

TFY4115 Fysikk

Faseoverganger (smelte, fordampe)

Y&F kap.17.6+18.6 (8 sider)

L&H&L Kap. 17.10 (1½ side)

H&S kap 10 (6 sider)



Varme Q tilført et legeme kan:

1) Varmer opp stoff: $Q = C \cdot n \cdot \Delta T$

der C = molar varmekapasitet

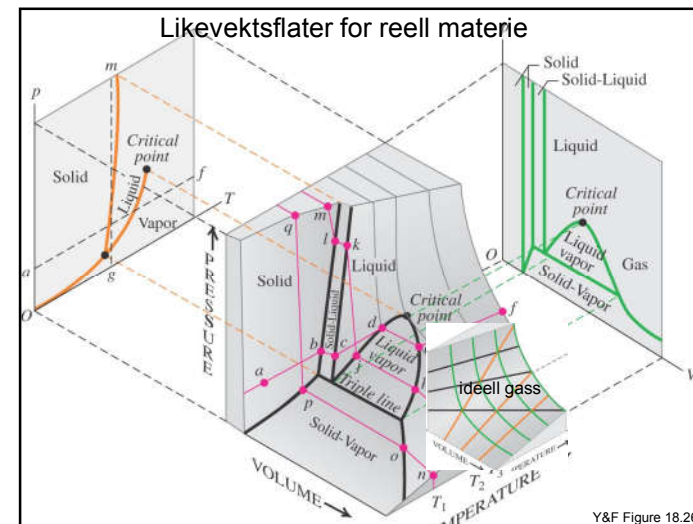
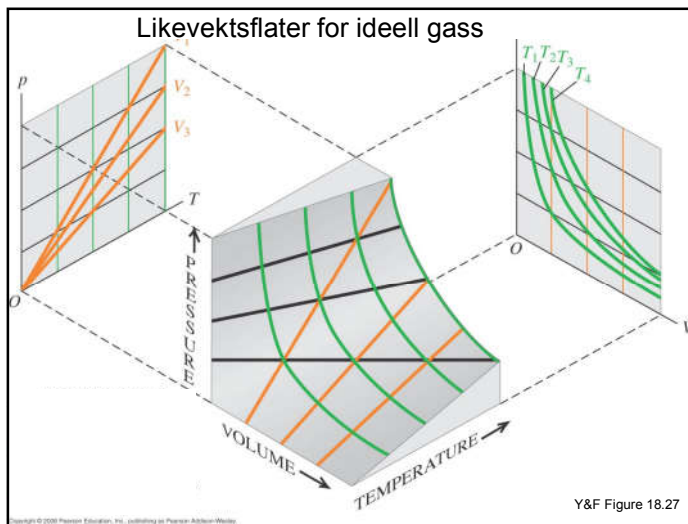
2) Smelte stoff: $Q = L'_s \cdot \Delta m$

der L'_s = spesifikk smeltevarme (J/kg)

3) Fordampe stoff: $Q = L'_f \cdot \Delta m$

der L'_f = spesifikk fordampingsvarme (J/kg)

