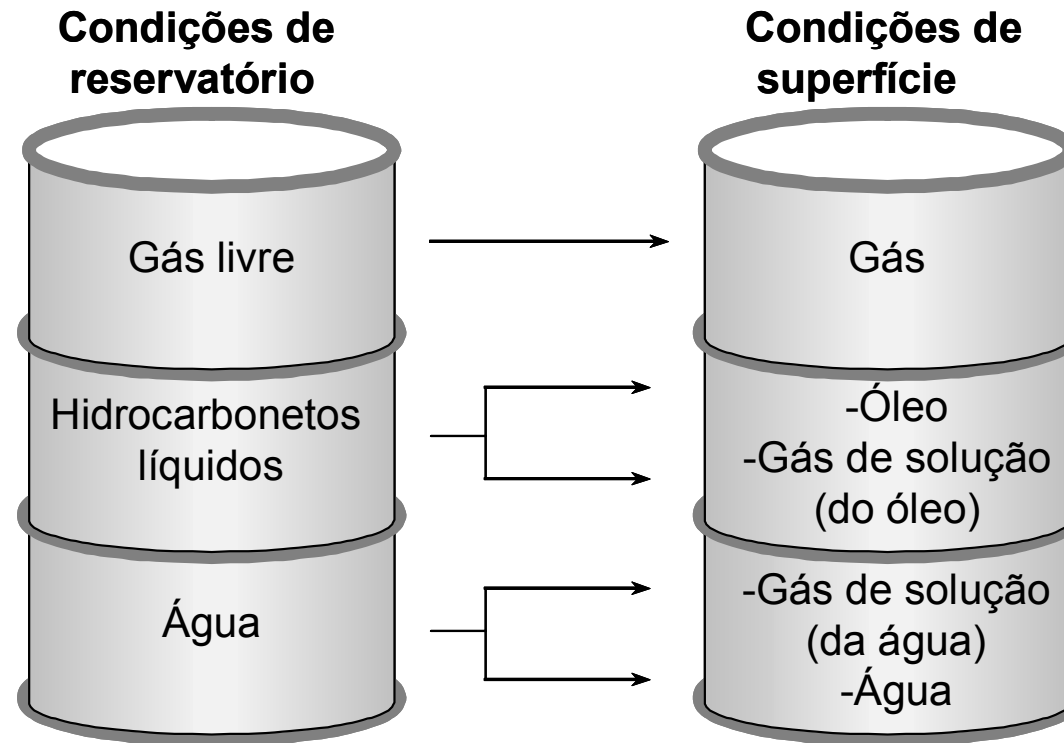


PROPRIEDADES dos FLUIDOS

- DIAGRAMAS PT
- ANÁLISE PVT
- CORRELAÇÕES
- VOLUMES

Propriedades dos Fluidos



FLUIDOS PRODUZIDOS

Propriedades dos Fluidos

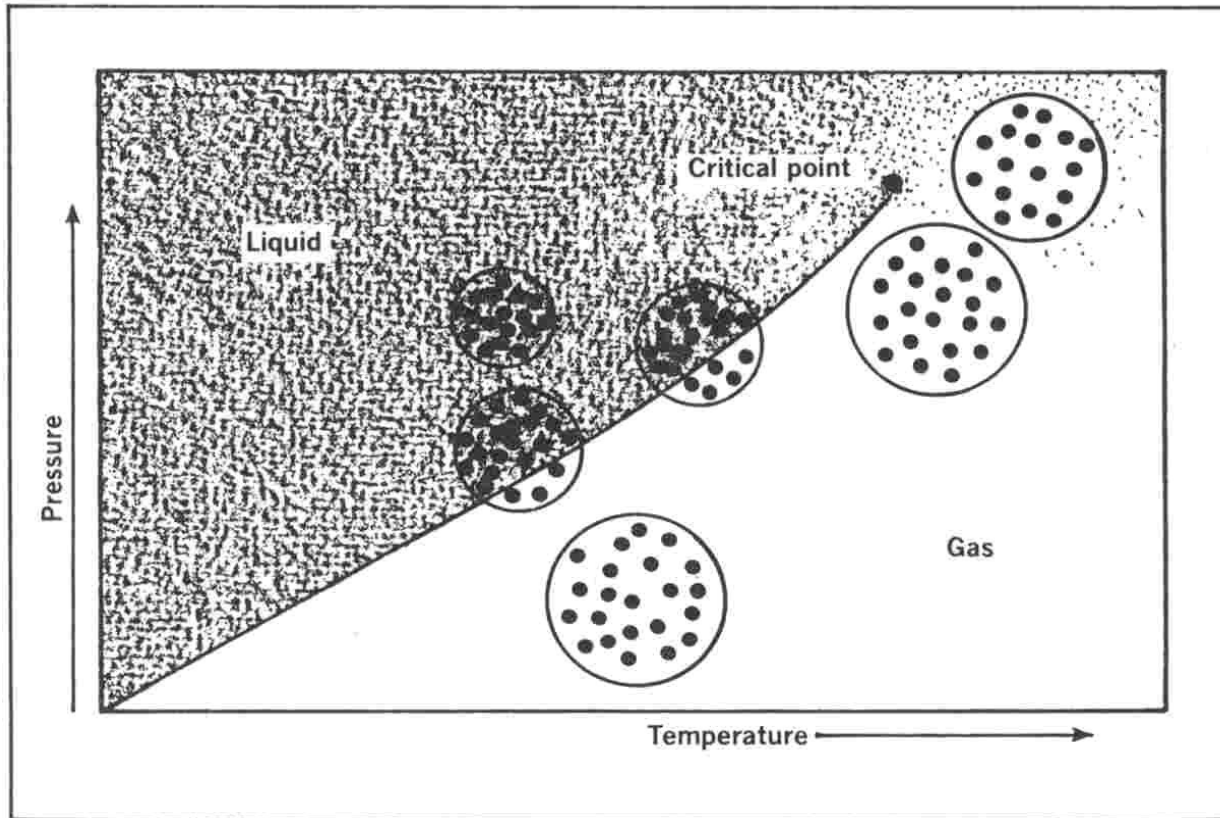


FIG. 2-3—Vapor pressure vs. temperature for a pure hydrocarbon component. Elements of Petroleum Reservoirs. Permission to publish by The Society of Petroleum Engineers.

DIAGRAMA P-T: 1 COMPONENTE

Propriedades dos Fluidos

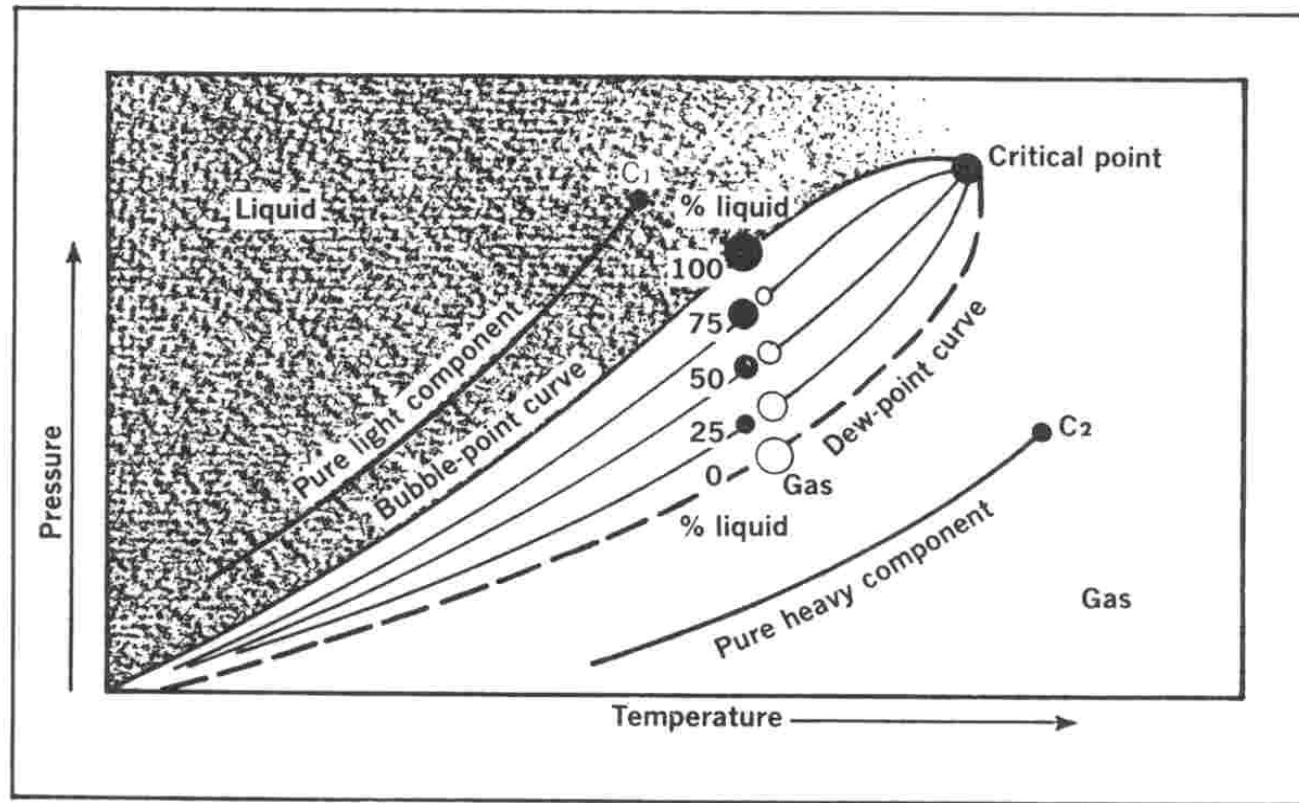


FIG. 2-4—Vapor pressure curves for two pure components and phase diagram for a 50:50 mixture of the same components. Elements of Petroleum Reservoirs. Permission to publish by The Society of Petroleum Engineers.

