

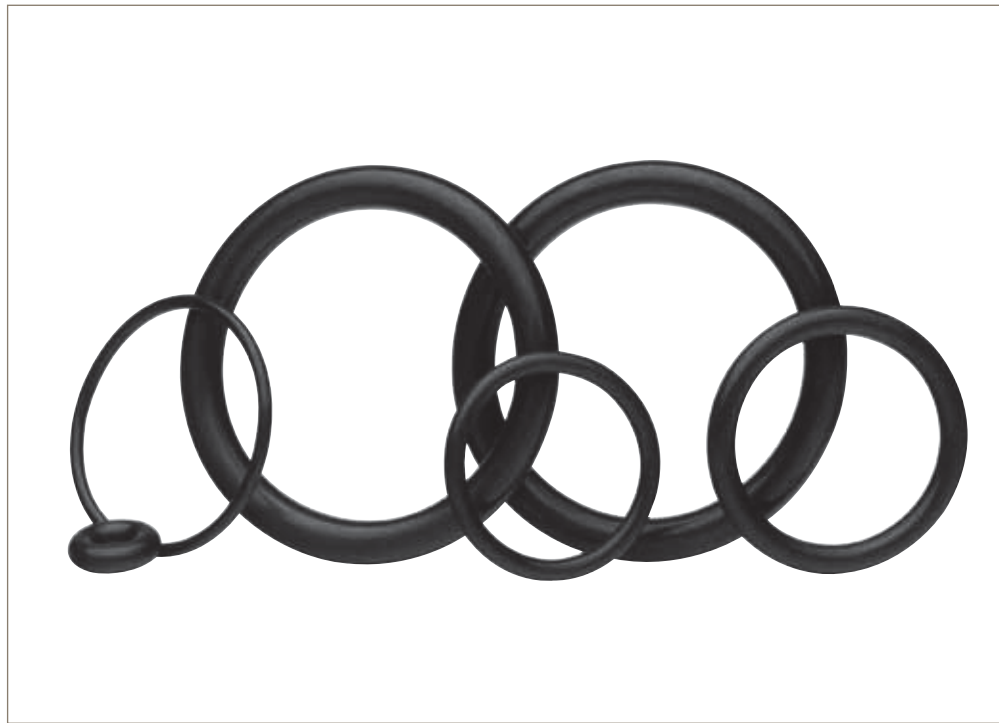
# NORSOK M-710, API 6A & ISO 23936-2 Approved

Parker Materials Certified to Industry Material Testing Standards



## Meeting the demanding challenges of today's Oil & Gas Industry:

In today's Oil and Gas Industry, the application environments are always changing with increasingly higher demands to improve seal elastomer performance. The industry has established testing standards for sealing materials typically used in applications such as subsea control systems, valves, and drilling systems within critical environments.



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## Product Features:

- Wide range of certified materials (HNBR, FKM, AFLAS®, FFKM)
- Certified through independent test laboratories (available upon request)
- Global availability
- Chemical compatibility in sour service (H<sub>2</sub>S) and sweet service applications
- Rapid gas decompression (RGD) resistance



ENGINEERING YOUR SUCCESS.

These standards are focused on Rapid Gas Decompression (RGD) testing and Sour Services (H<sub>2</sub>S) aging on elastomers and thermoplastics. The most common standards set today are NORSOK M-710 established by the Norwegian Petroleum Industry, ISO 23936-2 (the newest global standard) and API 6A FF/HH (ISO standard 10423:2009).

For decades Parker has been providing leading edge elastomer development to the energy, oil and gas industry. As we develop specific elastomers for use in critical applications such as RGD and sour services,

we utilize the services of recognized independent test laboratories for material testing and certification. We have a variety of formulations within the HNBR, FKM, AFLAS® and FFKM families that have passed the NORSOK M-710, ISO 23936-2 and API 6A requirements. The charts below provide details and accepted of our materials and test requirements.