4) Utvide en gass isotermt $Q = \int p dV$



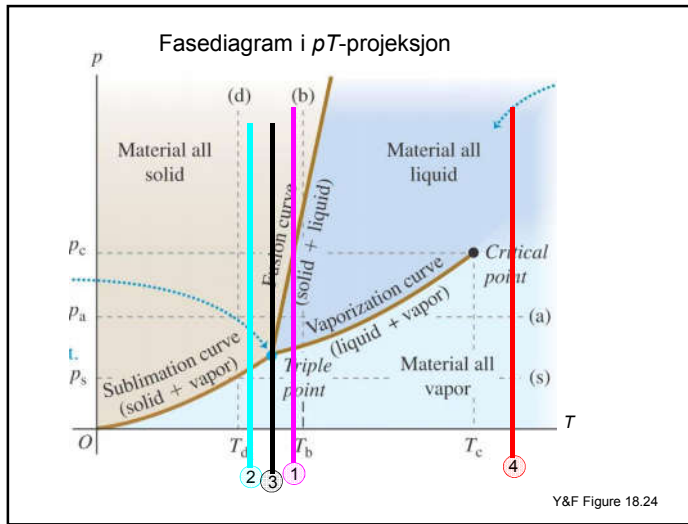
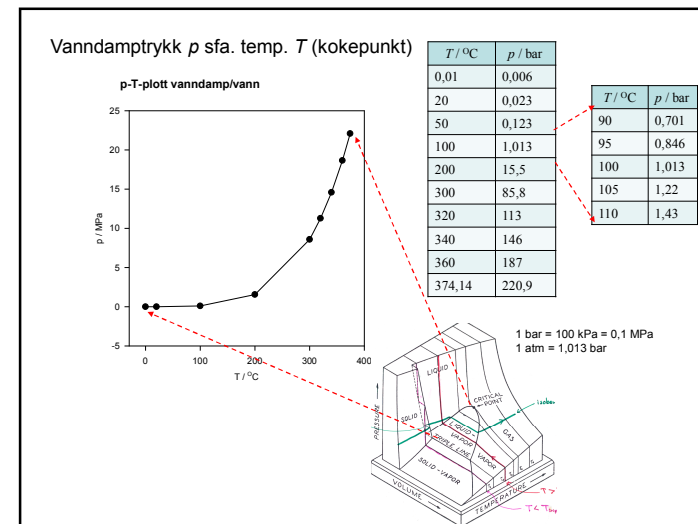
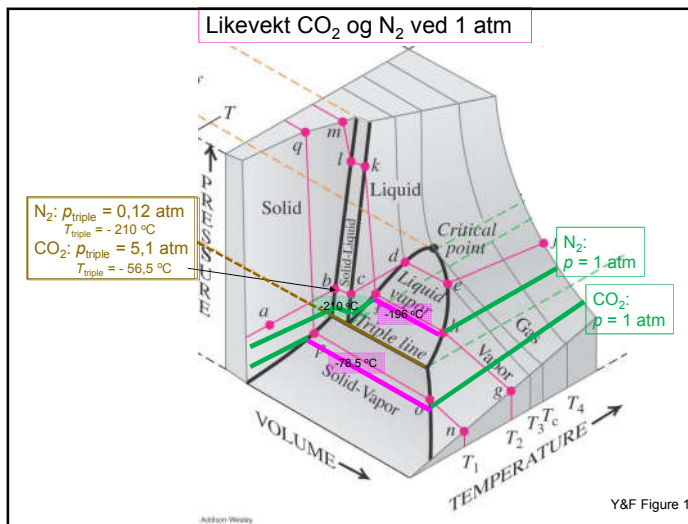