DIAGRAMA PT: 2 COMPONENTES

Propriedades dos Fluidos

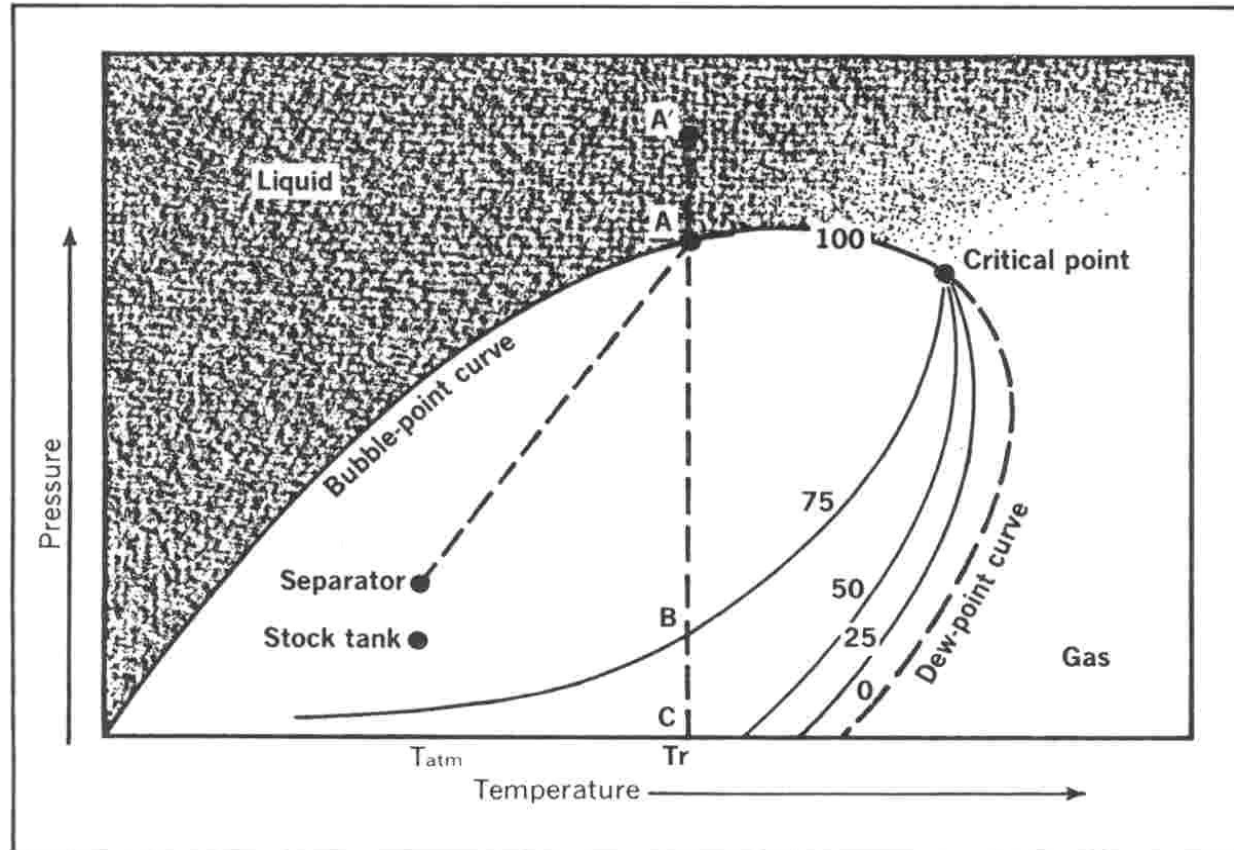


FIG. 2-5—Phase diagram of low shrinkage oil. Elements of Petroleum Reservoirs. Permission to publish by The Society of Petroleum Engineers.

DIAGRAMA PT: BLACK OIL

Propriedades dos Fluidos

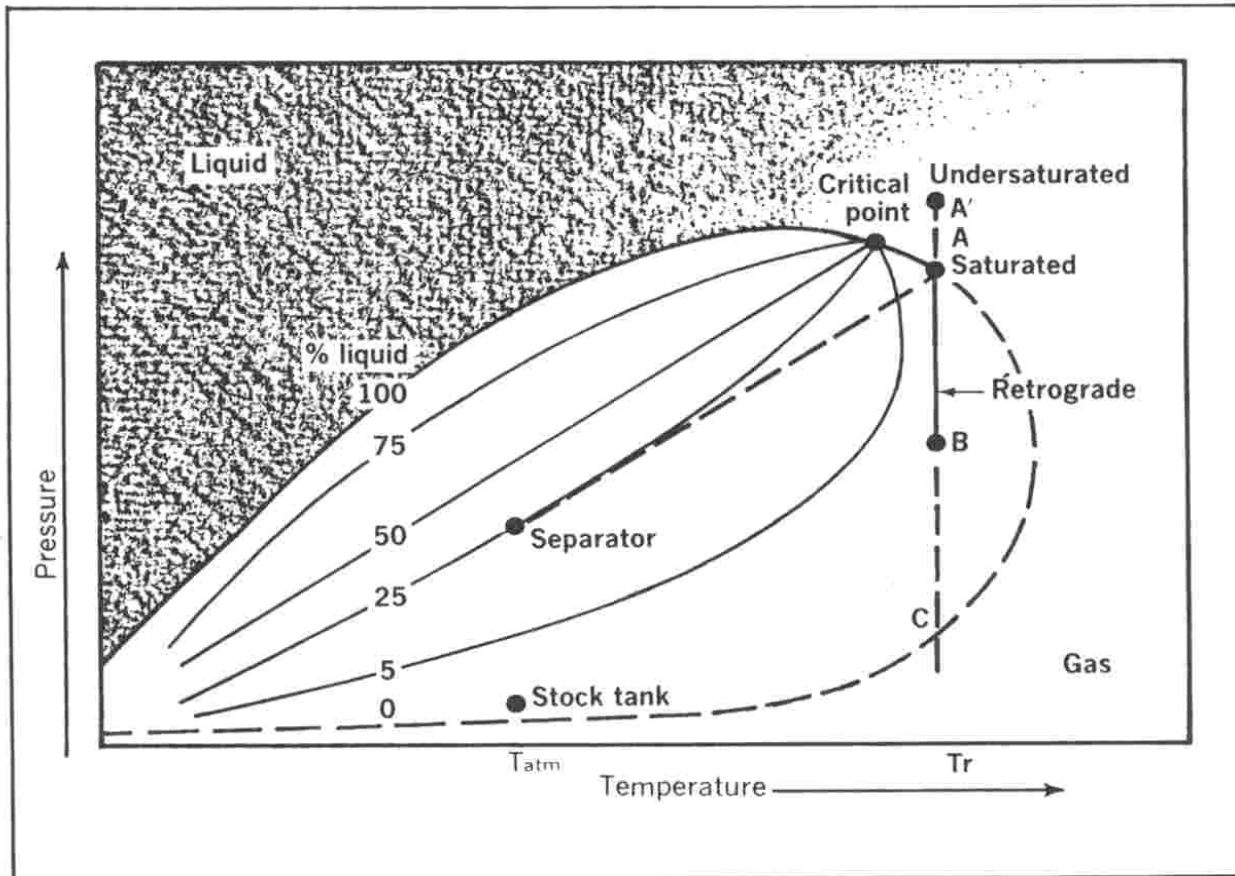


FIG. 2-6—Phase diagram of retrograde condensate gas. Elements of Petroleum Reservoirs. Permission to publish by The Society of Petroleum Engineers.

