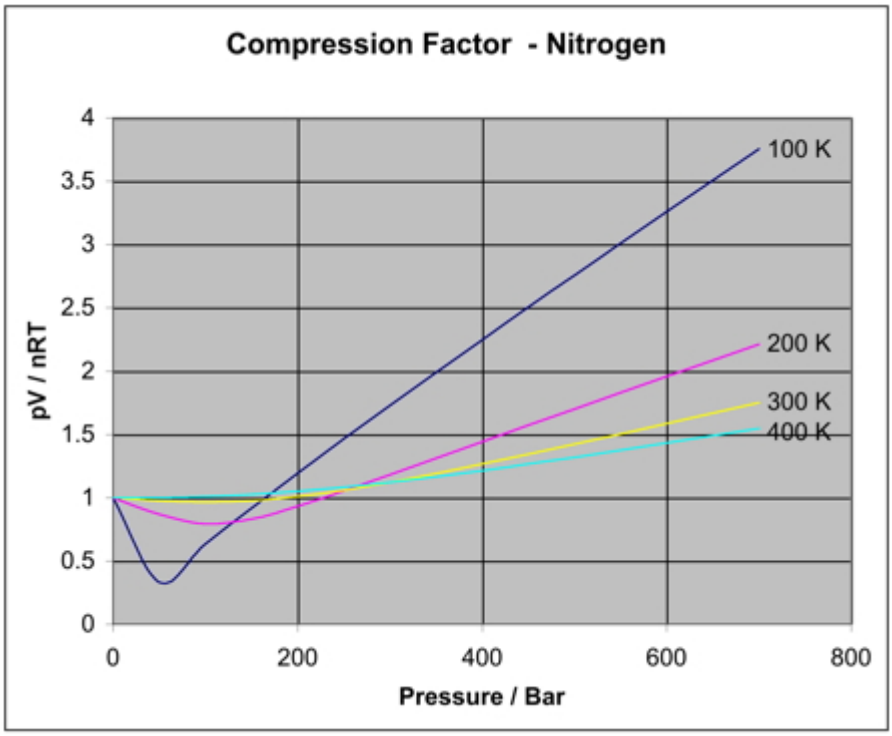
REAL GASES

1. You will be familiar with these graphs of compression factor against pressure for nitrogen at various temperatures from the Chemguide page you have just read:



a) If nitrogen was an ideal gas, what would these graphs look like? Explain your answer.

b) When we do calculations involving nitrogen at ordinary lab temperatures and pressures, we treat it as an ideal gas. How do these graphs justify that?

c) An ideal gas would have molecules which have a negligible volume compared with the volume of the container. Explain why, in a real gas, the gas becomes less ideal the higher the pressure.

d) Explain, using diagrams, why intermolecular attractions in a real gas have the effect of lowering the value of the compression factor.

e) Considering the nitrogen graph at 100 K, why does the compression factor fall as you increase the pressure at the beginning of the curve?

f) Still considering the 100 K graph, why does the compression factor increase from then on?

g) Now considering all of the curves, why is the initial fall in the compression factor much more dramatic at lower temperatures?