



C. OTTO GEHRCKENS  
SEAL TECHNOLOGY



# Explosive Decompression. No problem.

High-tech compounds for the  
oil and gas industry



# Highest resistance for maximum safety

Extreme, rapid pressure changes make the greatest demands of all components. In particular, seals that need to seal off gaseous media are exposed to extreme stress when the gas sinks from high pressure to low pressure in just a short time.

This phenomenon, known as explosive decompression, often leads to leaks, because the seals used cannot withstand the high stress. To guarantee the greatest possible safety levels, selecting a suitable material is extremely important.

## Serious damage

The phenomenon of explosive decompression occurs in various sectors of industry, and affects the widest range of components. It typically occurs in the oil and gas industry, in which the highest safety standards apply. In this sector, elastomer seals can be found in pig trap valves, gate valves, ball valves and various control valves, for example. But elastomer seals are also exposed to explosive decompression in the fields of compressor construction and compressed air preparation.

Many manufacturers and operators in the petrochemical industry and mechanical engineering sector therefore often experience leaks as a result of damaged seals. Explosive decompression is in many cases

the cause of the damage to the elastomer seals. This is easy to detect visually, as blistering or surface cracks occur.



*Enlarged view of a conventional sealing ring, which exhibits clear signs of damage as a result of explosive decompression.*

## A job for special materials

Conventional elastomer sealing materials are out of the question for applications in which explosive decompression occurs. Only specially developed elastomers, which distinguish themselves by their excellent physical properties, are suitable for such applications.

Seals made from COG's special materials are able to withstand explosive decompression and can prevent expensive leaks. In the fields of compressor construction and oil production, the special compounds hold their own even in long-term tests, and therefore achieve optimum sealing results in the widest variety of sectors.

## **i** **NORSOK**

*The NORSOK M-710 standard was developed by the Norwegian oil and gas industry, and is a procedure for testing seal materials' resistance to explosive decompression. Testing the effects of acid gas on the polymer forms a further component of this standard. As a result of these high demands, the NORSOK standard is today one of the most important worldwide standards.*



*The extreme physical stresses, combined with the most demanding safety standards, make high-performance materials essential for sealing components, especially for oil production.*

## **i** **Safely standardised according to NACE**

*The American NACE standards include procedures for testing elastomer sealing materials' resistance when exposed to high temperatures and high pressure. For applications where strong pressure drops occur (explosive decompression), the NACE TM0297 standard is the decisive safety standard in the USA. For elastomer seals' requirements when additionally exposed to an acid gas environment, standard NACE TM0187 applies.*



# All AED compounds at a glance

For the high demands on elastomer seals against explosive decompression (AED/Anti Explosive Decompression or RGD/Rapid Gas Decompression) COG offers a wide range of AED compounds which were especially developed for use in this sector. Among them you can find not only HNBR and FKM materials, but also the FFKM compounds in COG's

Resist® range. All compounds have been tested successfully according to the Norsok M-710 (Annex B) standard – the leading international standard for this field of application and renowned for safety for applications where explosive decompression may occur.



## HNBR 899 (HNBR)

The HNBR 899 has passed the Norsok M-710 (Annex B) test with the best possible rating of „0000“. This HNBR is a multi-purpose compound which is usable in different industrial applications. Due to the chemical resistance e. g. to mineral oils with additives or oil and grease in combination with a low gas or vapour permeability this compound is an optimal choice for many applications.

## Properties

- Outstanding resistance to explosive decompression
- Norsok M-710 (Annex B) tested
- High chemical resistance
- High mechanical strength
- Low gas and vapour permeability
- Good mechanical properties
- Good oil and grease resistance
- Applicable under high pressure

## Vi 840 (FKM)

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With Norsok M-710 standard and ISO 23936-2 certifications, this interesting material demonstrates excellent resistance to extreme changes in pressure, and is therefore ideal for use in applications where explosive decompression occurs. Furthermore, Vi 840 has been successfully tested according to NACE TM0187, DVGW DIN EN 682 - GBL, and with low temperature resistance, meets the requirements of DIN EN 14141 and the important API 6A and 6D standards.

### Properties

- Very good resistance to explosive decompression
- Certificates: Norsok M-710 (Annex B), ISO 23936-2, NACE TM0187, DVGW DIN EN 682 - GBL
- Fulfills DIN EN 14141 and API 6A & 6D standards
- Excellent low temperature flexibility: -46 °C
- Very good low temperature compression set

## Vi 899 (FKM)

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Next to an excellent low temperature flexibility down to -46 °C the FKM compound Vi 899 offers high resistance to explosive decompression. Vi 899 is suitable for the use in API 6A & 6D compliant valves and wellhead equipment. A good chemical resistance and physical properties complete the performance profile of that high-tech compound.