DIAGRAMA PT: RETRÓGRADO

Propriedades dos Fluidos

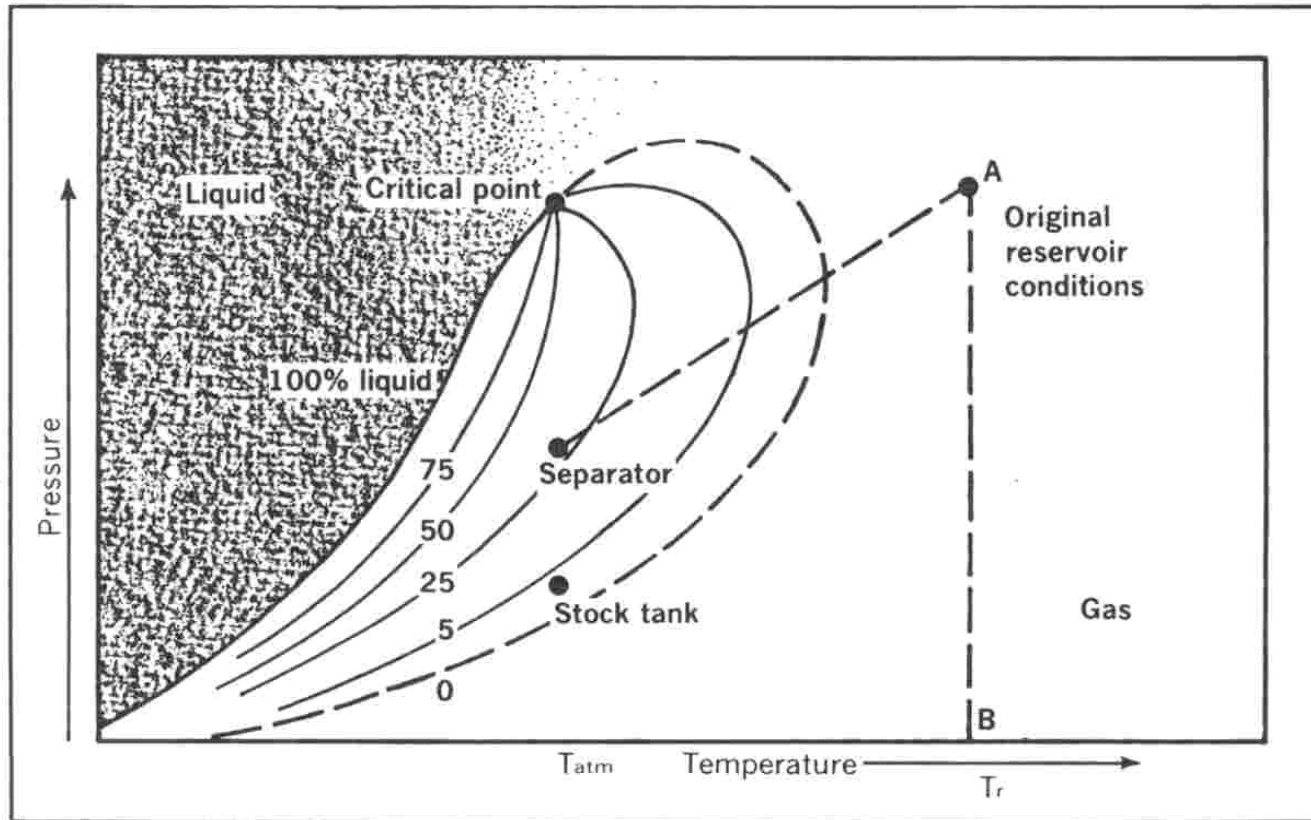


FIG. 2-7—Phase diagram of wet gas. Elements of Petroleum Reservoirs. Permission to publish by The Society of Petroleum Engineers.

DIAGRAMA PT: GÁS RICO

Propriedades dos Fluidos

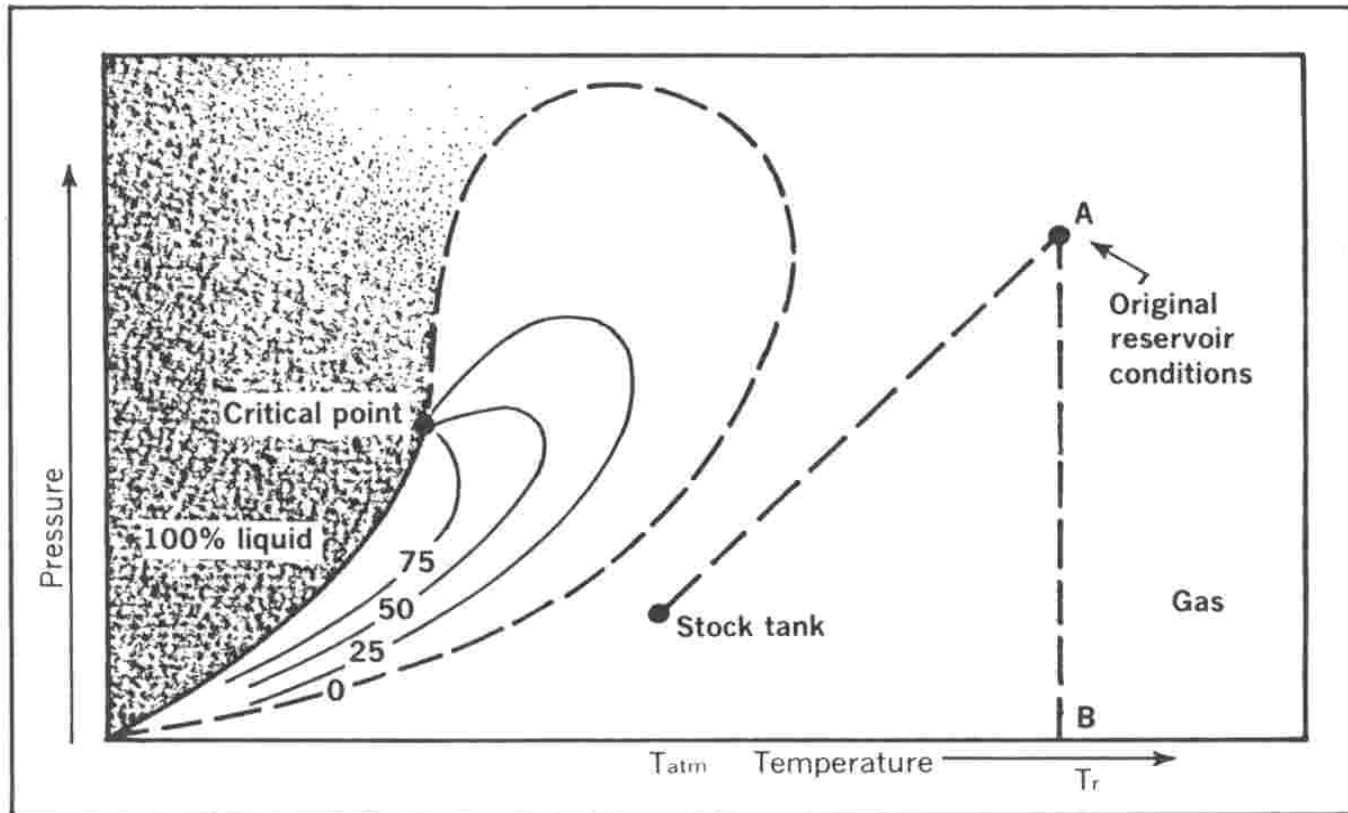
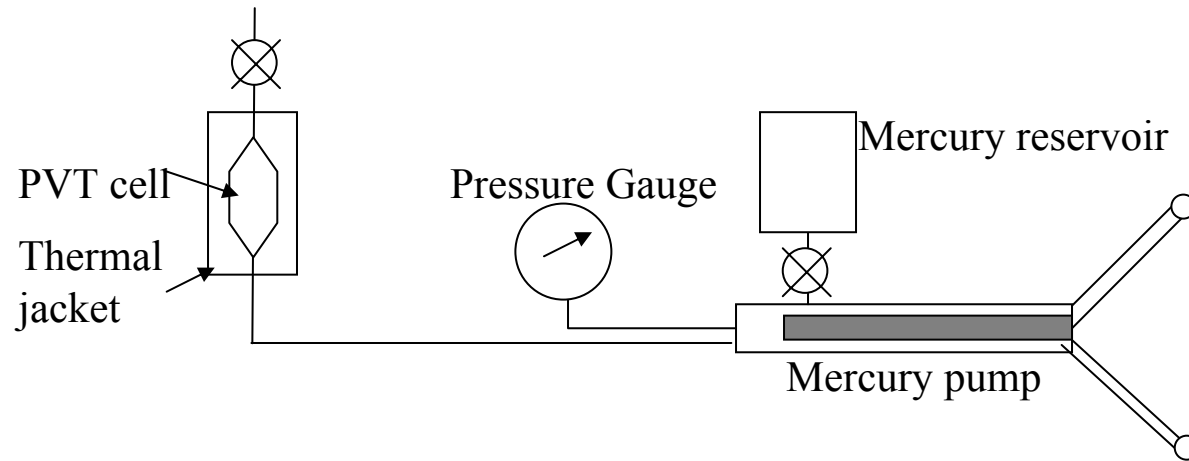


FIG. 2-8—Phase diagram of dry gas. Elements of Petroleum Reservoirs. Permission to publish by The Society of Petroleum Engineers.

DIAGRAMA PT: GÁS POBRE (SECO)

