



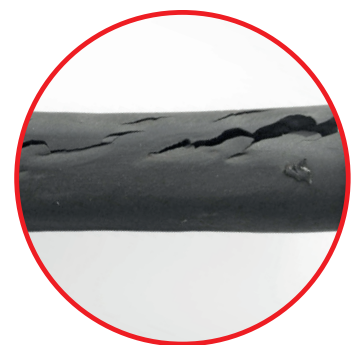
**SEAL TECHNOLOGY**  
PREMIUM-QUALITY SINCE 1867



## **Explosive Decompression. No problem.** High-tech compounds against explosive decompression.

The first-class precision elastomer seals from COG are used for various industrial applications. They must fulfill highest requirements to achieve the best possible sealing result. Many manufactures and operators in the oil and gas industries as well as in the compressor manufacturing business and in compressed air conditioning have leakage problems with elastomer seals, especially when a drop in pressure takes place.

This primarily occurs in sealings which create a barrier against gaseous media if highly pressurized gas falls to a very low pressure level within a very short period of time. The result of this process is often a damage of the sealings. The elastomer material is either torn in various places or blistering on the surface. This phenomenon is called **explosive decompression**.



For the high demands on elastomer seals **against explosive decompression** (AED / Anti Explosive Decompression) COG offers a wide **range of AED compounds** which were especially developed for use in this sector. **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.

# Sealing compounds against explosive decompression

Conventional elastomer sealing materials cannot be used in applications with explosive decompression as their resistance against such force is not sufficient. Only high-tech sealing compounds which were especially designed with very good physical properties are applicable in this sector.

Due to a special recipe and performance the FKM compounds from COG are suitable for applications in gas environment and have a long-term sealing effect even when a drop in pressure occurs. Furthermore FKM compounds offer a high chemical and thermal resistance.

## Vi 840

The special FKM Vi 840 is suitable for the wide-ranging applications in the valve and gas industries. With Norsok M-710 (Annex B) 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 DVGW DIN EN 13787, and with low temperature resistance of right down to -46 °C, meets the requirements of DIN EN 14141 and the important API 6A and 6D standards..

### Properties of Vi 840:

- Very good resistance to explosive decompression
- Certificates: Norsok M-710 (Annex B), ISO 23936-2, NACE TM0187, DVGW DIN EN 682 - GBL, DVGW DIN EN 13787
- Fulfills: DIN EN 14141 and API 6A & 6D standards
- Excellent low temperature flexibility: -46 °C
- Very good low temperature compression set

### Datasheet

COG-No.:	Vi 840
Basic elastomere:	Fluorinated rubber (FKM)
Colour:	black
Temperature range:	from -46 °C to +200 °C
License/Certificate:	Norsok M-710 (Annex B), ISO 23936-2, NACE TM0187, DVGW DIN EN 682 - GBL, DVGW DIN EN 13787

### Typical properties

Properties	Unit	Value	Testing methods
Hardness:	Shore A	80 ± 5	DIN ISO 7619-1
	°IRHD	80 ± 5	DIN ISO 48
Tensile strength:	MPa	> 15	DIN 53 504
Ultimate elongation:	%	> 150	DIN 53 504
TR-10	°C	-40	ASTM D 1329
Compression set (24 h/200 °C)	%	< 15	DIN ISO 815

The indicated values do not replace the official data sheet. They are not binding and exclude all liability for damage of any kind.

## Vi 890

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 of Vi 890:

- 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

### Datasheet

COG-No.:	Vi 890
Basic elastomere:	Fluorinated rubber (FKM)
Colour:	black
Temperature range:	from -20 °C to +210 °C
License/Certificate:	Norsok M-710 (Annex B), NACE TM0187

### Typical properties

Properties	Unit	Value	Testing methods
Hardness:	Shore A	90 ± 5	DIN ISO 7619-1
	°IRHD	90 +3/-8	DIN ISO 48
Tensile strength:	MPa	> 17	DIN 53 504
Ultimate elongation:	%	> 130	DIN 53 504
Compression set (24 h/200 °C)	%	< 15	DIN ISO 815

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## Vi 899

Next to an excellent low temperature flexibility down to  $-46\text{ }^{\circ}\text{C}$  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 of Vi 899:

- Very good resistance to explosive decompression
- NORSOK M-710 (Annex B) and NACE TM0187 tested
- Good chemical and thermal resistance
- Operating temperature range from  $-46\text{ }^{\circ}\text{C}$  up to  $+230\text{ }^{\circ}\text{C}$
- Fulfills the API 6A & 6D standard in the valve and wellhead equipment industry
- Good physical properties

### Datasheet

COG-No.:	Vi 899
Basic elastomere:	Fluorinated rubber (FKM)
Colour:	black
Temperature range:	from $-46\text{ }^{\circ}\text{C}$ to $+230\text{ }^{\circ}\text{C}$
License/Certificate:	NORSOK M-710 (Annex B), NACE TM0187

### Typical properties

Properties	Unit	Value	Testing methods
Hardness:	Shore A	$90 \pm 5$	DIN ISO 7619-1
	$^{\circ}\text{IRHD}$	$90 +3/-8$	DIN ISO 48
Tensile strength:	MPa	$> 12.5$	DIN 53 504
Ultimate elongation:	%	$> 165$	DIN 53 504
Compression set (24 h/200 $^{\circ}\text{C}$ )	%	$< 20$	DIN ISO 815

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## Vi 900

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  $-40\text{ }^{\circ}\text{C}$ , the material even maintains a reliable seal at temperatures right down to  $-50\text{ }^{\circ}\text{C}$ , therefore meeting all requirements of the important API 6A and 6D standards.

