

An introduction to...

Integrated valves

For nearly 100 years, and until recently, gas suppliers through the decades have relied on the use of simple valves to discharge their products from the gas cylinders in which they are supplied, and to ensure these gases remain firmly sealed within the cylinder.

Gas is stored in cylinders under high pressures that can go as high as 300 bar. Although this pressure drops as the gas is released from the cylinder, traditional valves do not control or have any effect on the pressure. Since most gas users require gas at pressures only up to about 3 bar, regulators had to be introduced as an additional component of the supply system to adjust the pressure. It had come to be widely accepted that gas customers needed to buy a pressure regulator in order to be able to use the gas they purchased.

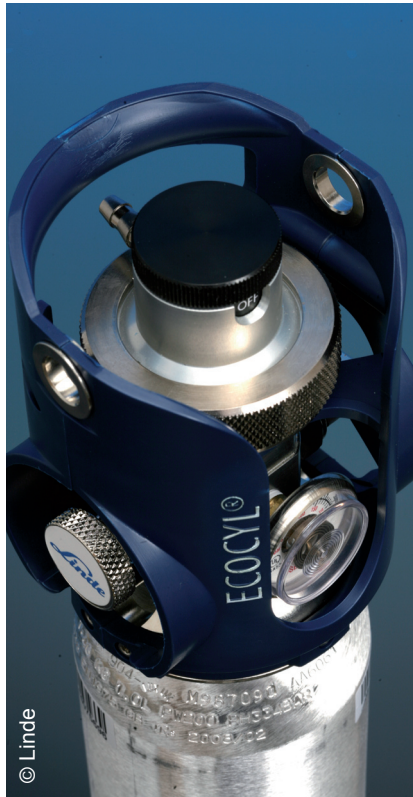
"This mandatory valve/regular set-up did unfortunately create the opportunity for bad connections to produce leaks and for impurities from the outside air to enter the cylinder and contaminate the gas," says The Linde Group's Steve Harrison, Head of Specialty Gases and Specialty Equipment.

"A gas supply system is only as good as its weakest component and a cumbersome supply system like this inevitably created the risk for something to go wrong, with all the associated cost implications."

The evolution of the integrated valve began about 10 to 15 years ago, as gas suppliers acknowledged a need to make this process more efficient and productive. Pressure regulators were designed to be integrated into the valve, making it a simple procedure to discharge the cylinder contents at a usable pressure.

This type of integration presented quite a complex engineering challenge. Apart from having to combine two different operations in a single unit robust enough to withstand the rigours of road transport, the integrated valve had to be sufficiently compact to fit on the top of cylinders of all sizes, right down to a miniature cylinder with a 10 cm diameter top.

A significant challenge was to miniaturise an integrated valve for these small cylinders. Linde Gases' R&D and engineering teams, for example, initially designed these to supply the gas coming



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out of the cylinder at pressures up to 4 bar to suit the most common requirement of its customer base in this arena.

The result, the ECOCYL®, was small, portable and refillable cylinder, representing the state-of-the-art in integrated valves worldwide, the company claims. The cylinder features an integrated cylinder valve, pressure regulator and flow control all within the cylinder, which are permanently protected by a specially

designed protective cowling. This reduces the risk associated with connecting hoses and makes them safer and easier to handle than cylinders requiring connections and other associated gas handling equipment. The result is an easy, ready for use system.

Step beyond

However, compact, highly portable cylinders are also needed to calibrate gas detectors or gas sensors, which are often small portable devices affixed to the clothing of operators and technicians who work in hazardous environments, to monitor the safety of the ambient air.

The latest generation of gas detectors launched onto the market are very simple to use. At the end of each day, the operator only has to put the gas detector into a docking station that not only recharges its battery, but is also pre-programmed to check the sensors are correctly responding to the gas.

The kind of integrated regular and valve harnessed for this particular market segment is one step beyond what has been achieved before now. The ECOCYL OSQ from Linde Gases, for example, a demand valve regulator version of the ECOYCL, represents the leading edge of integrated valves.

This refillable cylinder for portable calibration and testing of highly sensitive environmental monitoring devices is a specific innovation with a specific purpose. The cylinder employs a unique negative pressure technology, guaranteeing precision in the calibration gas delivery requirements for ultra-sensitive instruments, which can be susceptible to damage from the positive gas pressure usually applied by other gas cylinders.

Most importantly it also supports a higher level of safety in the chemicals, utilities, processing and petrochemical industries. □

WITH THANKS...

gasworld would like to express its thanks to Linde Gases for contributing this month's equipment profile.