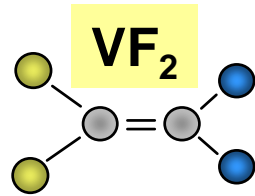




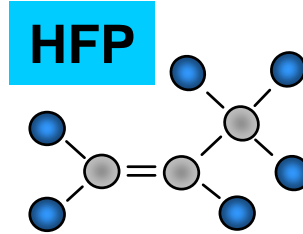
Module: 4
Viton® - Selection Guide



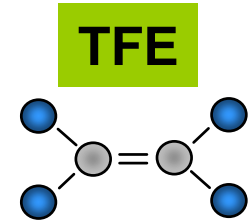
Monomers used in Viton®



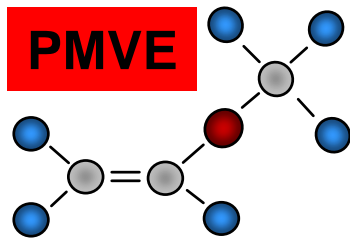
$\text{H}_2\text{C}=\text{CF}_2$ (59% fluorine)
vinylidene fluoride



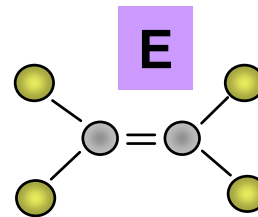
$\text{F}_2\text{C}=\text{CF}-\text{CF}_3$ (76% fluorine)
hexafluoropropylene



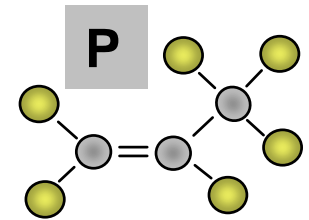
$\text{F}_2\text{C}=\text{CF}_2$ (76% fluorine)
tetrafluoroethylene



$\text{F}_2\text{C}=\text{CF}-\text{O}-\text{CF}_3$ (69% fluorine)
Perfluoro (methyl-based vinyl) ether



