

2023

PERLAST[®]

**Benchmark
Report**



Precision Polymer Engineering

Key Perlast® Materials

Benchmark testing was carried out by an external third-party test house to compare the performance characteristics of five perfluoroelastomer grades.

Typical material properties taken from published datasheets

Properties	Unit	Perlast®	Perlast®	Comp. Grade	Comp. Grade	Comp. Grade
		G80A	G75B	A	B	C
Max. Temp.	°C	310	325	327	316	275
100% Modulus	MPa	15.0	16.0	11.2	7.2	9.1
Tensile Strength	MPa	19.0	18.0	17.9	16.9	15.2
Elongation at break	%	150	125	160	150	160
Hardness	ShoreA	81	85	75	75	75
Compression Set 72h @ 200°C	%	18	18	13	14	25

Chemical Resistance Summary

Properties	Perlast®	Perlast®	Comp. Grade	Comp. Grade	Comp. Grade
	G80A	G75B	A	B	C
Acids (Nitric, sulphuric, hydrochloric)	1	1	1	1	1
Alkalis (NaOH, KOH, Mg(OH)2)	1	1	2	2	1
Amines (ethylenediamine, ethanolamine)	1	3	3	3	1
Water / Steam (250 °C)	1	1	3	3	1
Ketones (acetone, MEK, MIBK)	1	1	1	1	1
Esters (ethylacetate)	1	1	1	1	1
Ethers (dimethylether, diethylether)	1	1	1	1	1
Aldehydes (acetaldehyde)	1	1	1	1	1
Alcohols (methanol, ethanol)	1	1	1	1	1
Hydrocarbons (benzene, toluene, xylene)	1	1	1	1	1
Sour gas (H ₂ S)	1	1	1	1	1
Lubricating Oil (di-ester and petroleum based)	1	1	1	1	1
Fluorinated Fluids (HCFC, fluorocarbon oils)	3	3	3	3	3

1 = Excellent, little or no effect.

2 = Good, moderate (10-19%) swelling and change in physical properties.

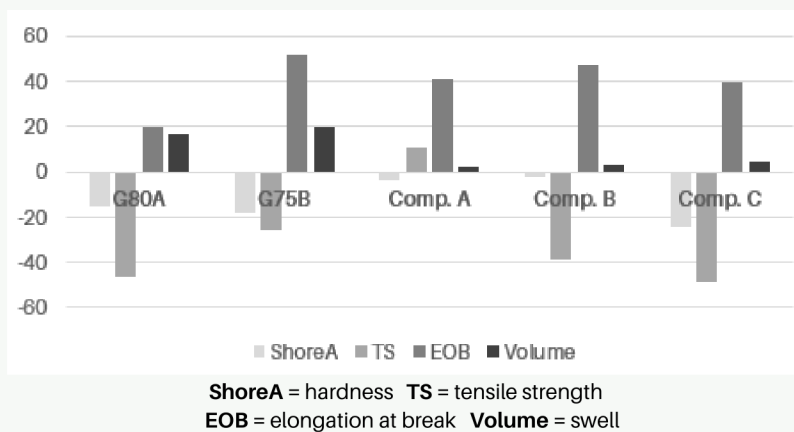
3 = Do not use, significant (>20%) swelling and noticeable change in physical properties

Immersion Testing in Acid

When immersed in 70% nitric acid for 168 hours at 80°C competitor grade A, B and C exhibited the smallest changes in hardness (IRHD) & volume swell.

Perlast® G80A exhibited the smallest changes in elongation (EOB).

Immersion in 70% nitric acid (168h at 80°C) % change



Images of the O-ring surfaces after ageing 20 x magnification

The test samples were BS 214 O-rings with each material grade tested side by side.



Summary:

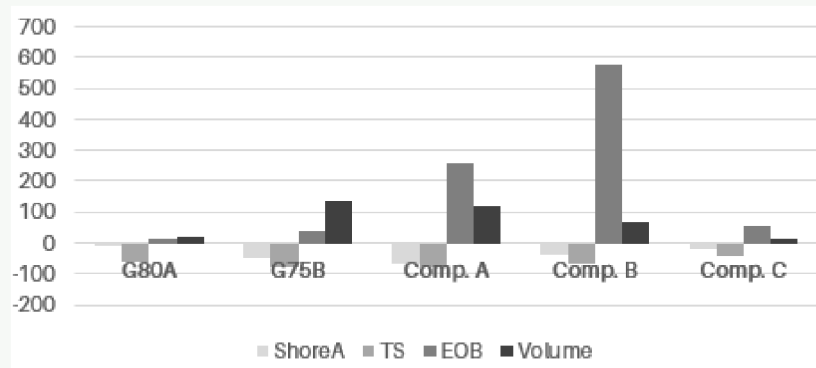
Perlast® G80A is a suitable alternative to competitor grades in acids.

Immersion Testing in Amines

When immersed in pure ethylenediamine for 168 hours at 100°C Perlast® G80A outperforms Perlast® G75B and all three competitor grades.

Competitor A and B show the worst properties.

Immersion in ethylenediamine (168h at 100°C) % change



ShoreA = hardness TS = tensile strength
EOB = elongation at break Volume = swell

Images of the O-ring surfaces after ageing 20 x magnification

The test samples were BS 214 O-rings with each material grade tested side by side.



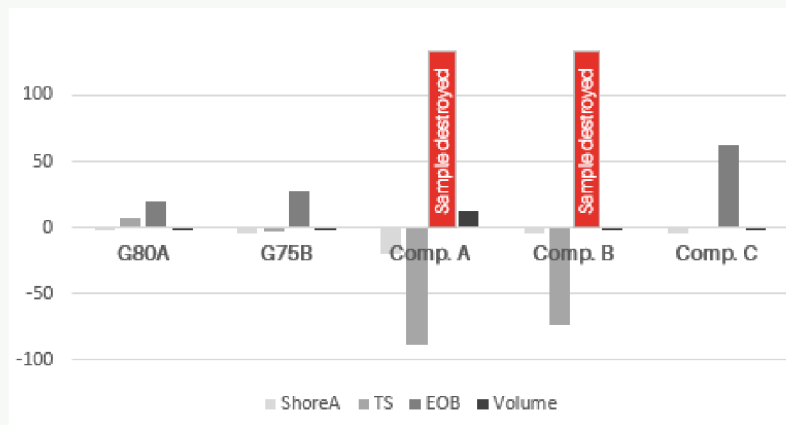
Summary:
Perlast® G80A is a suitable alternative to competitor grade C and superior to competitor grade A and B in amines.

Immersion Testing in Steam

When immersed in steam for 168 hours at 250°C competitor grades A and B were destroyed.

Perlast® G80A and Perlast® G75B outperformed all three competitor grades.

Immersion in steam (168h at 250°C) % change



ShoreA = hardness TS = tensile strength
EOB = elongation at break Volume = swell

Images of the O-ring surfaces after ageing 20x magnification

The test samples were BS 214 O-rings with each material grade tested side by side.



Summary:
Perlast® G80A is a suitable alternative to competitor grade C and both Perlast® grades are superior competitor grades A and B in steam applications.

For more information on the
Perlast® material range contact:



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