

06th June 2024

Hydrogen compression with screw compressors

Efficient and reliable solutions for the hydrogen economy

Hydrogen is regarded as the energy carrier of the future and is an important milestone for the decarbonisation of industry. As a strong partner to the process industry, AERZEN has been dealing with the topic of hydrogen compression for decades and therefore has a high level of expertise in this field. The compressor specialist's state-of-the-art technologies are in demand worldwide and warrant efficient and safe compression. The VR and VMY series screw compressors have proven particularly successful in this regard.

Hydrogen is the lightest element present, which makes compression fundamentally more difficult. As it has a very low energy density in relation to the volume flow (energy content per volume unit), large electrolysis plants also have to compress correspondingly high volume flows, which has an effect on the sizes and, thus, on the investment costs, footprint, etc. of the machine equipment. In addition, hydrogen is very reactive, i.e. highly flammable. Special attention is, therefore, paid to the required explosion protection. The formation of an ignitable mixture with the atmospheric oxygen must be avoided at all costs.

The advantages of screw compressors for the compression of hydrogen

For the compression of hydrogen in the low-pressure range, screw compressors are a sensible solution or supplement to high-pressure compressors. Due to their design-related internal compression without free inertia forces, screws are above all reliable and flexible endurance runners with very low maintenance intensity and comparatively low operating costs in full and partial load operation. The AERZEN range includes both oil-free (VRA and VRW series) and oil flooded (VMY series) versions and achieves top marks in the fields of efficiency, installation space, economy and process reliability. All solutions are reconciled by the AERZEN process gas specialists to the customer's individual process.

VRW: maximum efficiency and increased differential pressure in one stage

The [oil-free compressors of the VRW series](#) (volume flows up to 6,000 m³/h, differential pressures from 3 to 9 bar) have been specially developed for the compression of saturated electrolysis hydrogen with unrivalled efficiency and differential pressure. Compression is based on the principle of oil-flooded screw compressors - with a small but subtle difference: the oil was replaced by water. The water serves both to cool the gas and to seal the gap, enabling compression to higher differential pressures with high efficiency. This stage can, thus, replace a two-stage system with classic oil-free screw compressors and is even more

energy-efficient. For the customers, this results in significant advantages in terms of footprint as well as investment and operating costs.

VMY: highest differential pressures, maximum flexibility

The [oil-injected screw compressors of the VMY series](#) deliver the highest differential pressures and compression ratios in the AERZEN product portfolio (volume flows from 190 to 23,000 m³/h, differential pressures from 3 to 20 bar) and are characterised by maximum reliability and low operating costs. They are insensitive to fluctuating process parameters and gas compositions and are equipped with a control valve for infinitely variable control of the volume flow. The secondary rotor is not driven by timing gears (as with oil-free compressors), but by direct power transmission from the driven rotor. The oil injection quantity regulates the outlet temperature and, in case of humid gases, it is ensured that the oil is always compressed above the specific dew point temperatures. This reliably prevents the failure of water in the oil/gaseous mixture.

You will find AERZEN at ACHEMA 2024 in hall 8, stand D38.

(3,730 characters incl. spaces)

About AERZEN

Industrial plants all over the world are supplied with gaseous media using AERZEN blowers and compressors. The innovative AERZEN machine technology represents experience gained over more than 160 years of company history. The AERZEN product portfolio includes rotary lobe compressors, positive displacement blowers, turbo blowers and screw compressors and, in addition to standard products, also offers customised special solutions. Digital services can be used to increase efficiency, availability and productivity in a sustainable and future-oriented manner. In addition, AERZEN After Sales Service offers the full range of services - from full maintenance contracts to repairs and modernisations of existing plants.

Image overview:



AERZEN-VRW.jpg The oil-free screw compressors in the VRW series bring large H₂ volume flows to higher intermediate pressures, making them the perfect link between electrolyzers and high-pressure compressors

Image: AERZEN



AERZEN-VMY.jpg The oil-injected screw compressors in the VMY series deliver the highest differential pressures and compression ratios in the AERZEN product portfolio

Image: AERZEN

Keywords: Hydrogen compression, screw compressors, reliability, hydrogen

Meta title: AERZEN efficient hydrogen compression

Meta Description: AERZEN offers a wide range of trend-setting screw compressors for hydrogen compression.

Deeplinks:

<https://www.aerzen.com/de/produkt/water-injected-screw-compressor-series-vrw>

<https://www.aerzen.com/de/produkt/oeleingespritzte-schrauben-verdichter-baureihe-vmv>

Press release



Contact

Sebastian Meißler

Aerzener Maschinenfabrik GmbH • Reherweg 28 • 31855 Aerzen

Phone: 05154/81-9970 • Fax: 0049 (0) 5154/81-709970

sebastian.meissler@aerzen.com • www.aerzen.com

Press office

Köhler + Partner GmbH

Brauerstraße 42 • 21244 Buchholz i.d.N.

Phone +49 4181 92892-0 • Fax +49 4181 92892-55

E-mail: info@koehler-partner.de • www.koehler-partner.de