

## Joule-Thomson effect

Article no: P2320600



### Principle

A stream of gas is fed to a throttling point, where the gas ( $\text{CO}_2$  or  $\text{N}_2$ ) undergoes adiabatic expansion. The differences in temperature established between the two sides of the throttle point are measured at various pressures and the Joule-Thomson coefficients of the gases in question are calculated.

### Benefits

- For both demonstration and student experiments
- With detailed experiment guide
- Affordable set-up

### Tasks

1. Determination of the Joule-Thomson coefficient of  $\text{CO}_2$ .
2. Determination of the Joule-Thomson coefficient of  $\text{N}_2$ .

### Learning objectives

- Real gas
- Intrinsic energy
- Gay-Lussac theory
- Throttling
- Van der Waals equation
- Van der Waals force
- Inverse Joule-Thomson effect
- Inversion temperature

## Scope of delivery

Joule-Thomson apparatus	04361-00	1
Universal power supply, 600mA 3/4.5/5/6/7.5/9/12V, incl. 9 adaptors	11078-99	1
Reducing valve for CO2 / He	33481-00	1
Reducing valve f.nitrogen	33483-00	1
Wrench for steel cylinders	40322-00	1
Gas-cylinder Trolley for 2 Cyl.	41790-20	1
Steel cylinder,CO2, 10l, full	41761-00	1
Steel cylinder,nitrogen,10l, full	41763-00	1
Hose clip f.12-20 diameter tube	40995-00	2
PVC tubing webbed, inner dia. = 8 mm, l = 1 m	47528-01	2
Cobra SMARTsense High Precision Temperature - Sensor for measuring temperature, -50 ... +150 °C (Bluetooth + USB)	12950-00	1