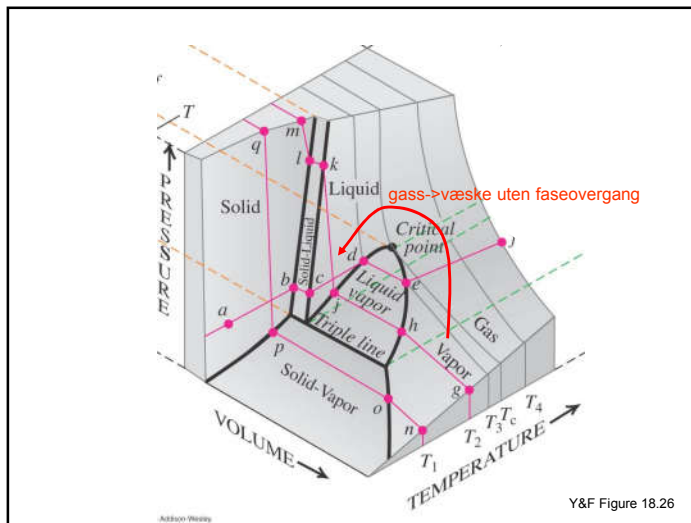
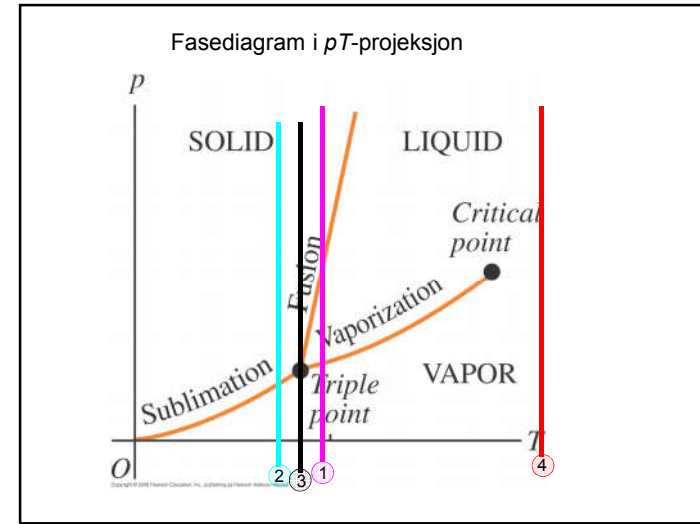
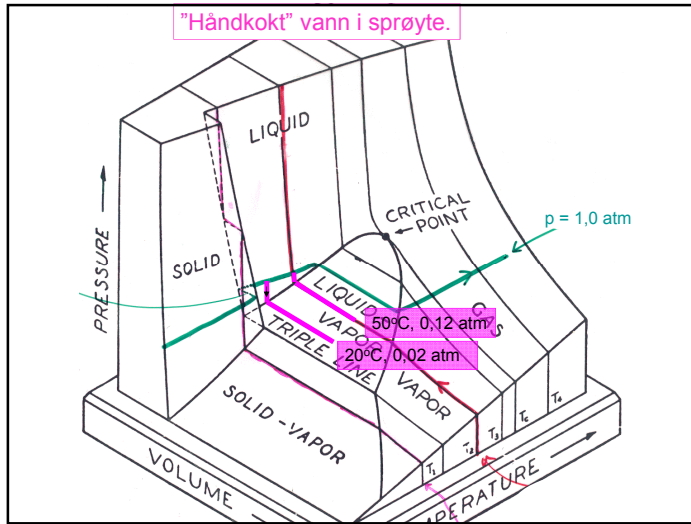
Table 18.3 Triple-Point Data

Substance	Temperature (K)	Pressure (Pa)
Hydrogen	13.80	0.0704×10^5
Deuterium	18.63	0.171×10^5
Neon	24.56	0.432×10^5
Nitrogen	63.18 = -210 °C	$0.125 \times 10^5 = 0,12 \text{ atm}$
Oxygen	54.36	0.00152×10^5
Ammonia	195.40	0.0607×10^5
Carbon dioxide	216.55 = -56,5 °C	$5.17 \times 10^5 = 5,1 \text{ atm}^*$
Sulfur dioxide	197.68	0.00167×10^5
Water	273.16 = 0,01 °C	$0.00610 \times 10^5 = 0,0060 \text{ atm}$

