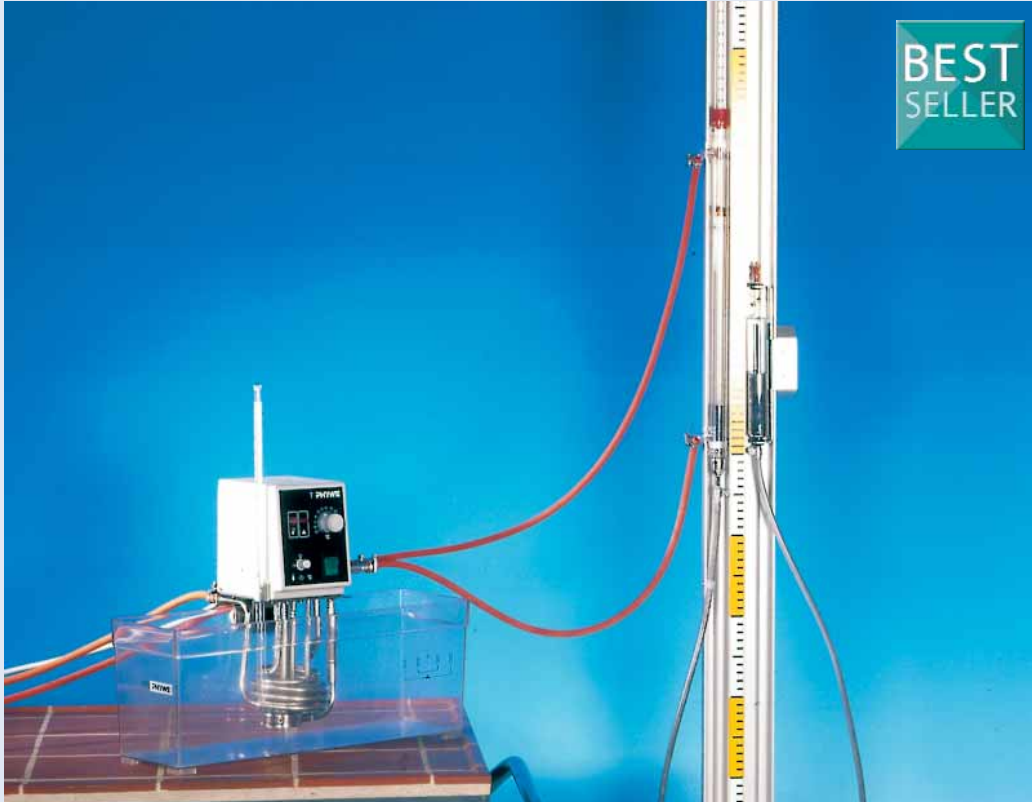


3.2.01-01 Equation of state of ideal gases



What you can learn about ...

- Pressure and temperature
- Volume
- Coefficient of thermal expansion
- Coefficient of thermal tension
- Coefficient of cubic compressibility
- General equation of state for ideal gases
- Universal gas constant
- Boyle and Mariotte's law
- Gay-Lussac's law
- Charles' (Amontons') law

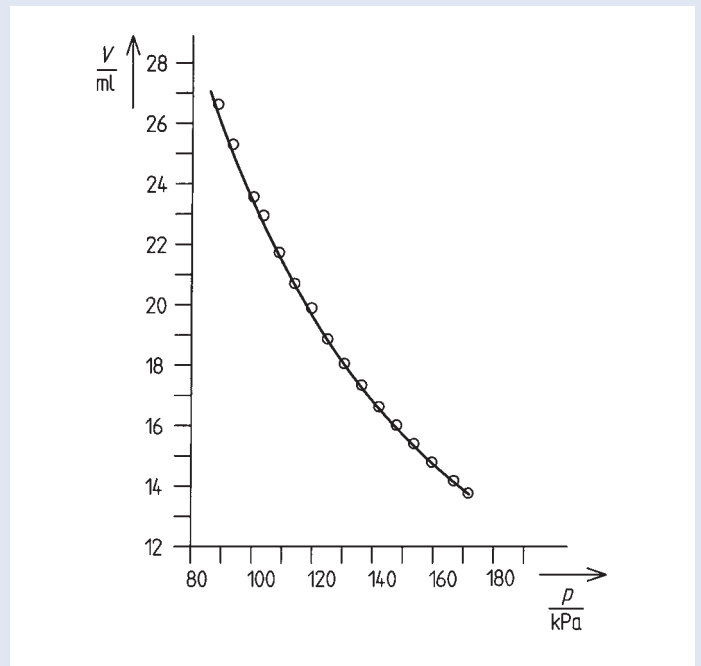
Principle:

The state of a gas is determined by its temperature, its pressure and the amount of substance. For the limiting case of an ideal gas these state variables are linked by the general equation of state, from which special correlations can be derived for specific changes of state.

What you need:

Gas law apparatus	04362.00	1
Immersion thermostat TC10	08492.93	1
Accessory set for TC10	08492.01	1
Bath for thermostat, Makrolon	08487.02	1
Weather monitor, 6 lines LCD	87997.10	1
Laboratory thermometers, -10...+100°C	38056.00	1
Mercury tray	02085.00	1
Support base -PASS-	02005.55	1
Support rod, stainless steel 18/8, $l = 1000$ mm	02034.00	1
Right angle clamp	37697.00	2
Universal clamp	37718.00	2
Pinchcock, width 15 mm	43631.15	1
Hose clip, $d = 8-12$ mm	40996.01	6
Rubber tubing, $d_i = 6$ mm, $l = 1$ m	39282.00	1
Mercury, filtered, 1000 g	31776.70	1
Water, distilled 5 l	31246.81	1

Complete Equipment Set, Manual on CD-ROM included
Equation of state of ideal gases P2320101



Correlation between pressure p and volume V for a constant quantity of air ($n = 0.9536$ mmol) during an isothermic change of state ($T = 298.15$ K).

Tasks:

For a constant amount of gas (air) investigate the correlation of

1. Volume and pressure at constant temperature (Boyle and Mariotte's law)
2. Volume and temperature at constant pressure (Gay-Lussac's law)
3. Pressure and temperature at constant volume (Charles' (Amontons' law))

From the relationships obtained calculate the universal gas constant as well as the coefficient of thermal expansion, the coefficient of thermal tension, and the coefficient of cubic compressibility.