V1238-95 Explosive Decompression and Extrusion Resistant Fluorocarbon Elastomer

Technical Bulletin

No. 5704B1-USA

Fluorocarbon for sealing in high pressure, high temperature and 100% CO_2 environments

Parker compound V1238-95 is a 95 Shore A durometer fluorocarbon material developed to help protect critical applications from the detrimental effects of explosive decompression and extrusion. Compound V1238-95 has a unique combination of superior physical and chemical properties, as well as excellent compression set resistance.

V1238-95 exhibits more than twice the extrusion resistance of standard 90 durometer materials, with the added benefit of showing no visual physical damage after exposure to 100% CO_2 concentrations. Using proprietary Parker compounding technology, V1238-95 offers a fluorocarbon seal material that is *both* explosive decompression and extrusion resistant for aggressive Energy, Oil and Gas environments.

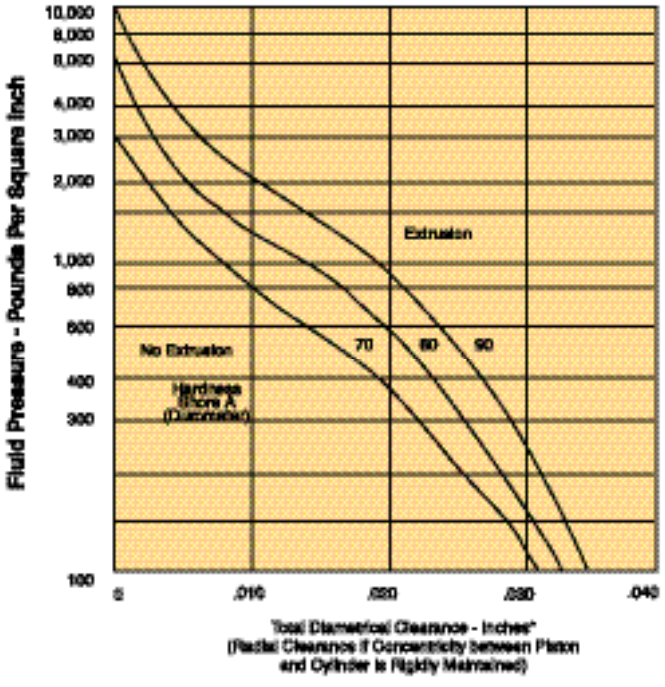
Mechanics of Extrusion

Extrusion occurs when a gas or liquid at high pressure forces the seal material into the clearance gap between the mating surfaces. The larger the diametrical clearance, the more likely extrusion will occur. Elevated temperature and chemical compatibility may also influence potential for seal extrusion.

Mechanics of Explosive Decompression (ED)

When a system is decompressed rapidly, explosive decompression, or “ED,” can occur. This is due to gas permeating or dissolving into the seal material.When the system pressure decays quickly, the entrapped gas expands, rupturing the O-ring.

Typical seal damage
from explosive decompression



Extrusion-Pressure/ Hardness/Clearance-gap Relationships

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Parker Compound V1238-95

Explosive Decompression Test Conditions	Test Samples AS568-227 O-Rings	
Typical Physical Properties	**V1238-95**	**Competitor**
Hardness, Shore A	94	
Tensile strength, psi	2610	
Elongation, %	70	
50% Modulus, psi	1710	
Compression set (70 hrs @ 392°F)	23.5%	
Test 1 (75°F, 1000 ml CO_2, 820 psig, 120 hrs)		
Hardness change, Shore M, pts.	-3	-10
Volume change, %	+24	+29
Weight change, %	+9	+4
Tensile strength change, %	-57	-45
Elongation change, %	-12	+21
50% Modulus change, %	-53	-58
20 Second decay (820 to 0 psig) Visual appearance	Good, medium swell, no damage	Good, medium swell no damage
Test 2 (250°F, 1000 ml CO_2, 1000 psig, 72 hrs)		
Hardness change, Shore M, pts.	-2	-3
Volume change, %	+3	+2
Weight change, %	+2	+1
Tensile strength change, %	-36	-29
Elongation change, %	-13	-76
50% Modulus change, %	-34	-30
20 Second decay (820 to 0 psig) Visual appearance	Excellent, low swell, no damage	Fair, O-Ring had two splits
Test 3 (75°F, 1000 ml CO_2, 1000 psig, 72 hrs)		
Hardness change, Shore M, pts.	-3	-4
Volume change, %	+3	+2
Weight change, %	+2	+1
Tensile strength change, %	-59	-16
Elongation change, %	-32	+13
50% Modulus change, %	-41	-33
20 Second decay (820 to 0 psig) Visual appearance	Good, low swell, no damage	Fair, O-Ring had two splits

Extrusion Test Conditions	Test Samples AS568-227 O-Rings	
Typical Physical Properties	**V1238-95**	**V0858-95**
Hardness, Shore A	94	
Tensile strength, psi	2402	
Elongation, %	75	
50% Modulus, psi	1632	
Compression set (70 hrs @ 392°F)	20.6%	17.0%
PI Extrusion Test, 302°F, 0.0626" gap		
Failure pressure, psi Visual appearance or degradation	510 Light extrusion	308 Severe extrusion

04/02-1.5M-CE *Unless otherwise noted, these are test values from a limited number of samples and should not be used for establishing specific limitations.*

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