

ECOCYL[®] VAH and VSH. The portable HiQ[®] specialty gas solutions.

Introduction

In today's industry, a broad range of gases and chemicals are used. Particularly, the chemical, the pharmaceutical and the biotech industries have a high demand of gas products. Many of them are used as raw materials for chemical synthesis, others are used as intermediate products or serve as catalysts in chemical reactions.

Most processes and syntheses are tested on a laboratory scale after their development. If this test phase is successful, it is followed by a pilot phase before production on an industrial scale is initiated. For both phases, only small amounts of gases and chemicals are necessary. These gases are often toxic or hazardous and therefore require detailed knowledge regarding storage, handling and disposal etc. both on the part of the customer and the supplier.

Normally, these products are supplied in high-pressure and disposable gas cylinders. The cylinder size may vary from 0.4 up to 10 litres, according to consumption and requested mobility. However, in most cases only small gas amounts are needed. Therefore, the smallest cylinder size available (≤ 1 litre) is usually sufficient.



Requirements

Most applications require a needle valve to regulate the gas flow. Pressure is usually less important, since most products are liquefied and only have a low vapour pressure. The protection cap, if present, does neither cover the main valve nor the regulating valve. This represents a considerable safety risk, especially when the cylinders are moved or transported during their use. Moreover, disconnecting the regulating valve from one cylinder and connecting it to another is difficult and requires a dedicated end user training.

Solution

Linde has developed a unique and environmentally friendly solution for these problems. ECOCYL[®] is a small, refillable cylinder equipped with an integrated cylinder valve with a direct flow regulating function. The unique valve design allows direct and accurate flow adjustment without the need for an additional flow regulator. The valve is fully integrated into the cylinder's protection cap. Therefore, the system is safe and easy to handle. End users only have to open the cylinder valve until the required flow is reached.

The model ECOCYL[®] VAH is basically suitable for all acid gases, whereas the ECOCYL[®] VSH is used with alkaline-related gases. However, both are also suitable for most other gases, including those with an oxidation potential.

With ECOCYL[®] VAH and ECOCYL[®] VSH, Linde covers the business area of truly portable cylinders with integrated equipment, fully protected by a proper cylinder cap. Furthermore, the model ECOCYL[®] RSH is available for pure gases and a wide range of gas mixtures.

Safety

Like all other cylinder valves, the special regulating valves used in Linde's ECOCYL[®] VAH and ECOCYL[®] VSH have been tested according to EN-ISO 10297 in order to comply with the Transportable Pressure Equipment Directive (TPED, European Council Directive 1999/36/EC). Approved units are marked with the Greek letter π (pi), often followed by 4 digits.

**Technical data
overall unit**

| | |
|-----------------------------|--|
| Diameter | 9.5 cm |
| Height | 39 cm |
| Weight | (Empty) 2.9 kg |
| Filling pressure | 150 bar g maximum |
| Gas volume | Dependent on gas |
| Outlet pressure | 150 bar g maximum, dependent on gas |
| Outlet flow | Variable and adjustable with main valve |
| Outlet connection | 6 and 8 mm hose connection |
| Inlet connection (cylinder) | 17E - W 19.8 x 1/14", according to ISO 11116-1 |

**Technical data
cylinder**

| | |
|--|---|
| Diameter | 9.0 cm |
| Height | 27 cm |
| Volume | 1 litre |
| Weight | 1.9 kg |
| Material | Seamless steel cylinder |
| Filling pressure | 150 bar g (suited for a maximum operating pressure of 200 bar g to enable future product expansion) |
| Test pressure | 300 bar g |
| Tested according to | TPED - EN1964-1 |
| Cylinder connection | 17E - W 19.8 x 1/14", according to ISO 11116-1 |
| Torque between valve and cylinder (according to EN-ISO 13341) | VAH (ASB) 120-150 Nm VSH (SS) 80-100 Nm |

**Technical data
main cylinder valve**

| | |
|-------------------------------|--|
| Main body | 3.5 cm ² |
| Height | 11 cm |
| Weight | 0.63 kg |
| Material | Stainless steel and aluminium silicon bronze |
| Surface treatment | None |
| Maximum pressure | 150 bar g |
| Valve connection | 17E - W 19.8 x 1/14", according to ISO 11116-1 |
| Outlet pressure | 150 bar g, dependent on gas |
| Outlet flow | Dependent on gas |
| Outlet connection | 6 and 8 mm universal hose connection |
| Inlet connection filling port | Customised; 7/16-24UNS-2A |

**Technical data
protection cap**

| | |
|-----------------------------|---------------------------|
| Diameter | 9.5 cm |
| Height | 13 cm |
| Weight | 0.13 kg |
| Material | Polyacetal |
| Screw connection tool sizes | 3/32" and 7/64" hexagonal |

**Linde AG**

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