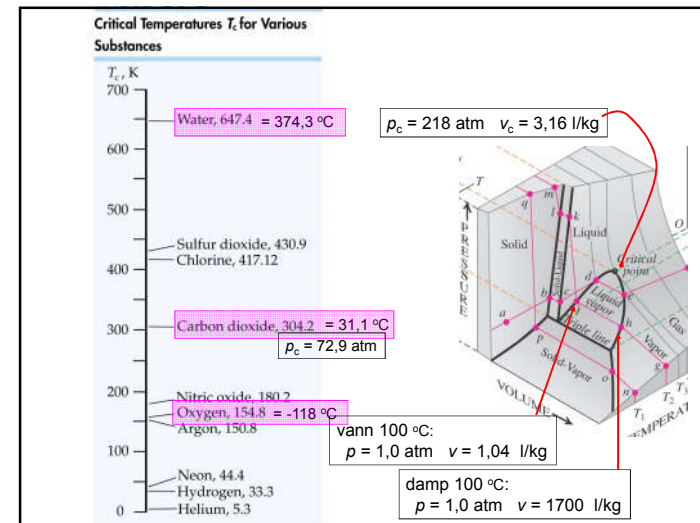
*) ved 1 atm:
sublimerer ved -78,5 °C

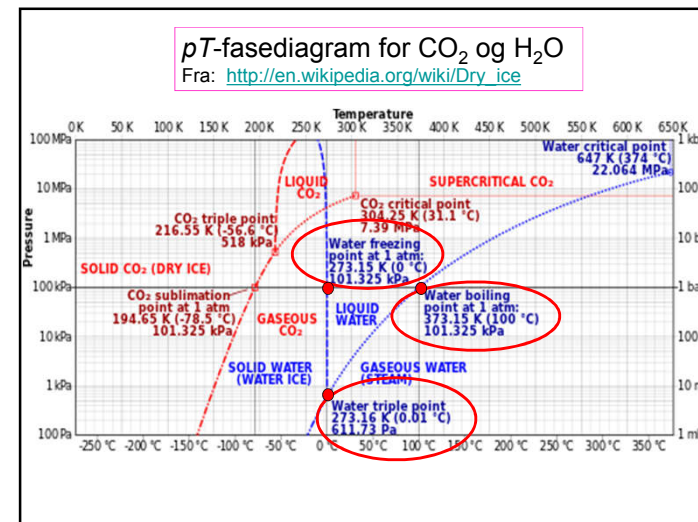
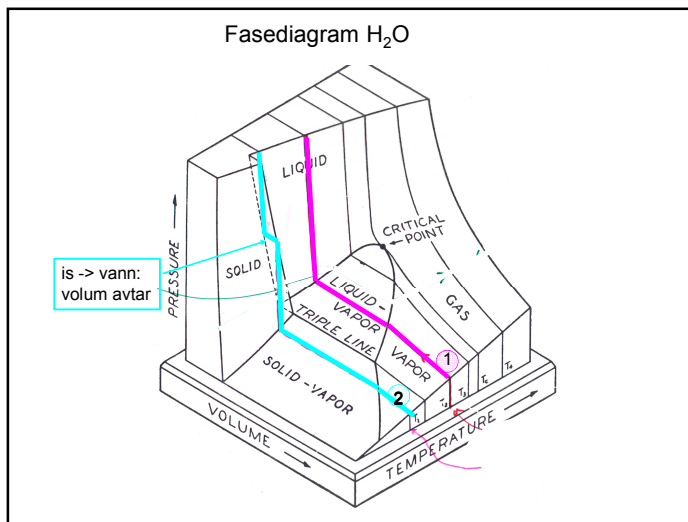
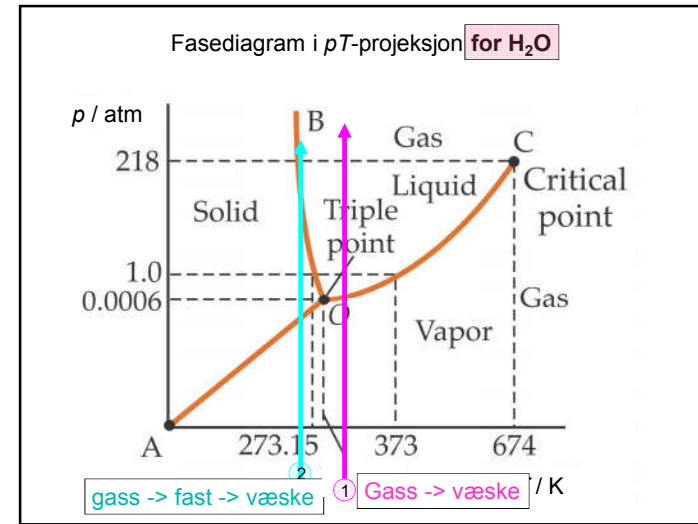
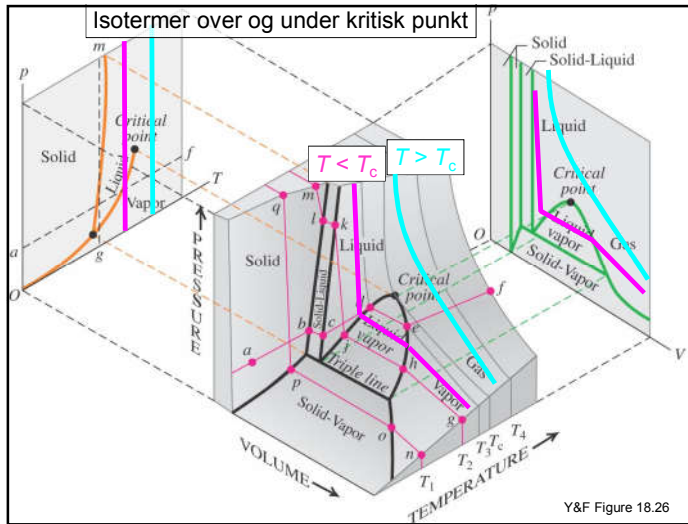
Y&F Table 18.3