### Properties of Vi 900:

- Outstanding resistance to explosive decompression
- NORSOK M-710 (Annex B), ISO 23936-2 and NACE TM0187 tested
- Fulfills API 6A & 6D standards
- Operating temperature range, from  $-50\text{ }^{\circ}\text{C}$  to  $+200\text{ }^{\circ}\text{C}$
- High low temperature flexibility; TR-10 value:  $-40\text{ }^{\circ}\text{C}$

### Datasheet

COG-No.:	Vi 900
Basic elastomere:	Fluorinated rubber (FKM)
Colour:	black
Temperature range:	from $-50\text{ }^{\circ}\text{C}$ to $+200\text{ }^{\circ}\text{C}$
License/Certificate:	NORSOK M-710 (Annex B), ISO 23936-2, NACE TM0187

### Typical properties

Properties	Unit	Value	Testing methods
Hardness:	Shore A	$90 \pm 5$	DIN ISO 7619-1
	$^{\circ}\text{IRHD}$	$90 \pm 5$	DIN ISO 48
Tensile strength:	MPa	$> 12$	DIN 53 504
Ultimate elongation:	%	$> 100$	DIN 53 504
TR-10	$^{\circ}\text{C}$	$-40$	ISO 2921
Compression set (24 h/200 $^{\circ}\text{C}$ )	%	$< 20$	DIN ISO 815

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## HNBR 895

The compound HNBR 895 has an excellent chemical resistance especially to oil and fuel. Beyond that the compound provides a very good resistance to weather and heat. At the same time a high mechanical strength persists. HNBR 895 fulfills the Norsok M-710 (Annex B) requirements for resistance to explosive decompression. These are ideal conditions for a long-term, leakage free use in the oil and gas industry.

### Properties of HNBR 895:

- Very good resistance to explosive decompression
- Norsok M-710 (Annex B) and NACE TM0297-97 tested
- High chemical resistance
- High mechanical strength

### Datasheet

COG-No.:	HNBR 895
Basic elastomere:	Hydrated acrylnitrile-butadiene rubber (HNBR)
Colour:	black
Temperature range:	from -25 °C to +180 °C
License/Certificate:	NORSOK M-710 (Annex B), NACE TM0297-97

### Typical properties

Properties	Unit	Value	Testing methods
Hardness:	°IRHD	89	ASTM D 1415
Tensile strength:	MPa	32.1	ASTM D 412
Ultimate elongation:	%	264	ASTM D 412
Compression set (24 h/150 °C)	%	< 20	ASTM D 395

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## HNBR 899

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 of HNBR 899:

- 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

### Datasheet

COG-No.:	HNBR 899
Basic elastomere:	Hydrated acrylnitrile-butadiene rubber (HNBR)
Colour:	black
Temperature range:	from -17 °C to +150 °C
License/Certificate:	NORSOK M-710 (Annex B)

### Typical properties

Properties	Unit	Value	Testing methods
Hardness:	Shore A	90 ± 5	DIN ISO 7619-1
	°IRHD	90 +3/-8	DIN ISO 48
Tensile strength:	MPa	> 20	DIN 53 504
Ultimate elongation:	%	> 210	DIN 53 504
Compression set (24 h/100 °C)	%	< 20	DIN ISO 815

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# 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.



## COG Resist® RS 92 AED

The high-tech sealing compound COG Resist® RS 92 AED offers the exceptional chemical compatibility of an FFKM, combined with an excellent thermal resistance. The compound for highest requirements has been developed and tested 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 subsea valves, pumps and compressors. A low compression set and an improved leak prevention complete the performance profile of this high-tech compound.

### Properties of COG Resist® RS 92 AED:

- Very good resistance to explosive decompression
- NORSOK M-710 (Annex 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

### Datasheet

COG-No.:	COG Resist® RS 92 AED
Basic elastomere:	Perfluoro rubber (FFKM)
Colour:	black
Temperature range:	from -15 °C to +260 °C
License/Certificate:	NORSOK M-710 (Annex B), NACE TM0297