Propriedades dos Fluidos



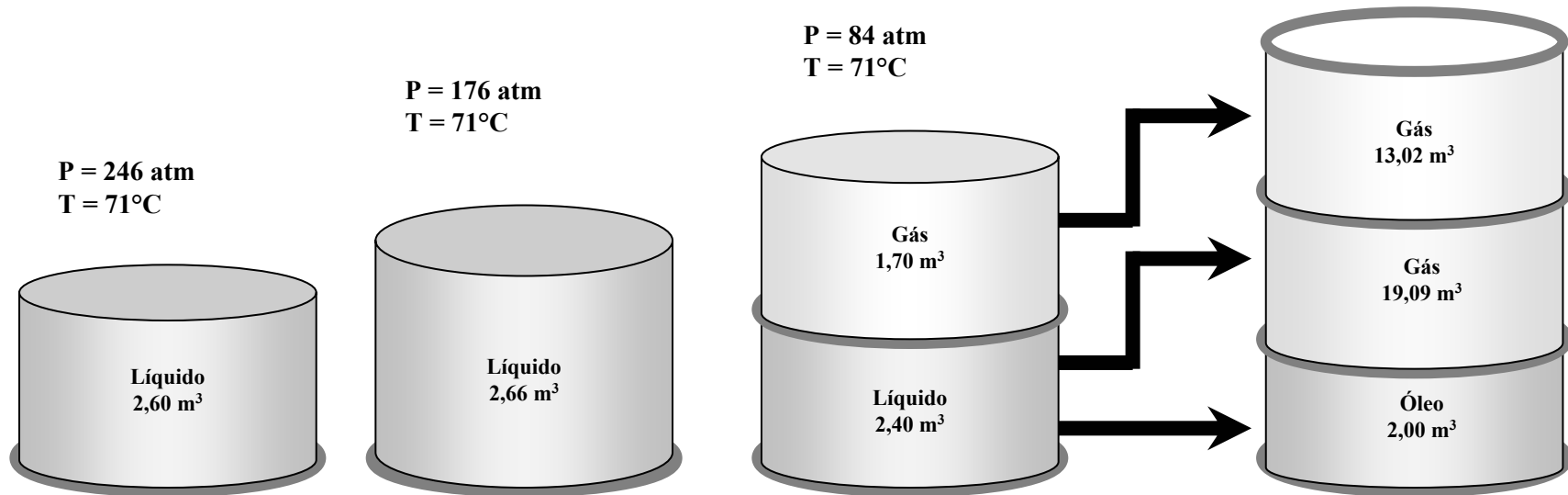
ANÁLISE PVT

Propriedades dos Fluidos

Condições padrão

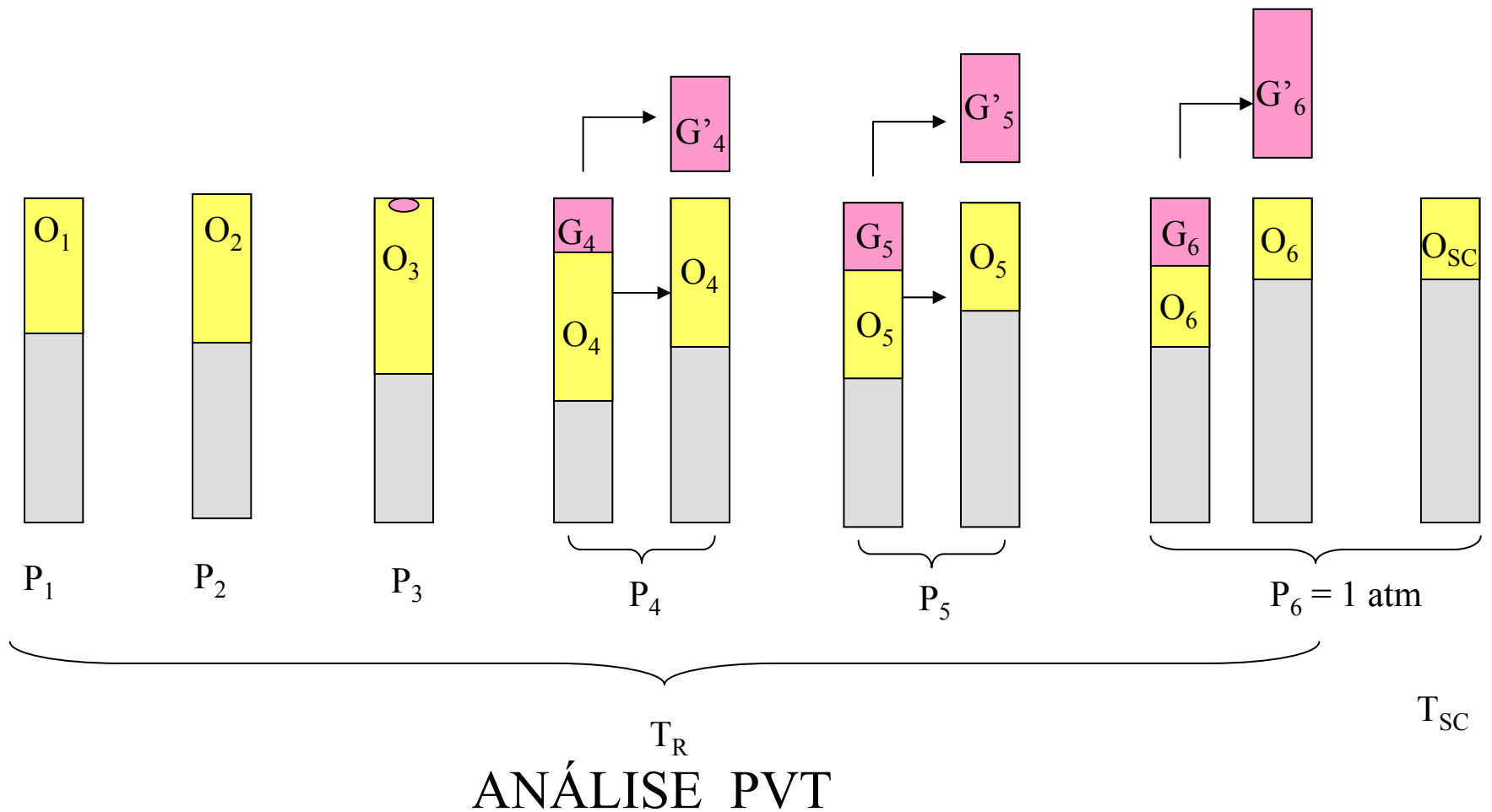
$P = 1 \text{ atm}$

$T = 20^\circ \text{C}$



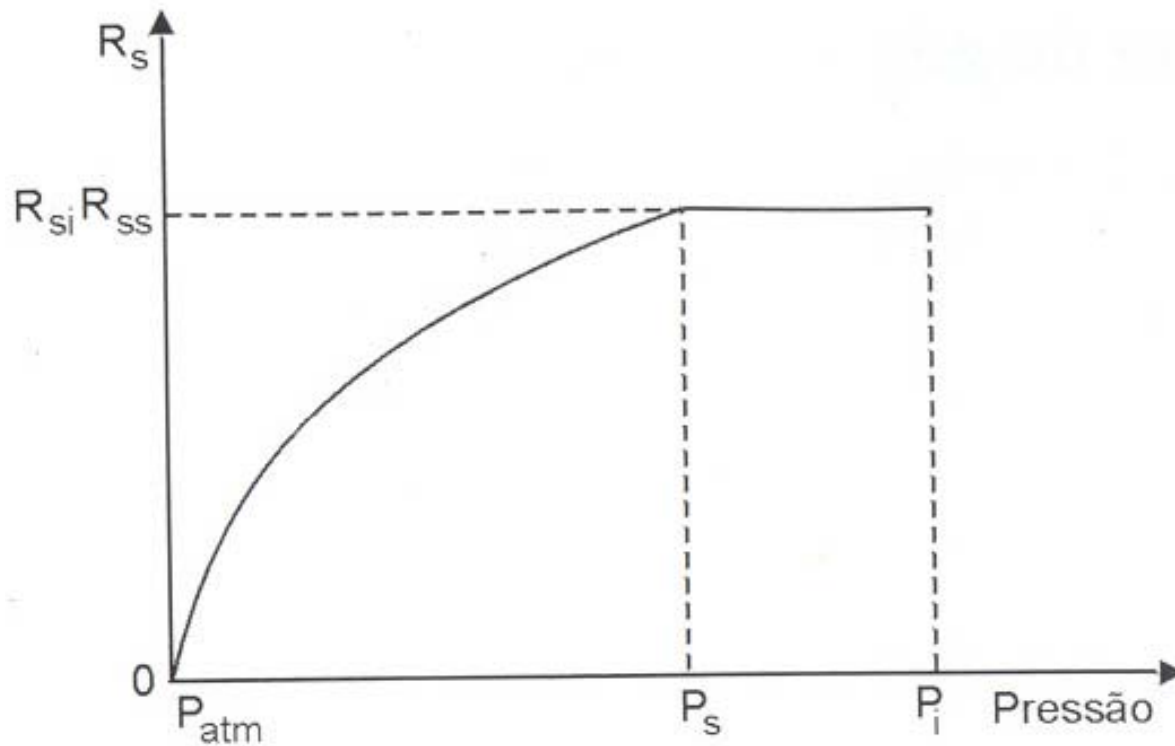
ANÁLISE PVT

Propriedades dos Fluidos

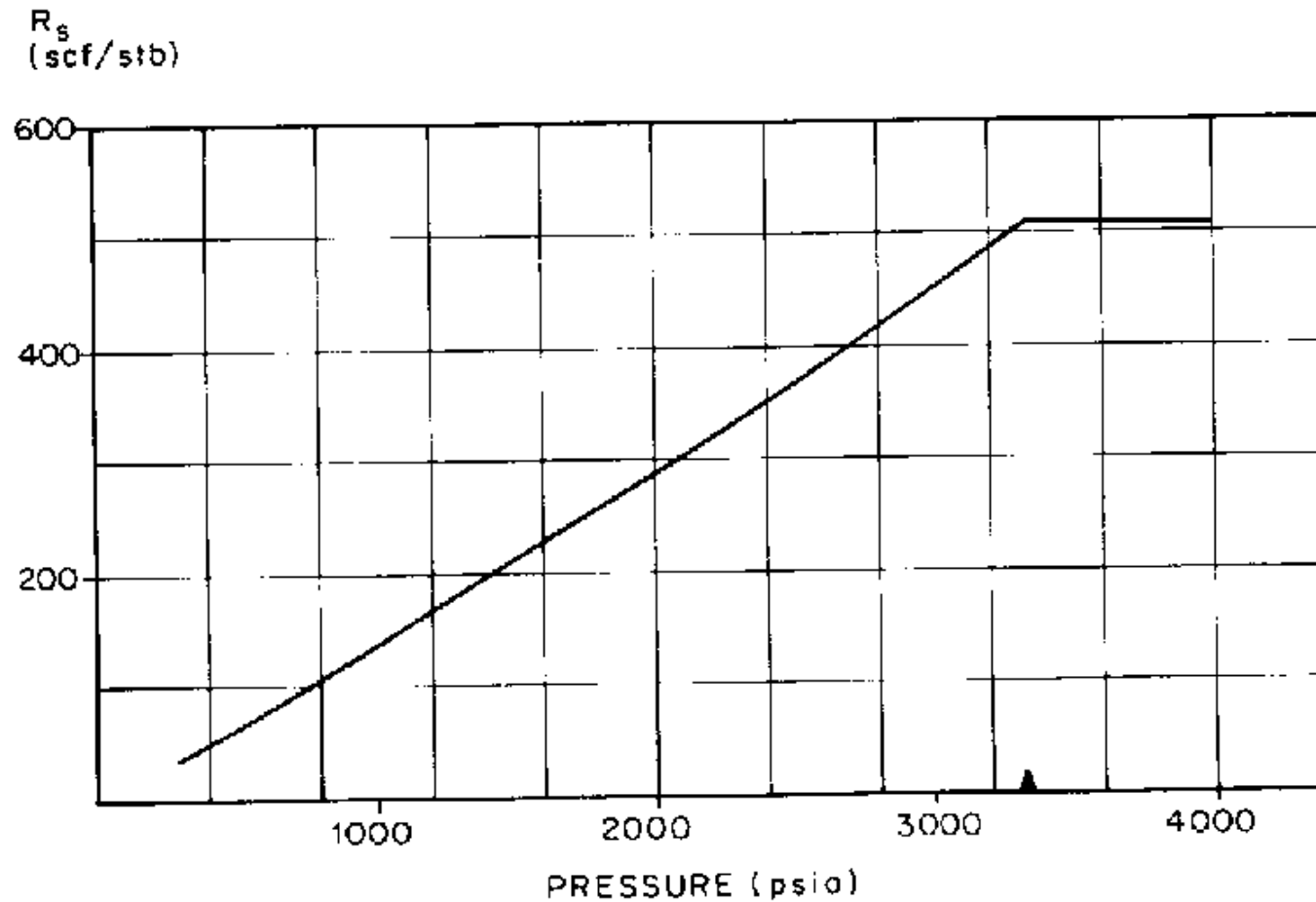


Propriedades dos Fluidos

R_s : Razão de Solubilidade do Gás no Óleo

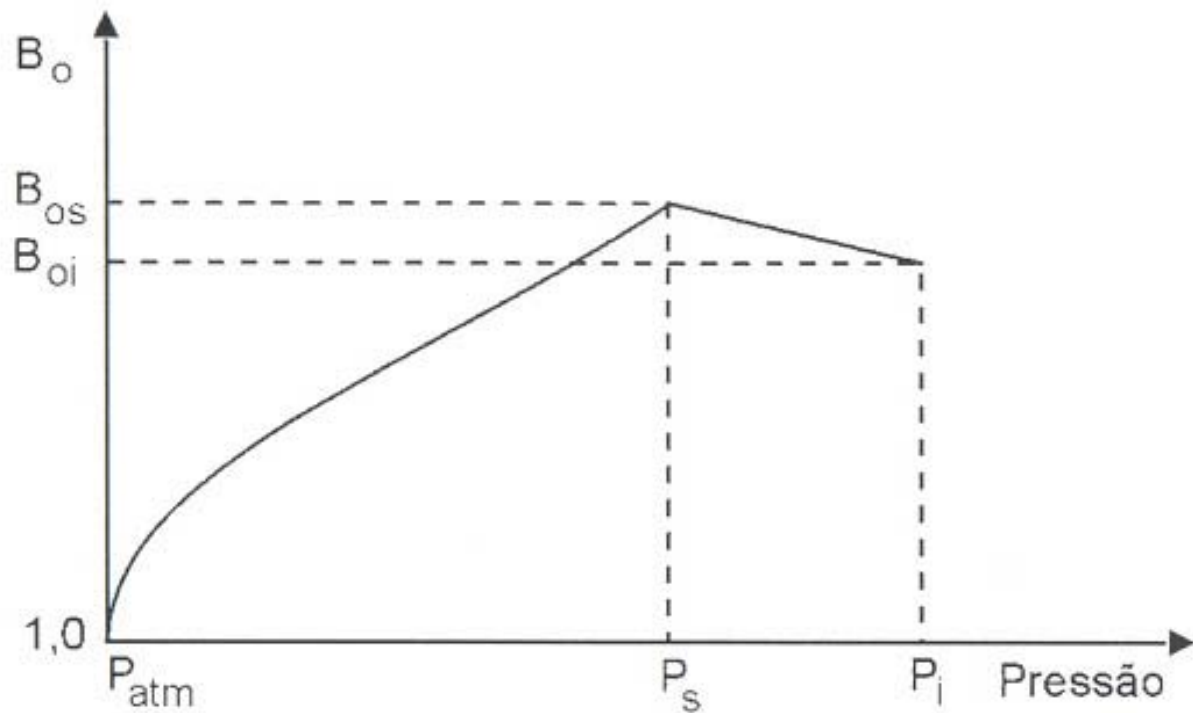


Propriedades dos Fluidos



