

3.4.02-00 Vapour pressure of water below 100°C – Molar heat of vaporization



What you can learn about ...

- Pressure
- Temperature
- Volume
- Vaporization
- Vapour pressure
- Clausius-Clapeyron equation

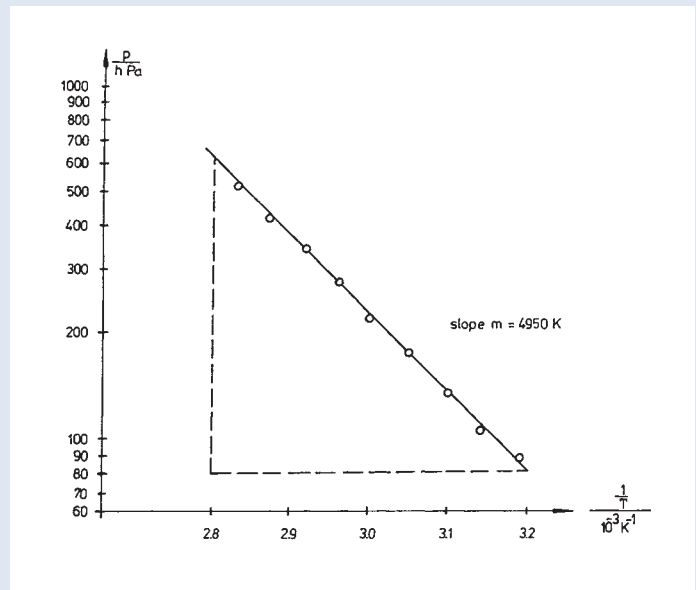
Principle:

The vapour pressure of water in the range of 40°C to 85°C is investigated. It is shown that the Clausius-Clapeyron equation describes the relation between temperature and pressure in an adequate manner. An average value for the heat of vaporization of water is determined.

What you need:

Manometer -1.0...0.6 bar	03105.00	1
Thermometer, -10...+110 °C	38005.02	2
Round flask, 100 ml, 3 necks, GL25, 2 x GL18	35677.15	1
Glass stopcocks, 1 way, right-angled	36705.01	1
Vacuum pump, rotary sliding-vane, one-stage	02750.93	1
Magnetic stirrer, Heating, Temperature-connection, 10 l	35731.93	1
Magnetic stirring rod, cylindrical, $l = 30$ mm	46299.02	2
Glass tube 200 mm ext. $d = 8$ mm	64807.00	1
Gasket for GL 18, 8 mm hole, 10 pcs	41242.03	1
Rubber tubing, vacuum, i.d. = 8 mm	39288.00	1
Rubber tubing, $d = 12$ mm	39285.00	1
Support base -PASS-	02005.55	1
Support rod -PASS-, square, $l = 630$ mm	02027.55	1
Support rod with hole, stainless steel, $l = 50$ cm, M10 thread	02022.20	1
Universal clamp with joint	37716.00	2
Right angle clamp -PASS-	02040.55	2
Beaker, DURAN®, short form, 400 ml	36014.00	1
Beaker, DURAN®, short form, 600 ml	36015.00	1
Water, distilled 5 l	31246.81	1

Complete Equipment Set, Manual on CD-ROM included
 Vapour pressure of water below 100°C –
 Molar heat of vaporization P2340200



Semilogarithmic representation of vapour pressure p as a function of $1/T$.

Tasks:

1. About 250 ml of de-mineralized water are allowed to boil for about 10 minutes to eliminate all traces of dissolved gas. The water is then cooled down to room temperature.
2. The 3-neck round flask is filled about three-quarters full with gas-free water and heated. At 35°C the space above the water within the round flask is evacuated. Further heating causes an increase in pressure p and temperature t of water within the round flask. p and t are read in steps of 5 °C up to a maximum of $t = 85$ °C.