### Properties

- Very good resistance to explosive decompression
- Norsok M-710 (Annex B) and NACE TM0187 tested
- Good chemical and thermal resistance
- Operating temperature range from -46 °C up to +230 °C
- Fulfills the API 6A & 6D standards
- Good physical properties

## Vi 890 (FKM)

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The compound Vi 890 has proven its ability in praxis for applications where explosive decompression may occur. The compound has been tested successfully to the Norsok M-710 (Annex B) standard and NACE TM0187. The very good Norsok rating of „1100“ makes clear why so many customers trust in the ultimate performance of this compound.

### Properties

- Very good resistance to explosive decompression
- Norsok M-710 (Annex B) and NACE TM0187 tested
- Excellent chemical and thermal resistance
- Operating temperature range from -20 °C up to +210 °C
- Good physical properties
- Applicable under high pressure

## Vi 900 (FKM)

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The FKM compound Vi 900 successfully proved its capabilities as an elastomer seal for use in the oil and gas industries in impressive fashion. The material passed the Norsok M-710 (Annex B) test without any damage whatsoever, achieving the best possible rating: '0000'. Vi 900 therefore demonstrates maximum resistance to explosive decompression. With a TR-10 value of -40 °C, the material even maintains a reliable seal at temperatures right down to -51 °C, therefore meeting all requirements of the important API 6A and 6D standards.

### Properties

- Outstanding resistance to explosive decompression
- Norsok M-710 (Annex B), ISO 23936-2 and NACE TM0187 tested
- Fulfills the API 6A & 6D standards
- Operating temperature range, from -51 °C to +230 °C
- High low temperature flexibility: TR-10 value -40 °C

## COG Resist® RS 92 AED (FFKM)

The high-tech sealing compound COG Resist® RS 92 AED offers the exceptional chemical compatibility of an FFKM, combined with an excellent thermal resistance and has been developed to explosive decompression. Ideal preconditions for a use in all situations where the sealing material comes into contact with high pressure as well as with aggressive media, e. g. in valves, pumps and compressors. A low compression set and an improved leak prevention complete the performance profile of this high-tech compound.

### Properties

- Very good resistance to explosive decompression
- NORSOK M-710 (Annex A and B) and NACE TM0297 tested
- Temperature range from -15 °C up to +260 °C
- Very good chemical and thermal resistance
- Excellent resistance to methanol, hot water, vapour and oils
- Low compression set



### FFKM compounds

*FFKM rubbers are currently the elastomers that are most resistant to chemicals. They combine the elastic properties of rubber with the outstanding chemical resistance of PTFE. As a high-performance elastomer, COG Resist® possesses outstanding resistance to temperature and chemicals whilst its material behaviour is very well balanced. With FFKM COG Resist® RS 92 AED, COG offers a top-class compound.*

# Technical specifications

You can find the most important information about these special materials clearly presented in the table below.

If you require further information, or have specific questions about individual materials, our experts will of course be pleased to help you.

You can't find the ideal material for your application among them? [Detailed data sheets](#) for all these, as well as countless other materials, can always be found [on our website](#). Or visit our material advisor at [www.COG.de/en](http://www.COG.de/en)

COG-No.		HNBR 899	Vi 840	Vi 890	Vi 899	Vi 900	COG Resist® RS 92 AED
Basic elastomer		HNBR	Fluorinated rubber (FKM)				Perfluoroelastomer (FFKM)
Colour		black	black	black	black	black	black
Temperature range	max.	+150 °C	+200 °C	+210 °C	+230 °C	+230 °C	+260 °C
	min.	-17 °C	-46 °C	-20 °C	-46 °C	-51 °C	-15 °C
<b>Rubber technology data</b>							
Hardness Shore A		90 ± 5	80 ± 5	90 ± 5	90 ± 5	90 ± 5	92 ± 5
Hardness °IRHD		90 +3/-8	80 ± 5	90 +3/-8	90 +3/-8	90 ± 5	92 ± 5
Tensile strength (MPa)		> 20	> 15	> 17	> 12,5	> 12	> 20
Ultimate elongation (%)		> 210	> 150	> 130	> 165	> 100	> 100
TR-10		n.s.	-40 °C	-19 °C	-30 °C	-40 °C	n.s.
Compression Set (%)		< 20	< 15	< 15	< 20	< 20	< 25
<b>License/Certificate</b>							
Norsok M-710 Annex A							
Norsok M-710 Annex B		•	•	•	•	•	•
NACE TM0187			•	•	•	•	
NACE TM0297							•
ISO 23936-2			•			•	
DIN EN 14141			•				
API 6A- & 6D standards			•		•	•	
DVGW DIN EN 682 - GBL			•				

► For details of test methods and other information relating to the materials, please see the data sheets at <https://www.cog.de/en/products/data-sheets>.

► The stated values do not replace those in the official data sheet. They are non-binding, and we cannot be held liable for damages of any kind that may arise.





More  
information at  
[www.COG.de/en](http://www.COG.de/en)  
or contact us  
directly.

## COG at a glance

- Founded in 1867 in Pinneberg, near Hamburg
- Autonomous and independent family business employing over 260 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' signet from PRIMAKLIMA
- Close cooperation with leading manufacturers of raw materials
- Our own mixing and compound development facilities



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