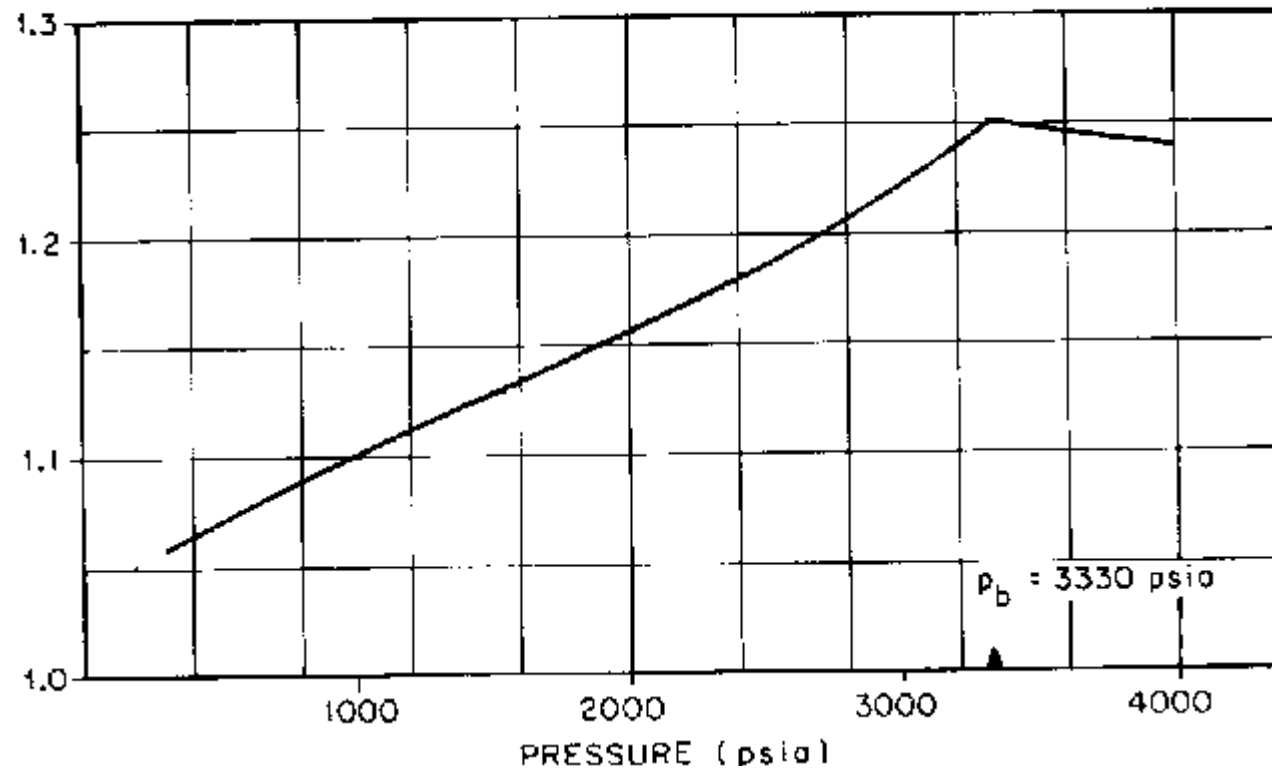
Propriedades dos Fluidos

Bo: Fator Volume de Formação do Óleo



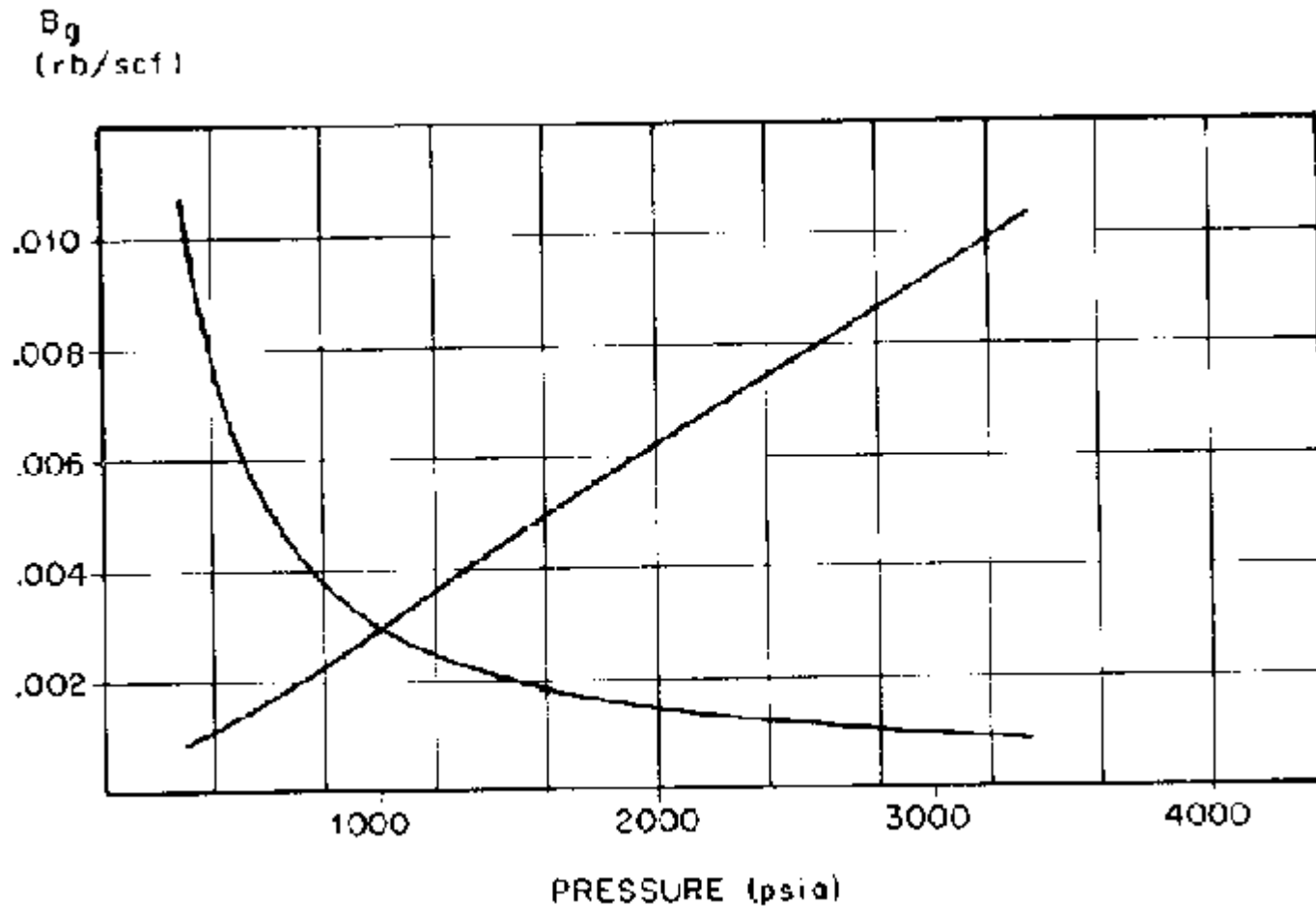
Propriedades dos Fluidos

B_o
(rb/stb)

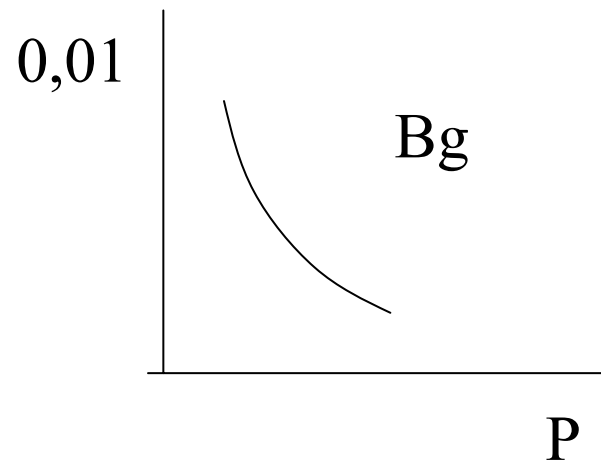
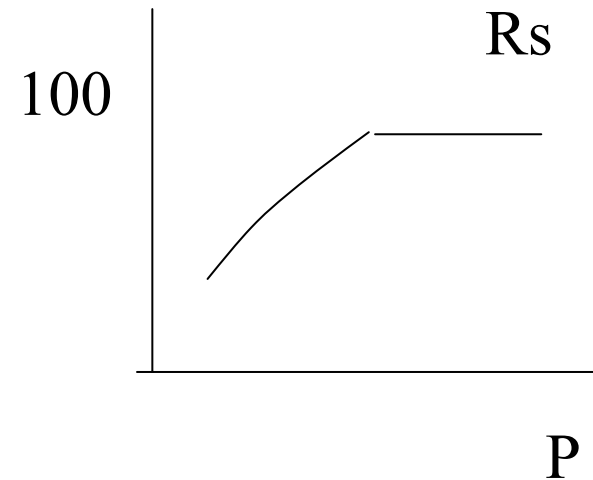
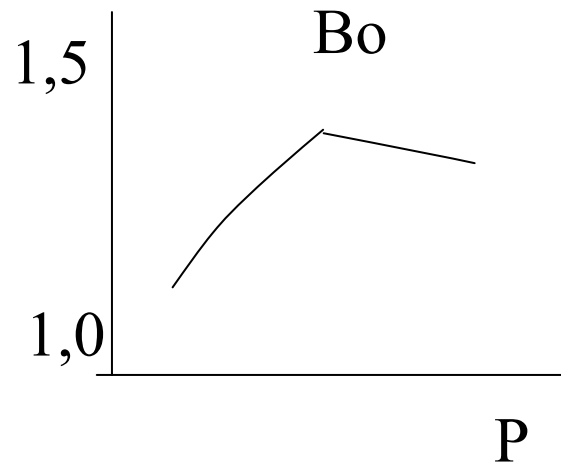


Propriedades dos Fluidos

B_g: Fator Volume de Formação do Gás



Propriedades dos Fluidos



Propriedades dos Fluidos

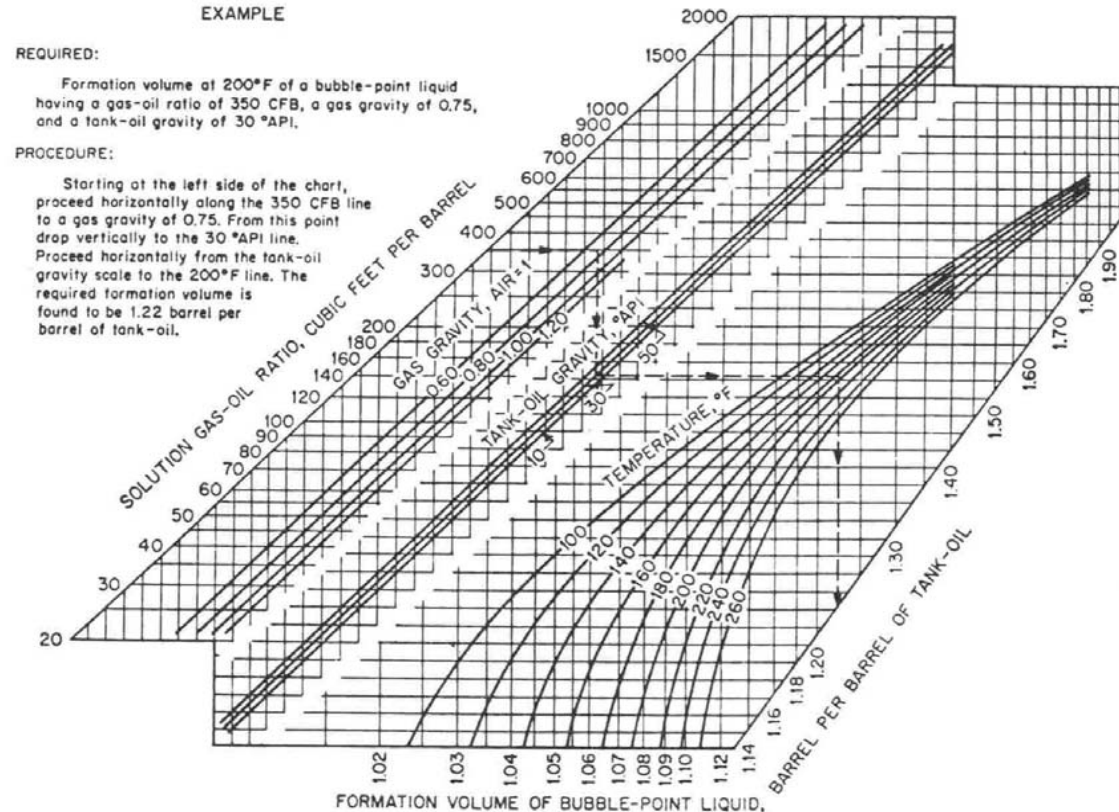


