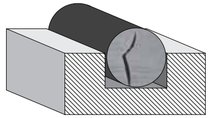
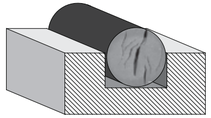
RAPID GAS DECOMPRESSION



Under high pressures, gas diffuses in all kind of elastomers, creating microscopic bubbles between the molecular chains. Gas permeability may considerably vary with the type of elastomer. Silicone-based elastomers, for instance, are the most permeable and permeability varies with hardness and temperature. A quick loss of pressure causes the gas bubbles expansion, exerting a force that can break the inner structure of the material (see the picture on the left side). In some cases the bubbles explode towards the outer surface of the O-ring seal. This phenomenon is known as "rapid gas decompression".



RGD can be caused by any of the following situations:

- High pressure conditions (damage is unlikely to occur at pressures below 30 bar);
- Using different types of gas (ex. carbon dioxide generates a larger quantity of bubbles in comparison with oxygen, this could increases the RGD phenomena);
- Choosing a wrong groove fill;
- Not optimized cross link density;
- Not exeptional control of fillers dispersion.

This problem can be avoided as follows:

- Choosing a compound resistant to rapid gas decompression (Oldrati RGD);
- Increasing the decompression time in order to allow the gas release from the seals more slowly.

Advantages of Oldrati's O-rings:

- Increase safety performance;
- Reduce fugitive emissions;
- Increase valve efficiency and reliability;
- Extension of maintenace intervals.

OC-11/18

RGD Approved Compounds

Oil & Gas Applications

oldratigroup
RUBBER & PLASTIC GOVERNANCE

oldrati® rubber & plastic products

RGD (RAPID GAS DECOMPRESSION)

APPROVED COMPOUNDS PORTFOLIO

Key: Swelling temperature at 23°C | From 10% to 30% | From 30% to 50% | Up to 50% (not recommended)