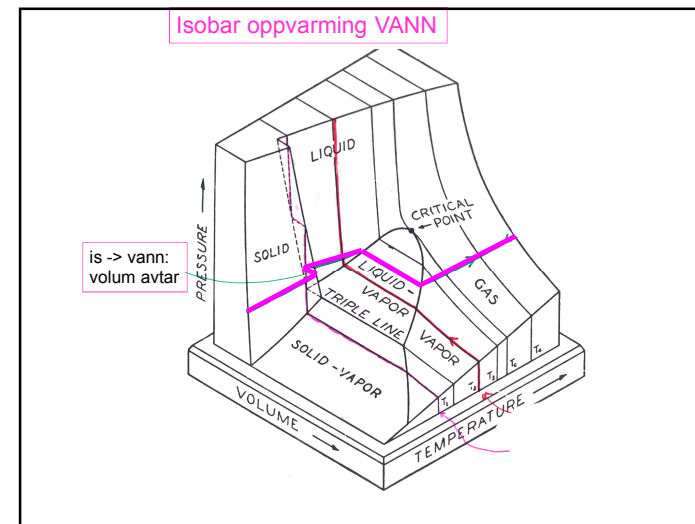
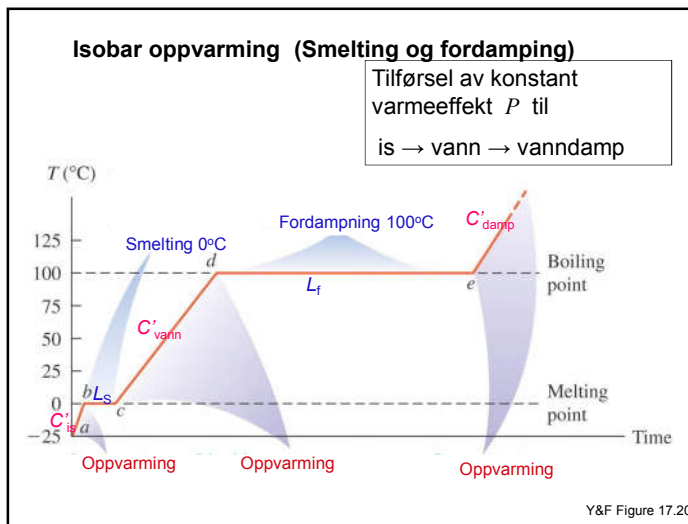
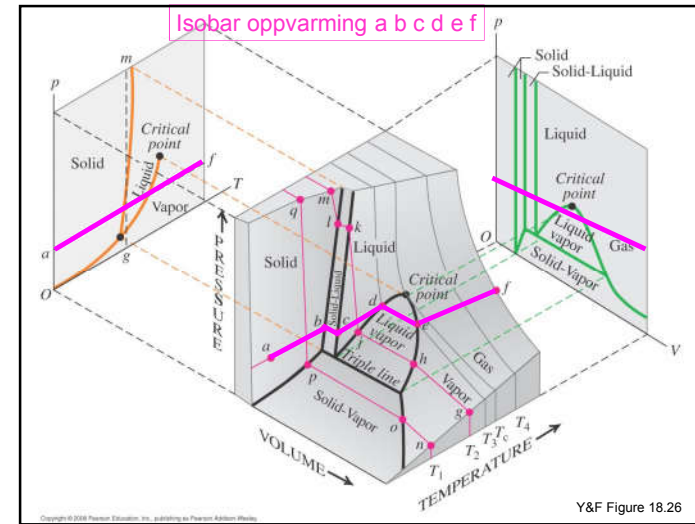
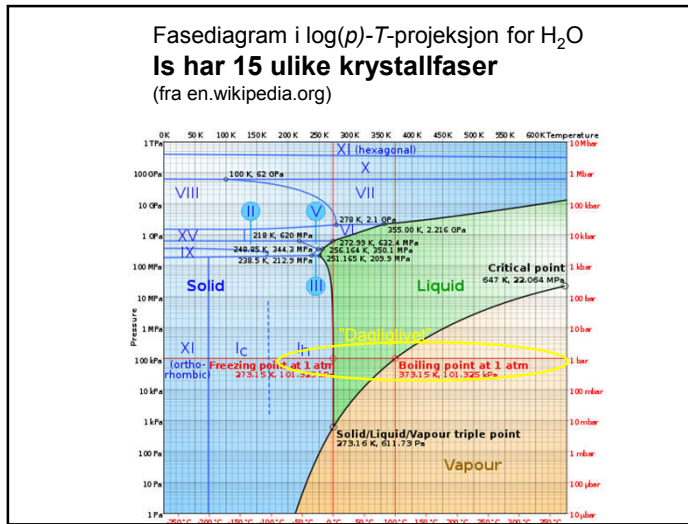