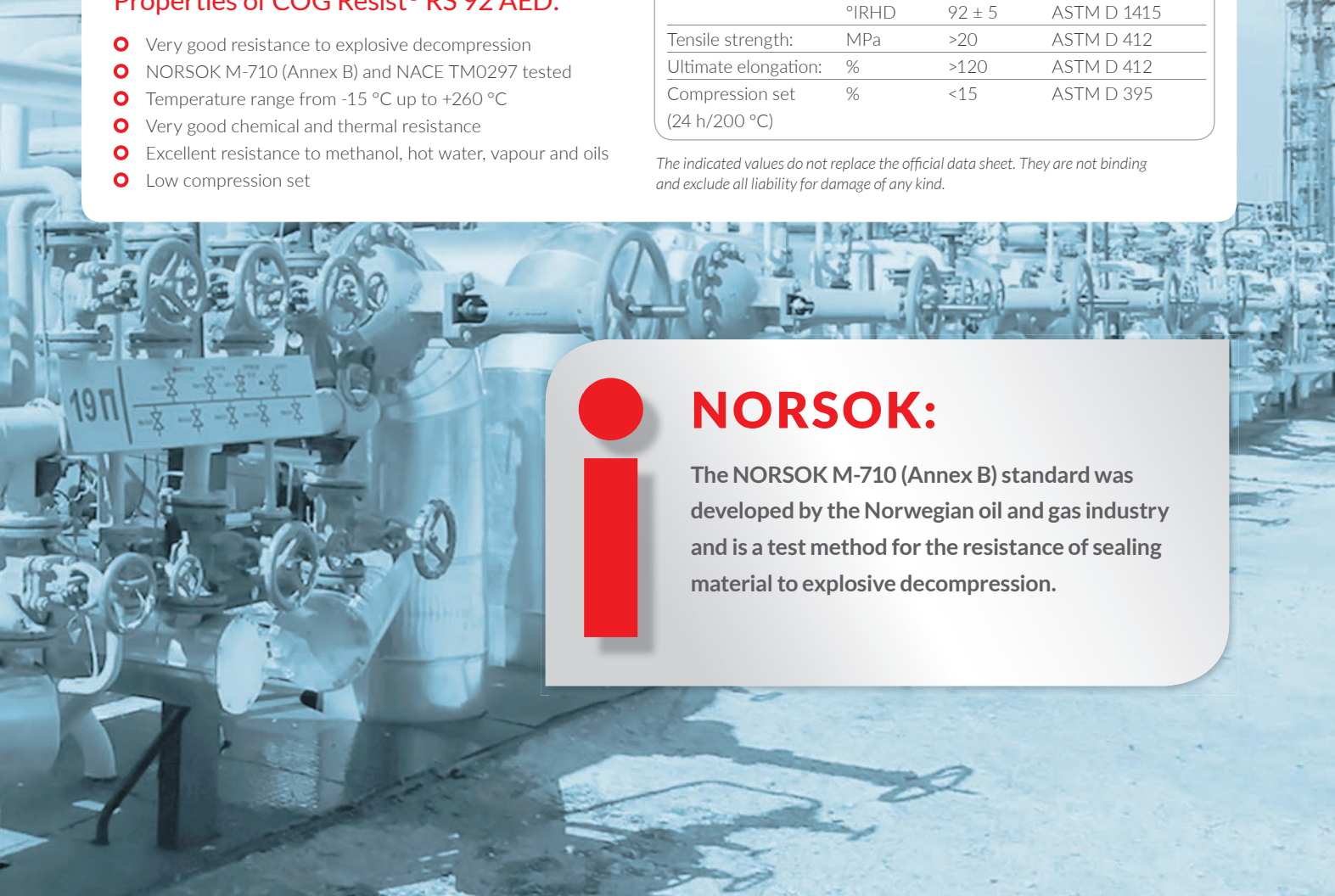
### Typical properties

Properties	Unit	Value	Testing methods
Hardness:	Shore A	92 ± 5	ASTM D 2240
	°IRHD	92 ± 5	ASTM D 1415
Tensile strength:	MPa	>20	ASTM D 412
Ultimate elongation:	%	>120	ASTM D 412
Compression set (24 h/200 °C)	%	<15	ASTM D 395

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## NORSOK:

The NORSOK M-710 (Annex B) standard was developed by the Norwegian oil and gas industry and is a test method for the resistance of sealing material to explosive decompression.



# The greatest resistance to extreme pressure changes.

The phenomenon explosive decompression exists in various industrial applications and concerns different components. Due to that, all elements used must be resistant to explosive decompression. A typical field of application is the natural gas production. Elastomer seals can be used in machine parts like in pig traps, gate valves, ball cocks and other regulating valves. Using the special compounds from COG, damages from explosive decompression and costly leakages have already been avoided. Additionally the compounds have been tried and tested successfully in high pressure compressor constructions and in endurance tests carried out in oil production.

All compounds ensure a long-time sealing performance even if an extremely sudden change in pressure takes place. Next to a high chemical and thermal resistance the compounds offer a hardness which counteract a possible gap extrusion and avoid explosive decompression.

Sealing compounds which are used in such areas must withstand the common interaction that can occur in a production process. Often a challenging task which only a few sealing compounds can fulfill. Manufacturing expertise, an experienced consultancy and external, independent tests offer ideal conditions for a safe and satisfying sealing result.

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