



C3.1.1  
PROPERTIES OF GASES

C3.1.1.1  
Determination of the density  
of gases

Determination of the density of gases (C3.1.1.1)

Cat. No.	Description	C3.1.1.1
379 07	Sphere with 2 stopcocks, glass, 1 l	1
667 072	Support ring for round flask, 250 ml, cork	1
SAP R313	Precision Balance Practum 313-1S	1
375 58	Hand vacuum pump	1
665 913	Gas syringe, 100 ml with 1-way stopcock	1
661 000	Minican pressurised gas canister, nitrogen	1
660 998	Minican pressurised gas canister, oxygen	1
660 980	Fine regulating valve for minican gas canisters	1
604 481	Rubber tubing, 1 m x 4 mm diam., DIN 12865	1
667 183	Rubber tubing, 1 m x 8 mm diam., DIN 12865	1
604 510	Tubing connector, 4...15 mm	2
661 082	Stopcock grease, 60 g	1

A gas is a collection of molecules which are separated by great distances from one another and are in chaotic motion. It completely fills any volume which is available to it. In so doing, it always has the same volume, regardless of which gas it is. Because of the large molecular distances, gases are highly compressible.

Density ( $\sigma$ ) is defined as mass ( $m$ ) per unit volume ( $V$ ):

$$\sigma = \frac{V}{m}$$

In experiment C3.1.1.1, a sphere of known volume with two stopcocks is used to determine the density of various gases. The mass of the enclosed air is determined from the measured difference between the total weight of the sphere filled with gas and the empty weight of the evacuated sphere.