$\text{H}_2\text{C}=\text{CH}_2$
ethylene

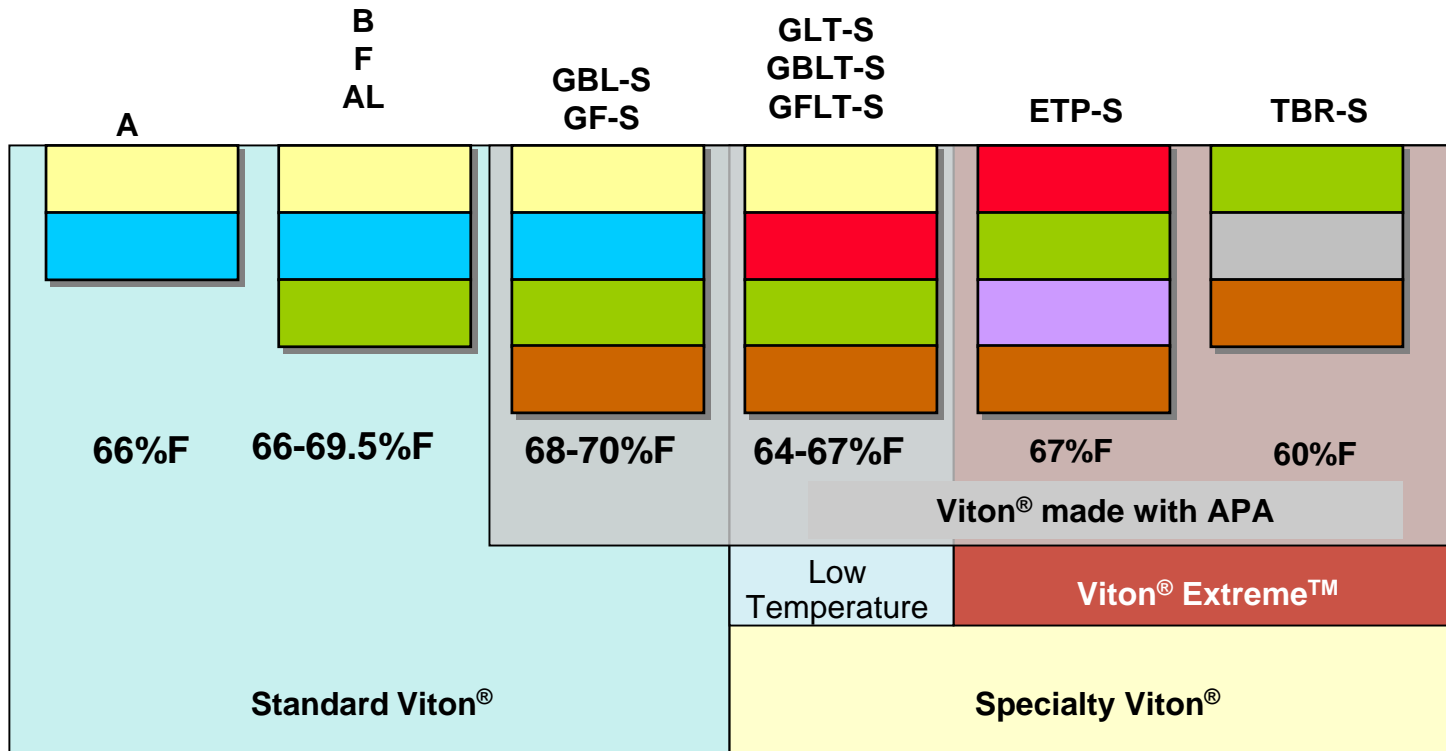


$\text{H}_2\text{C}=\text{CH}-\text{CH}_3$
propylene

Carbon
 Hydrogen
 Fluorine
 Oxygen



Viton® Types Monomer Composition



*Cure Site Monomer (composition depends on polymer)

