C. OTTO GEHRCKENS
SEAL TECHNOLOGY

Hydrogen technology sealed for the future.

Material innovations for H_2 applications

H2 Seal

COG.de/en

Custom seal solutions

Whether O-rings or moulded parts – as a manufacturer with our own production facilities and toolshop, we tailor the elastomer components required for your seal solution to your specific requirements. And this of course also applies to the materials in our H_2 Seal range. This means we make tomorrow's technology available today!

Any questions? Here are the answers!

If you require further information, or have specific questions about the materials in the H_2 Seal series, COG's experts will of course be pleased to help you. Detailed data sheets for all these, as well as countless other materials, can always be found on our website. Or visit our product advisor at www.COG.de.

Material innovations for tomorrow

Mobility, energy and industry – modern hydrogen technologies display enormous potential in many sectors. Hydrogen is of central importance as a versatile energy source, and also offers new possibilities for production processes as a chemical raw material.

All over the world, experts from science and business are researching the extensive field of hydrogen technologies refining their practical application. Among the most important factors for success are perfectly compatible components, whereby in particular the seals are of utmost importance for proper functioning.

Certified safety in series production

COG has designed the high performance H_2 range of materials to be used in the widest range of applications involving hydrogen. As experienced sealing experts, COG can draw on its strong expertise when developing tailor-made solutions for H_2 applications. For maximum dependability, these special materials exhibit especially low levels of hydrogen permeability, which has been certified in an extensive series of tests.

H2 Seal

Highest demands on seals

Hydrogen is used as a colourless, odourless gas which easily evaporates and is extremely flammable. For this reason, H_2 applications present seals with an enormous challenge on safety grounds. Hydrogen production using electrolysis is a complex and energy-intensive process. For financial reasons, losses from H_2 evaporation should be prevented at any cost. The lowest possible H_2 permeability is the central requirement of the materials used in these applications.

Elastomer specialists for H_2 applications

AP 208 (EPDM)

Robust, long-lasting and flexible at low temperatures – this AP 208 material, developed specially for H_2 applications, combines the properties of EPDM with hydrogen impermeability that is above average in its class. This blue compound also performs well with a compression set of < 15 % and an operating temperature of right down to -55 °C.

Properties

- H_2 Seal tested
- Good hydrogen permeation coefficient
- Peroxidically cross-linked
- Operating temperature from -55 to +140 °C
- Very low compression set: < 15 %

COG material	AP 208	Vi 208
Basic elastomer	EPDM	FKM
Colour	blue	blue
Operating temperature	from -55 °C to +140 °C	from -10 to +200 °C
Approval	H_2 Seal	H_2 Seal
Rubber technology values		
Hardness Shore A (DIN ISO 48)	70 ± 5	80 ± 5
Hardness °IRHD (DIN ISO 48)	70 ± 5	80 ± 5
Tear resistance (DIN 53 504)	> 7 MPa	> 15 MPa
Ultimate elongation (DIN 53 504)	> 150 %	> 150 %
Compression set (DIN ISO 815)	< 15 % (24 h/100 °C)	< 15 % (24 h/200 °C)

Vi 208 (FKM)

This blue material Vi 208 offers the wide range of uses of an FKM in combination with an excellent H_2 impermeability that goes far beyond the normal level expected from a conventional FKM. Good resistance to chemicals and an operating temperature range of -10 to +200 °C make Vi 208 a powerful all-rounder for H_2 applications.

Properties

- H_2 Seal tested
- Very good hydrogen permeation coefficient
- Excellent resistance to chemicals
- Operating temperature from -10 to +200 °C
- Low compression set < 15 %

Tested and passes with flying colours

The permeation test proves it

These H_2 seal materials are the result of intensive development work, and their optimum suitability for use as sealing components in hydrogen technology applications has been proven by an independent testing laboratory in extensive tests. Compared with conventional EPDM and FKM materials, AP 208 and Vi 208 offer considerably lower H2 permeation rates – a must for hydrogen applications.

H_2 permeation at 23 °C/pressure 5 bar		
	AP 208	Vi 208
T/°C	23,0	23,0
Δp/bar	1,0	1,0
P coefficient /Ncm³ mm m⁻² day⁻¹ bar⁻¹	1317	281

Ncm³: standardised volume at 237,15 K and 1,01325 bar
Δp: partial pressure differential

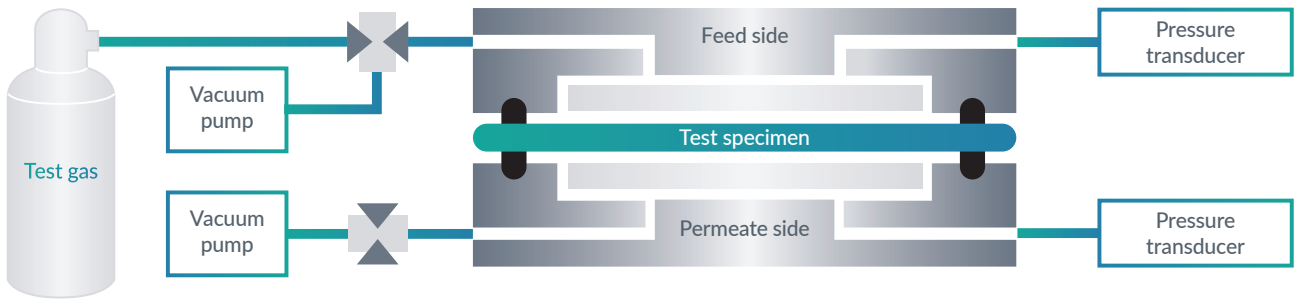
Permeability professionally certified

The H_2 gas permeability was measured in a rising pressure method based on DIN 53380. The hydrogen permeation coefficient was determined for three specimens each of AP 208 and Vi 208.

The material sample thickness was determined at ten different points on the sample and then, in accordance with DIN 53380, was specified as the arithmetic mean of the individual measurements carried out.

How the tests were performed

The tests were performed using pressurised H_2 (quality grade 5.0) at a constant test temperature of 23 °C, with temperature accuracy of ±1 °C. For the purposes of the experiment, the gas permeability was determined in four steps: degassing, determination of the sample-specific blank value, measurement and determination of the volume.



climate neutral business PK-DE-00733

More informations at **www.COG.de** or contact us directly.

COG at a glance

- Founded in 1867 in Pinneberg, near Hamburg
- Independent family business employing over 270 staff
- World's largest O-ring warehouse (over 45,000 items kept in stock for immediate delivery)
- State of the art logistics centre for maximum delivery capability
- Quality management to DIN EN ISO 9001
- Environmental management to DIN EN ISO 14001
- Climate-neutral business operations according to PRIMAKLIMA
- Close cooperation with leading manufacturers of raw materials
- COG's technology centre for material development

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