FIG. 2-9—Calculation of oil-formation volume factor by Standing's correlation. Permission to publish by The Society of Petroleum Engineers.

Correlação Standing: $(R_s, SG, API, T) \rightarrow B_o$

Propriedades dos Fluidos

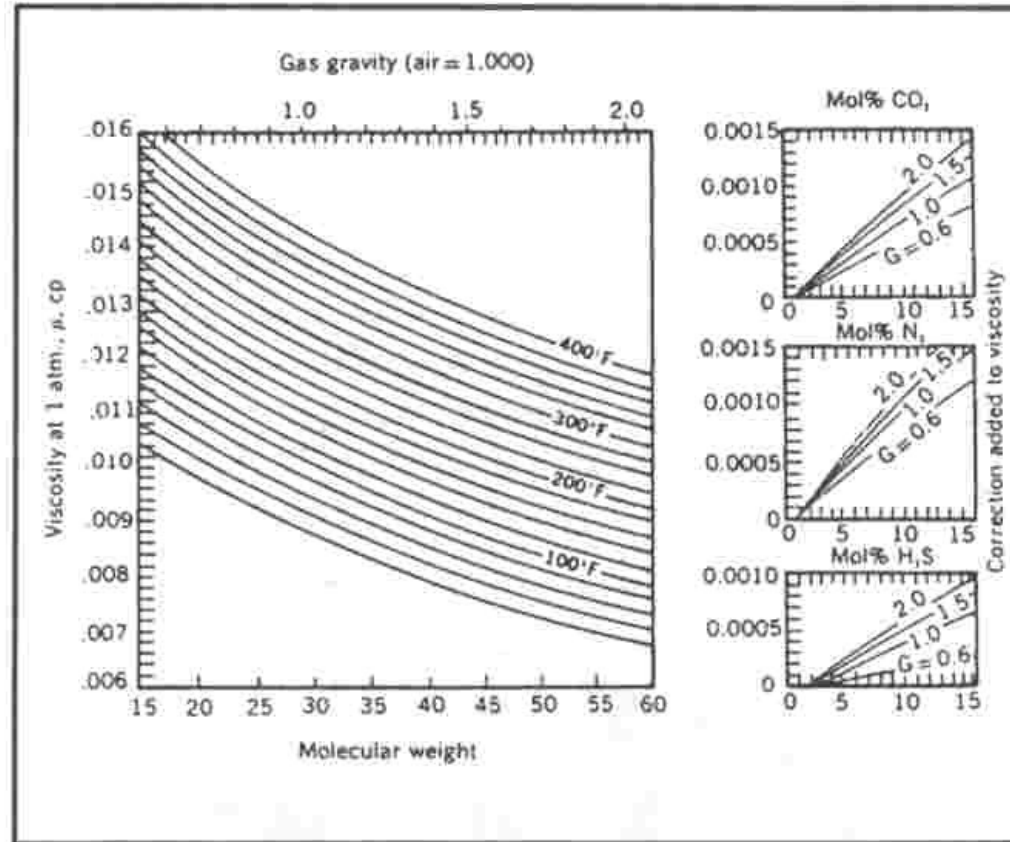


FIG. 2-11C—Viscosity of hydrocarbon gases at one atmosphere and reservoir temperatures, with corrections for nitrogen, carbon dioxide, and hydrogen sulfide. (Carr⁶). Permission to publish by The Society of Petroleum Engineers.