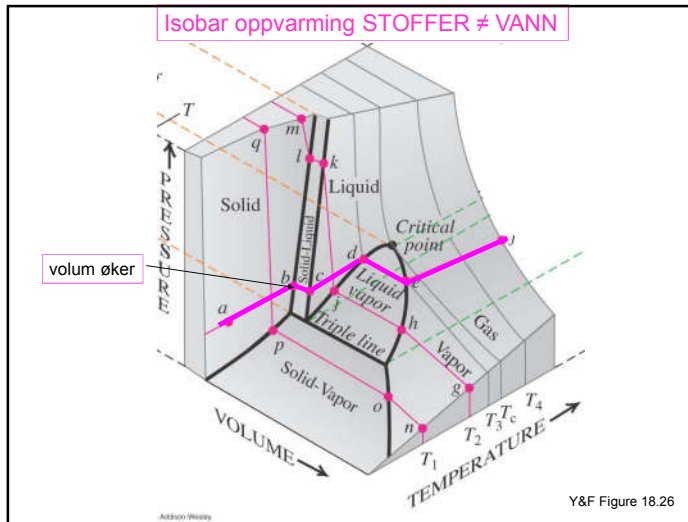


Y&F Figure 18.26









Faseoverganger. Oppsummering

- Fasediagram i pVT -rommet viser hvilke områder de tre faser fast, væske, gass kan eksistere hver for seg og sammen. Gjelder for reine faser (én type stoff).
- I fasediagram i pT -projeksjon er sameksistensflatene kurver. Fasediagram i pV -projeksjon også ofte brukes.
- Smelting (fast \rightarrow væske): L'_s = spesifikk smeltevarme (J/kg)
- Fordamping (væske \rightarrow gass) : L'_f = spesifikk fordampingsvarme (J/kg)
- I pT -plott har sameksistenskurve væske/gass $dp/dT > 0$.
- I pT -plott har sameksistenskurve fast/væske $dp/dT > 0$, **unntatt H_2O** fordi is har større volum enn vann.
- Sameksistenskurve væske/gass har et maksimalt (kritisk) punkt (p_{krit} , T_{krit}). For $p > p_{krit}$ og/eller $T > T_{krit}$ har væske og gass samme egenskaper.