OLDRATI NAME	ASTM 1418 NOMENCLATURE	POLYMER DESCRIPTION	SPECIFICATION APPROVAL	TEST CONDITION	O-RING SIZE	HARDNESS ShA	MODULUS 50% Mpa	TENSILE STRENGHT Mpa	ELONGATION EB %	TEMPERATURE RANGE	CHEMICAL RESISTANCE CHART								
					mm	ISO 48 ASTM 1415	ISO 37/ASTM 412	ISO 48/ASTM 1415	ISO 37/ASTM 412	*Celsius	AROMATIC HYDROCARBON	ALIPHATIC HYDROCARBON	AMMINE	SULPHIDRIC ACID	METHANOL	OLEUM (H2SO4 FUMING)	STEAM UP TO 200° C	NITRIC ACID 65%	LMW ESTERS
OLD-REX ICE	FFKM	Black perfluoroelastomer rubber with outstanding chemical resistance and low temperature applications	**NORSOK M-710 Rev. 3** (ISO 23936-2)	CH_4/CO_2 90/10 %; P 150 bar; Temp 100°; Groove fill 83%	Ø 15.24 X 5.33	90 ÷ 95	> 3	> 8	> 150	from -40 to +230° C									
OLD-REX P495N	FFKM	Black perfluoroelastomer rubber with outstanding chemical resistance	**NORSOK M-710** Rev. 2 **NORSOK M-710** Rev. 3 (ISO 23936-2)	CH_4/CO_2 90/10 %; P 150 bar; Temp 100°; Groove fill 90%	Ø 15.24 X 5.33	90 ÷ 95	> 10	> 20	> 80	from -5 to +230° C									
OLD EDLT 90NL	FKM	Black fluorocarbon rubber peroxide cured for very low temperature application	**NORSOK M-710** Rev.3 (ISO 23936-2) **SAUDI ARAMCO 06-SamSS-001** (2013)	CH_4/CO_2 90/10 %; P 150 bar; Temp 45°; Groove fill 83%	Ø 44,50 X 10,82	85 ÷ 90	> 5	> 10	> 70	from -50 to +220° C									
				CH_4/CO_2 95/5 %; P 2000 psi; Temp 100°; Groove fill 85%	Ø 44,50 X 10,82														
				CO_2 100% ; P 2000 psi; Temp 100°; Groove fill 85%	Ø 44,50 X 10,82														
				CH_4/CO_2 90/10 %; P 150 bar; Temp 100°; Groove fill 85%	Ø 15.24 X 5.33														
OLD EDG 90N	FKM	Black fluorocarbon rubber peroxide cured for low temperature application	**NORSOK M-710** Rev. 2 **NORSOK M-710** Rev. 3 (ISO 23936-2)	CH_4/CO_2 90/10 %; P 150 bar; Temp 100°; Groove fill 85%	Ø 15.24 X 5.33	85 ÷ 90	> 5	> 12	> 180	from -45 to +220° C									
OLD EDG 95N	FKM	Black fluorocarbon rubber peroxide cured for low temperature application	**TOTAL GS PVV 142** 03/01 Rev.00 **NORSOK M-710** Rev. 3 (ISO 23936-2)	CH_4/CO_2 80/20 %; P 190 bar; Temp 75°; Groove fill 70%	Ø 113.67 X 6.99	90 ÷ 95	> 8	> 12	> 90	from -45 to +220° C									
				CH_4/CO_2 80/20 %; P 190 bar; Temp 75°; Groove fill 73%	Ø 113.67 X 5.33														
				CH_4/CO_2 92/8 %; P 190 bar; Temp 75°; Groove fill 83,3%	Ø 113.67 X 10.82														
OLD EDG 98N	FKM	Black fluorocarbon rubber peroxide cured for low temperature application	**NORSOK M-710** Rev. 3 (ISO 23936-2)	CH_4/CO_2 90/10 %; P 150 bar; Temp 100°; Groove fill 85%	Ø 15.24 X 5.33	95 ÷ 98	> 9	> 12	> 40	from -45 to +220° C									
OLD EDFP 95NA	FKM	Black fluorocarbon rubber peroxide cured with improved chemical resistance	**SAUDI ARAMCO 06-SamSS-001** (2013)	CH_4/CO_2 95/5 %; P 2000 psi; Temp 100°; Groove fill 85%	Ø 37,47 X 5,33	90 ÷ 95	>6	>11	> 80	from -15 to +230° C									
				CO_2 100% ; P 2000 psi; Temp 100°; Groove fill 85%	Ø 37,47 X 5,33														
OLD EDFP 95N	FKM	Black fluorocarbon rubber peroxide cured with improved chemical resistance	**TOTAL GS PVV 142** 03/01 Rev.00	CH_4/CO_2 80/20 %; P 190 bar; Temp 75°; Groove fill 73%	Ø 113.67 X 6.99	90 ÷ 95	> 9	> 15	> 90	from -15 to +230° C									
					Ø 113.67 X 5.33														
OLD EDB 95N	FKM	Black fluorocarbon rubber bisphenolic cured with improved chemical resistance	**NORSOK M-710** Rev. 2	CH_4/CO_2 90/10 %; P 150 bar; Temp 100°; Groove fill 89%	Ø 15.24 X 5.33	90 ÷ 95	> 7	> 14	> 80	from -25 to +230° C									
OLD EDA 95N	FKM	Black fluorocarbon rubber bisphenolic cured	**NORSOK M-710** Rev. 2	CH_4/CO_2 90/10 %; P 150 bar; Temp 100°; Groove fill 90%	Ø 15.24 X 5.33	90 ÷ 95	> 7	> 15	> 90	from -25 to +230° C									
OLD EDAF 90N	FEPM	Black fluorocarbon rubber peroxide cured specifically designed in ammine service	**NORSOK M-710** Rev. 2	CH_4/CO_2 90/10 %; P 150 bar; Temp 100°; Groove fill 71%	Ø 15.24 X 5.33	85 ÷ 90	> 5	> 18	> 180	from -2 to +230° C									
OLD NHP ICE 90	HNBR	Black hydrogeneted nitrile butadiene rubber peroxide cured	**NORSOK M-710** Rev. 3 (ISO 23936-2)	CH_4/CO_2 90/10 %; P 150 bar; Temp 100°; Groove fill 85%	Ø 15.24 X 5.33	85 ÷ 90	Modulus 100% Mpa > 7	>12	>150	from -55 to +160° C									
OLD EDNHP 90N	HNBR	Black hydrogeneted nitrile butadiene rubber peroxide cured	**TOTAL GS PVV 142** 03/01 Rev.00	CH_4/CO_2 80/20 %; P 190 bar; Temp 75°; Groove fill 73%	Ø 113.67 X 6.99	85 ÷ 90	> 4	> 25	> 170	from -30 to +160° C									
					Ø 40.67 X 6.99														
					Ø 113.67 X 5.33														
			NORSOK M-710 Rev. 2	CH_4/CO_2 90/10 %; P 190 bar; Temp 75°; Groove fill 85%	Ø 15.24 X 5.33														
OLD ULTRA ED 90N	HNBR	Black hydrogeneted nitrile butadiene rubber peroxide cured	**TOTAL GS PVV 154** Rev.0	CH4/CO2 80/20 %; P 400 bar; Temp 90°; Groove fill 73%	Ø 113,67 X 6,99	85 ÷ 90	> 8	> 23	> 160	from -25 to +160° C									