VISCOSIDADE: GAS

Propriedades dos Fluidos

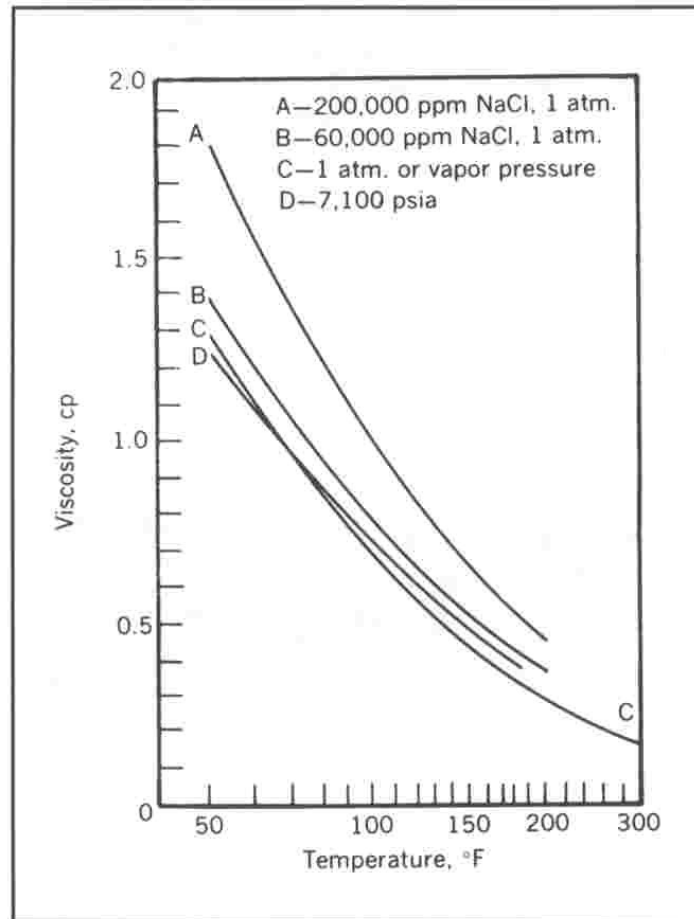


FIG. 2-11D—Viscosity of water as a function of temperature, pressure, and salinity. (After Chesnut).

VISCOSIDADE: ÁGUA

Propriedades dos Fluidos

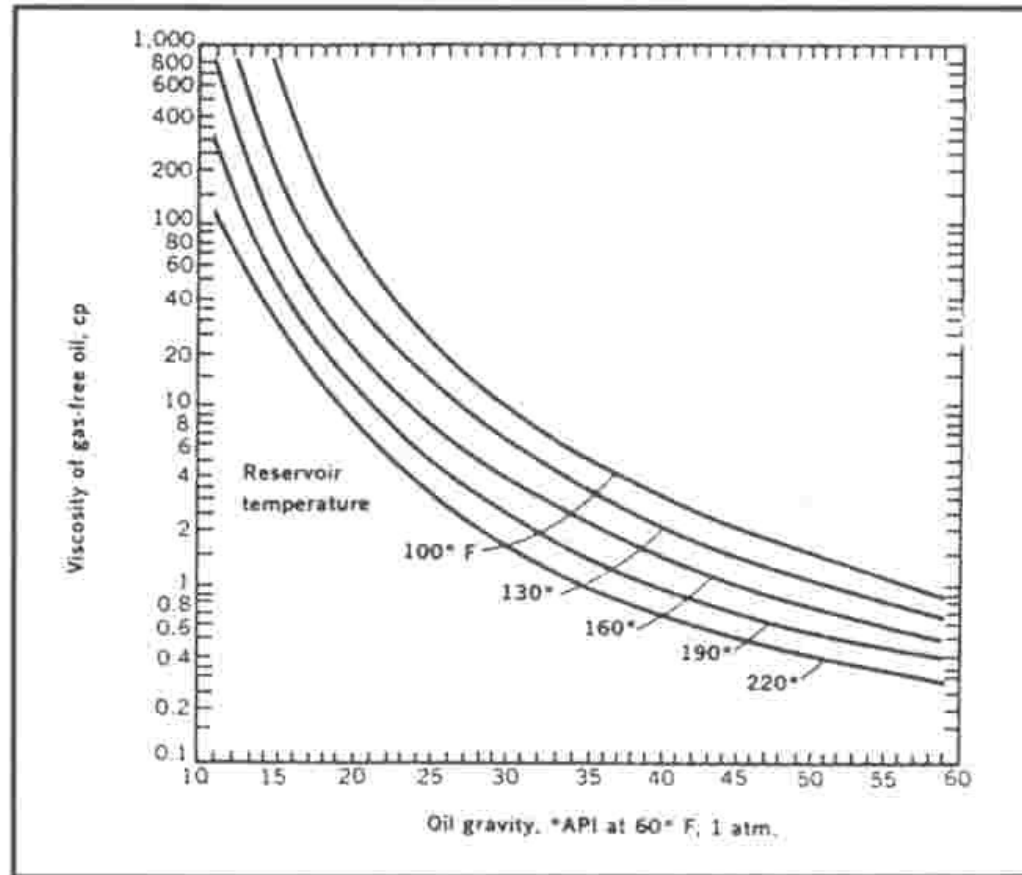
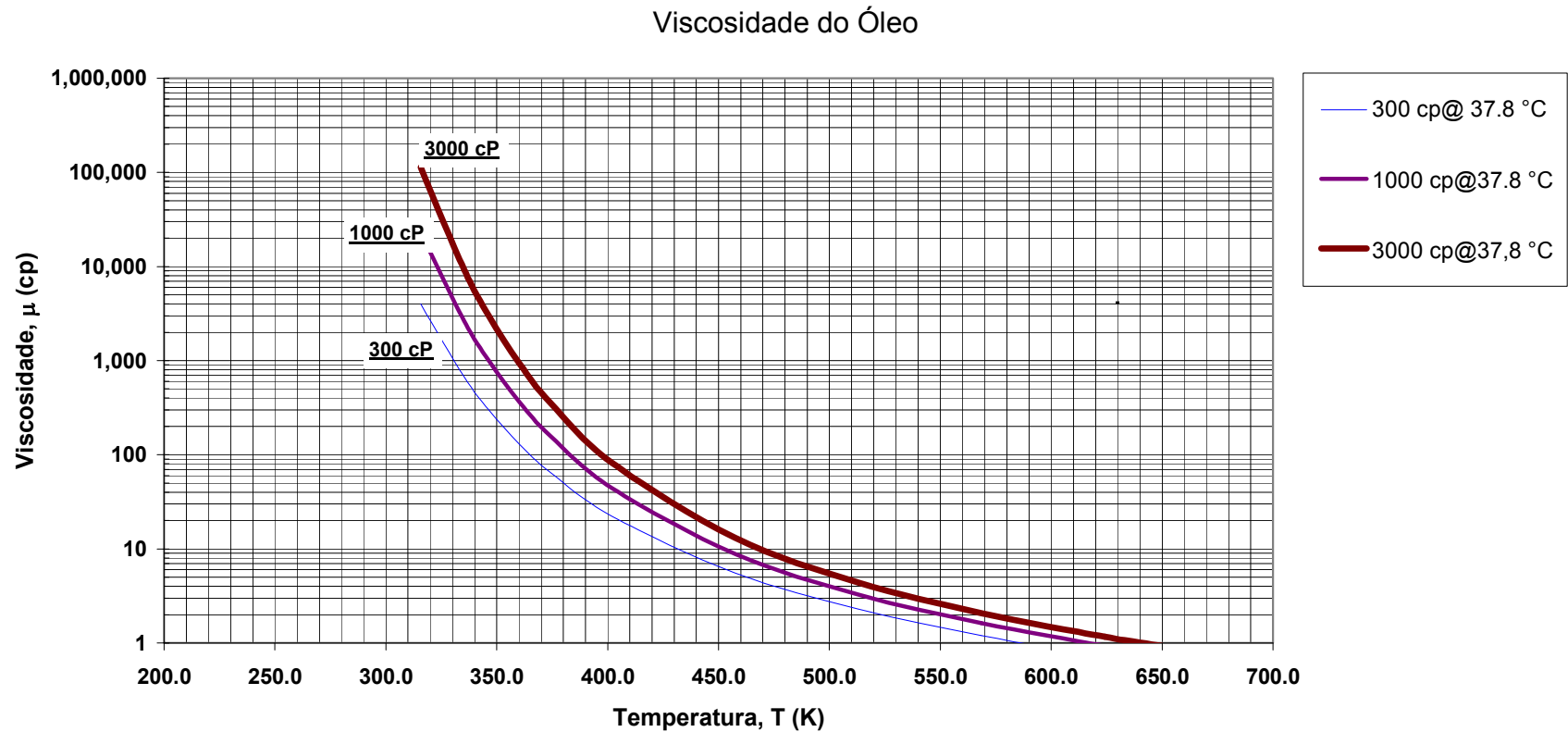


FIG. 2-11A—Viscosity of gas-free crude oil at reservoir temperature. (Beal¹). Permission to publish by The Society of Petroleum Engineers.

