

Most laboratory gas users will have to use some equipment to control pressure and/or flow rate. A pressure regulator will usually be central to the safe delivery of the gas.

Regulators prevent system over pressurisation when valves are closed down-stream of supply. Regulators can be single-stage or

## TYPE

multi-stage (two stage). A single stage regulator will accept a high variable inlet pressure and allow adjustment of a lower steady outlet pressure. Unfortunately, in the case of permanent and dissolved gases, single stage regulators can exhibit a tendency to rising outlet pressure as the cylinder they are connected to empties.

As the cylinder empties, the regulator valve spring pushes the valve further open. If a steady outlet pressure is needed this can be, at least, troublesome. Liquefied gases have less tendency to this problem as the single stage regulator accepts vapour pressure, which varies with ambient temperature not cylinder contents.

Consequently, two-stage regulators are favoured for:

- ◆ steady outlet pressure
- ◆ finer control over outlet pressure

These benefits are achieved by having two regulators joined in series within one piece of equipment.

Tied diaphragm means that as the user closes the regulator down a positive (rather than passive) force is exerted automatically on the valve, ensuring positive shut-off.

## SERVICE AND FUNCTION

Make sure you have the right regulator to do the job and to do it safely.

Take into consideration:

**Inlet pressure**  
Filled pressures of cylinders can vary as can maximum rated inlet pressures of regulators. Our regulators are designed and constructed to safely accept up to 300 barg inlet pressures!

**Material compatibilities**  
Check whether the regulator contains any materials that might react or degrade with the gas you intend to pass through it - the regulator should have the name of the gas to be used on it - they must not be interchanged.

**Outlet pressure**  
Check whether the regulator will deliver the right pressure for the application. Regulators vary in their outlet pressures.

**Heating**  
Check whether the regulator will need to be heated; whether gas sampling is required and whether an inlet pressure gauge or outlet pressure gauge is necessary.

GET THE RIGHT  
EQUIPMENT AT THE OUTSET  
THE REGULATOR IS IMPORTANT  
ENSURE ONGOING SAFETY BY  
CARE AND MAINTENANCE

## CARE AND MAINTENANCE

Gas control equipment cannot be expected to last indefinitely and old regulators have failed in service.

Regulators are precision instruments and must not be handled violently or allowed to get dirty.

Proposed checking procedure

1. List the scheduled maintenance checks to be carried out at least annually. Keep a record and record alongside it any functional checks recommended by the supplier. Ensure that no unauthorised repairs have been carried out.

2. List scheduled replacement items.  
The manufacturer will have a safe working life for each item, which must be replaced according to their instructions.

For cylinder gases a regulator life of 5 years will generally be quoted\*. A regulator will age irrespective of the amount of use it is put to. Our regulators are 'tagged' before despatch with Serial No., Date of Manufacture and Expiry Date.

## FLOW CONTROL

The regulator controls pressure, but not flow. If you need flow control, connect a suitable flow gauge or flow meter. Such items should also have an appropriate care and maintenance programme.

Other items of gas control equipment may well be necessary in a laboratory gas system. If, for example, a fuel gas is mixed with an oxidising gas and the mixture is then burned, non-return valves and flame arresting elements such as flashback arrestors would be prudent.

Purging, and the mechanisms to allow this, may be necessary to ensure gas purity and, not least, safety to the person changing the cylinder.

Pressure relief could be considered. A pressure regulator failure may not only be a potentially serious safety issue but could also damage a sensitive piece of equipment. An additional fail-safe device such as an excess flow valve to detect the effect of a leak and automatically isolate the supply may be fitted.

\* In corrosive gas service, this interval is reduced to two years. Stainless steel regulators for high purity and/or corrosive service are also available.