NORSOK M-710

Parker Materials Certified to NORSOK Standards

NORSOK Value:

For decades, Parker has been providing leading edge elastomer technology to the energy, oil and gas industry. As a value added service, Parker is now offering EOG elastomers tested and certified to NORSOK standards.

NORSOK standards are developed by the Norwegian Petroleum Industry to outline and secure adequate safety and cost efficient needs for petroleum industry developments and operations. NORSOK M-710 calls out the requirements for critical rubber sealing materials in applications such as subsea use, control systems and valves. It provides standards for rapid gas decompression (RGD) also known as explosive decompression (ED) testing and sour gas (H_2S) aging on elastomers and thermoplastics. These tests give insight to the performance and life expectancy of a seal in various EOG applications.

Parker enlisted MERL, Ltd., (Materials Engineering Research Laboratory), an independent research laboratory located in the United Kingdom, to conduct the stringent NORSOK tests on Parker's various EOG materials. Parker's materials were found to pass, if not exceed expectations and requirements set by NORSOK. See the charts below for Parker materials that received NORSOK approval.

Contact Information:

Parker Hannifin Corporation
O-Ring Division
2360 Palumbo Drive
Lexington, KY 40509

phone 859 269 2351
fax 859 335 5128
ordmailbox@parker.com

www.parkerorings.com

Product Features:

- Chemical compatibility in sour service (H_2S) and sweet service applications
- Rapid gas decompression (RGD) resistance
- Extrusion resistance
- Wide range of certified materials

Parker

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Sour Service Test Conditions

Volume %	Composition
30	3% CO_2, 2% H_2S, 95% CH_4
10	Distilled Water (conductivity <5µS)
60	70% heptane, 20% cyclone-hexane, 10% toluene
Pressure	100bar
Test Temperature (°C)	**FKM, FFKM, PTFE Materials Test Duration (Days)**
210	5, 10, 20, 35
220	3, 6, 12, 21
230	2, 4, 8, 14
Test Temperature (°C)	**HNBR Materials Test Duration (Days)**
180	5, 10, 20, 35
190	3, 6, 12, 21
200	2, 4, 8, 14

Sour Service Acceptance Criteria

	Elastomers Acceptance Criteria	Thermoplastics Acceptance Criteria
Hardness	+10/-20	N/A
Volume swelling	+25/-5%	+5/-1%
Tensile Strength	+/- 50%	+/- 50%
Elongation	+/- 50%	+/- 50%
Modulus at 50%	+/- 50%	+/- 50%
Visual inspection	The material shall show no tendency towards dissolution, cracking, blistering or physical deformation.	

Approved to Sour Service (H_2S) and Sweet Service Conditions

Certificate Available Upon Request

NORSOK Acceptance Criteria: Passed Tensile, Visual and Volume			
Elastomers		**Thermoplastics**	
Material	Type	Material	Type
FF102-75	FFKM	AP02	PTFE
FF200-75	FFKM	AP05	PTFE
FF202-90	FFKM	AP09	TFE
KB163-90	HNBR	AP31	TFM
KA183-85	HNBR	AP45	PTFE
N4007-95	HNBR	AP63	PTFE
N4263-90	XNBR	AP66	PEEK
V1041-85	TFE	AP68	PEEK
V1289-75	FKM	APV6	PTFE
V8534-90	FFKM	W4685	PEEK
V8588-90	FFKM	K2	PEEK HPV/ PTFE
VP103-95	TFE		
VP104-85	FKM		

Rapid Gas Decompression (RGD) Test Conditions

Volume %	Composition
3	Carbon Dioxide - CO_2
97	Methane - CH_4
Pressure	150 bar (reduced 20 bar/minute)
Temperature	100°C

RGD Acceptance Criteria

1. Examine four cut cross sections of the o-ring which has been subjected to RGD.
2. Rate the cracks according to the table below. Ratings of 4 and 5 are unacceptable.
3. Record the rating of each seal by listing the individual ratings in order of the highest first to the lowest last.

Description	Rating
No internal cracks, holes or blisters of any size.	0
Less than 4 internal cracks, each shorter than 50% of the cross section, with a total crack length less than the cross section.	1
Less than 6 internal cracks, each shorter than 50% of the cross section, with a total crack length of less than 2.5 times the cross section.	2
Less than 9 internal cracks of which max. 2 cracks can have a length between 50% and 80% of the cross section.	3
More than 8 internal cracks or one or more cracks longer than 80% of the cross section.	4
Crack(s) going through the cross section or complete separation of the seal into fragments.	5

Example: A rating of 5422 represents:

- One section with 1 or more cracks going through the seal cross section.
- One section had more than 8 cracks or minimum 1 crack > 80% of the seal cross section.
- Two sections had < 6 cracks < 50% of the cross section.

Approved to RGD Requirement

Elastomer	Type	10 Cycles	NORSOK
KB163-90	HNBR	3100	Pass
N4007-90	HNBR	2222	Pass
V1041-85	TFE	3100	Pass
V1238-95	FKM	3100	Pass

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