VISCOSIDADE: OLEO

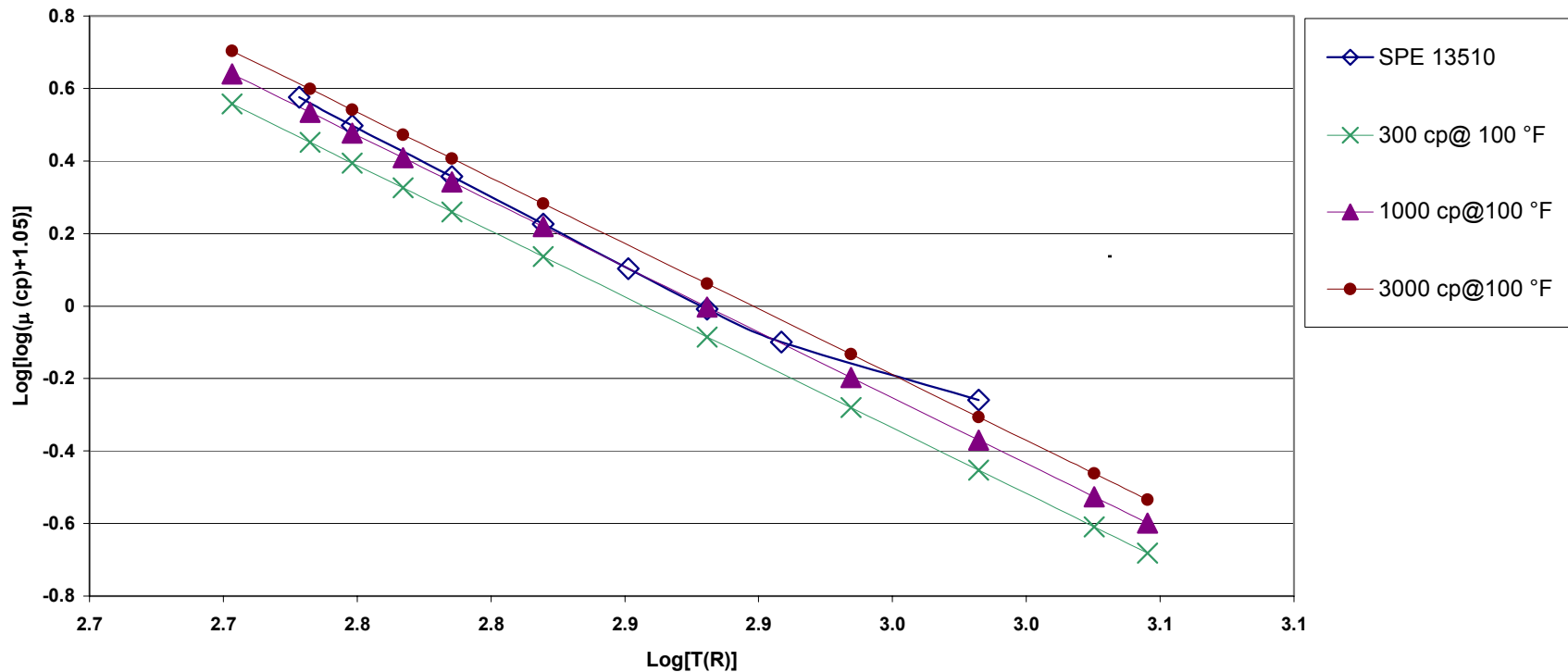
Propriedades dos Fluidos



Viscosidade: Óleo

Propriedades dos Fluidos

Viscosidade do Óleo

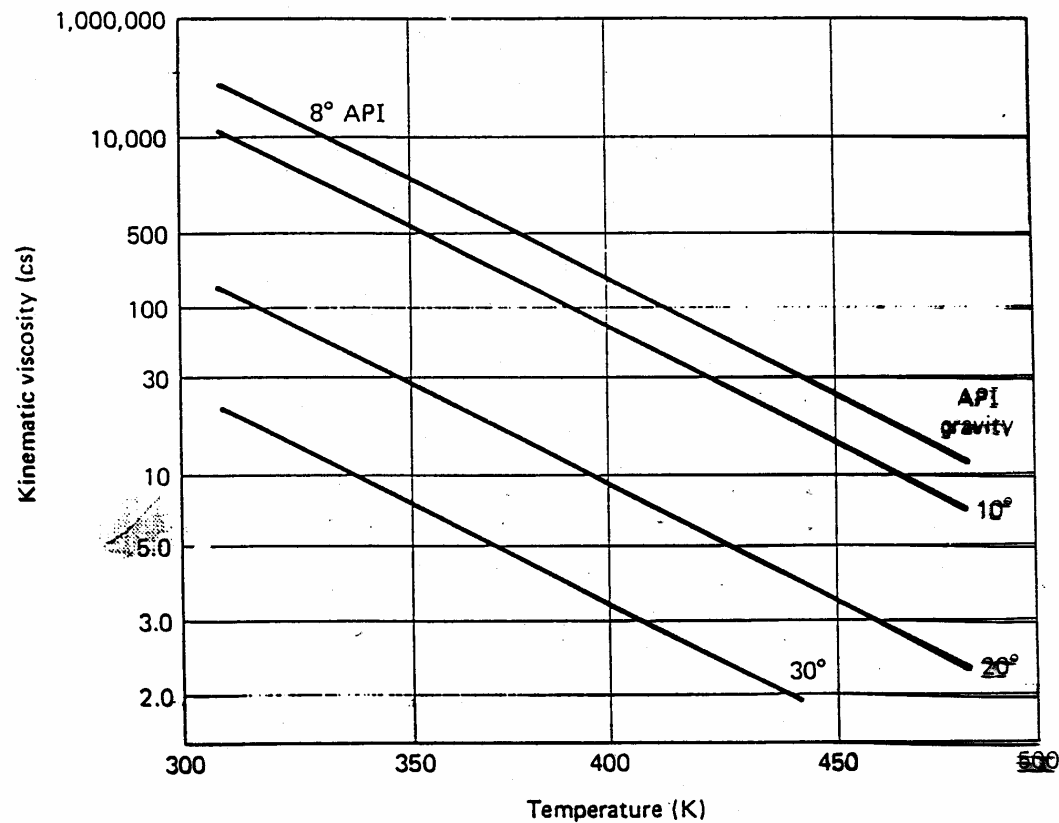


Viscosidade: Óleo

Propriedades dos Fluidos

Viscosidade: Óleo

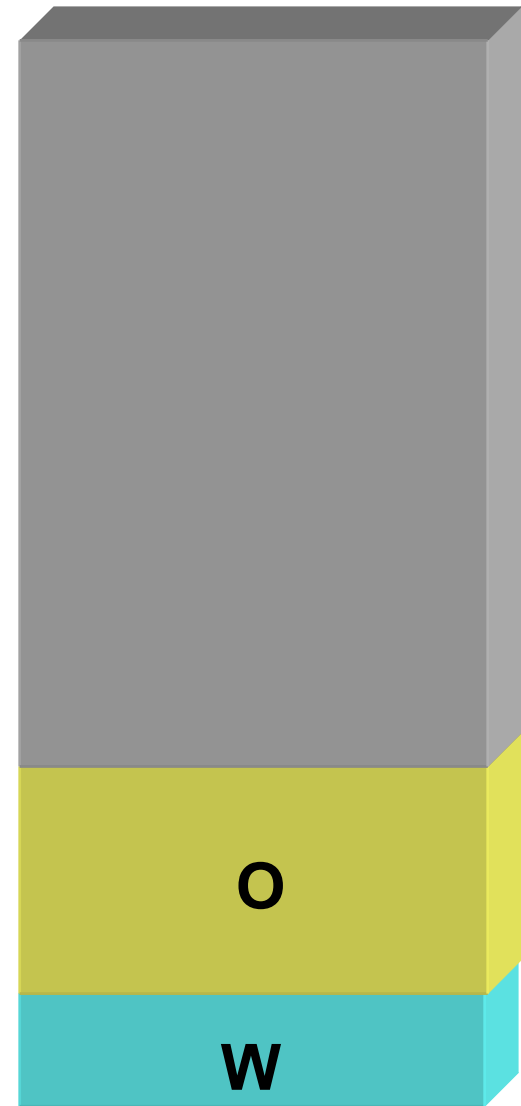
$$\mu_o = e^{e^{(a_4 + b_4 \ln T)}} - 1,05$$



Cálculo de Volumes

RESERVATÓRIO DE ÓLEO

- **Volume de Rocha:** $V_r = A.h$
- **Volume Poroso:** $V_{por} = A.h.\phi$
- **Volume de Óleo in Place:** VOIP ou N
$$N = A.h.\phi.S_o/B_o$$
- **Fator de Recuperação:** FR
- **Volume Recuperável:** $V_{rec} = N.FR$
- **Volume Produzido:** N_p
- **Reserva** = $N.FR - N_p$



Cálculo de Volumes

RESERVATÓRIO DE GÁS

- **Volume de Rocha:** $V_r = A.h$
- **Volume Poroso:** $V_{por} = A.h.\phi$
- **Volume de Gás in Place: VGIP ou G**
$$G = A.h.\phi.S_g/B_g$$
- **Fator de Recuperação: FR**
- **Volume Recuperável:** $V_{rec} = G.FR$
- **Volume Produzido:** G_p
- **Reserva = $G.FR - G_p$**