### Rapid Gas Decompression Test Conditions

	NORSOK M-710	ISO 23936-2
Gas composition	10:90, CO <sub>2</sub> :CH <sub>4</sub>	10:90, CO <sub>2</sub> :CH <sub>4</sub>
	3:97, CO <sub>2</sub> :CH <sub>4</sub>	10:90, CO <sub>2</sub> :N <sub>2</sub>
Temperature (°C)	100, 150, 200	100
Pressure (bar)	150, 200, 300	150
Exposure (hours)	72	68
Decomp rate (bar/min)	20-40	20
Decomp cycles	10	8
Seal type	O-ring [2-325]	O-ring [2-312 to 2-329]
Compression (%)	20	15
Volume fill (%)	80-85	85

### Approved Parker O-Ring Materials for RGD Applications

Material Type	Parker Material	Temperature	NORSOK M-710 RGD Gas composition 3:97, CO <sub>2</sub> :CH <sub>4</sub>	ISO 23936-2 RGD Gas composition 10:90; CO <sub>2</sub> :N <sub>2</sub>
HNBR	KA183-85	-55 to 300°F		√
HNBR	KB163-90	-25 to 300°F	√	√
HNBR	N4007-95	-25 to 300°F	√	√
FKM	VP104-85	+10 to 400°F		√
FKM	VG109-90	-50 to 400°F		√
FKM	V1238-95	-15 to 400°F	√	*
TFE/P AFLAS®	V1041-85	+15 to 450°F	√	√
TFE/P AFLAS®	VP103-90	+25 to 450°F		√
FFKM	FF580-75	+5 to 525°F		*
FFKM	V8588-90	+5 to 572°F		*

\* Testing in progress  
AFLAS® is a registered trademark of Asahi Glass Co., Ltd.

## Sour Service Test Conditions

	NORSOK M-710	ISO 23936-2	API 6A (FF/HH) H <sub>2</sub> S
Gas composition	(30% Vol.) 2:3:95; H <sub>2</sub> S:CO <sub>2</sub> :CH <sub>4</sub>	1. (30% Vol.) 3:2:95; H <sub>2</sub> S:CO <sub>2</sub> :CH <sub>4</sub> 2. (30% Vol.) 10:5:85; H <sub>2</sub> S:CO <sub>2</sub> :CH <sub>4</sub>	(35% Vol.) 10:80:10; H <sub>2</sub> S:CO <sub>2</sub> :CH <sub>4</sub>
Liquid composition	(60% Vol.) 70% heptane, 20% cyclohexane, 10% toluene	(60% Vol.) 70% heptane, 30% cyclohexane (60% Vol.) 70% heptane, 20% cyclohexane, 10% toluene	(60% Vol.) 70% heptane, 20% cyclohexane, 10% toluene
Other	(10% Vol.) Distilled water	(10% Vol.) De-ionised water	(5% Vol.) Distilled water
FKM temperature [°C]	210, 220, 230	195, 210, 220	200
HNBR temperature [°C]	150, 160, 170	136, 151, 166	150
Pressure (bar)	100	100	70
Exposure time	2-35 days	7, 14, 21, 35 days	160 hrs.
Test specimens	5	5	5
Acceptance criteria			Parker acceptance criteria
Swelling	+25%/-5%	+25%/-5%	+25%/-5%
Hardness	+10/-20	+10/-20	+10/-20
Tensile, elongation, modulus	±50%	±50%	±50%
Visual inspection	no dissolution tendency, cracking, blistering, deformation		no dissolution tendency, cracking, blistering, deformation

## Approved Parker O-Ring Materials for Sour Service Applications

Material Type	Parker Material	Temperature	NORSOK M-710 H <sub>2</sub> S	ISO 23936-2 H <sub>2</sub> S	API 6A (FF/HH) H <sub>2</sub> S
HNBR	KA183-85	-55 to 300°F	√	*	
HNBR	KB163-90	-25 to 300°F	√	*	√
HNBR	N4263-90	-20 to 275°F	√		
HNBR	N4007-95	-25 to 300°F	√	*	√
FKM	V1289-75	-55 TO 400°F	√		
FKM	VP104-85	+10 to 400°F	√	*	
FKM	VG109-90	-50 to 400°F	√	*	√
FKM	V1238-95	-15 to 400°F		*	√
TFE/P AFLAS®	V1041-85	+15 to 450°F	√	*	
TFE/P AFLAS®	VP103-90	+25 to 450°F	√	*	
FFKM	FF102-75	+5 to 525°F	√		
FFKM	FF200-75	+5 TO 608°	√		
FFKM	FF580-75	+5 to 525°F		*	√
FFKM	FF202-90	+5 TO 608°	√		
FFKM	V8588-90	+5 to 572°F	√	*	√

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