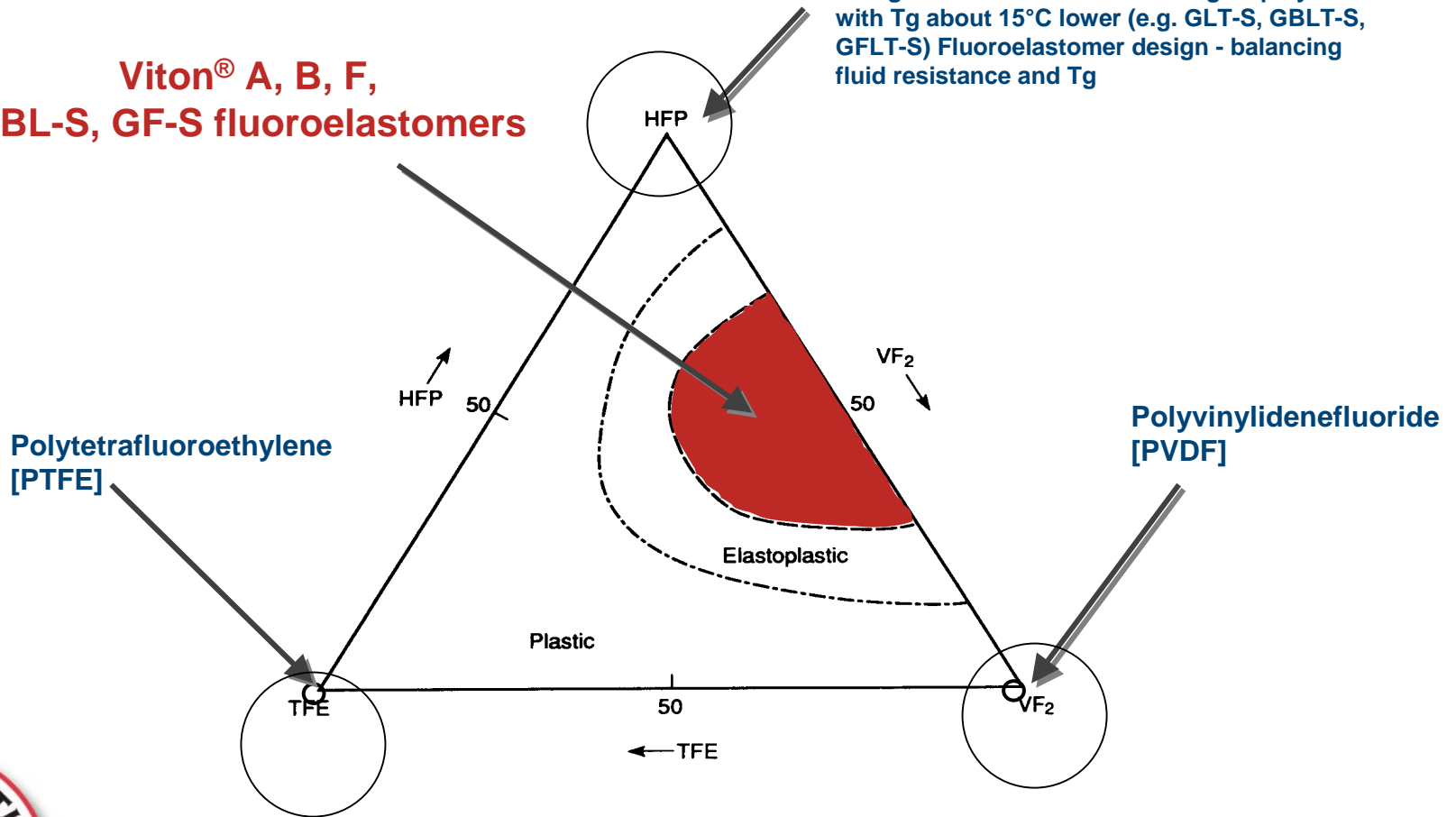


Fluoroelastomers

based on VF_2 , HFP and TFE

**Viton[®] A, B, F,
GBL-S, GF-S fluoroelastomers**

Using PMVE instead of HFP can give polymers with T_g about 15°C lower (e.g. GLT-S, GBLT-S, GFLT-S) Fluoroelastomer design - balancing fluid resistance and T_g



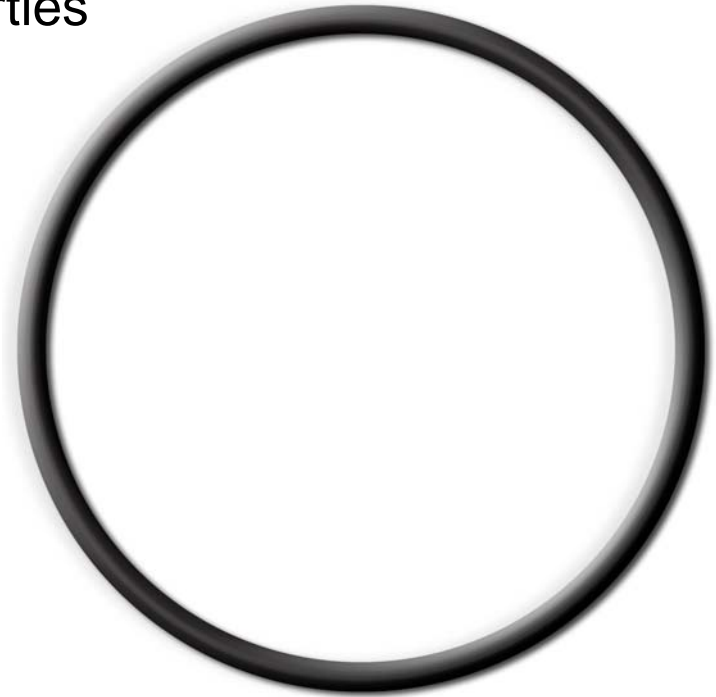
Ref.: Anestis L. Logothetis: fluoroelastomers, OrganoFluorine Chemistry: Principles and Commercial Applications, edited by R. E. Banks et al, Plenum Press New York 1994 (H59615)

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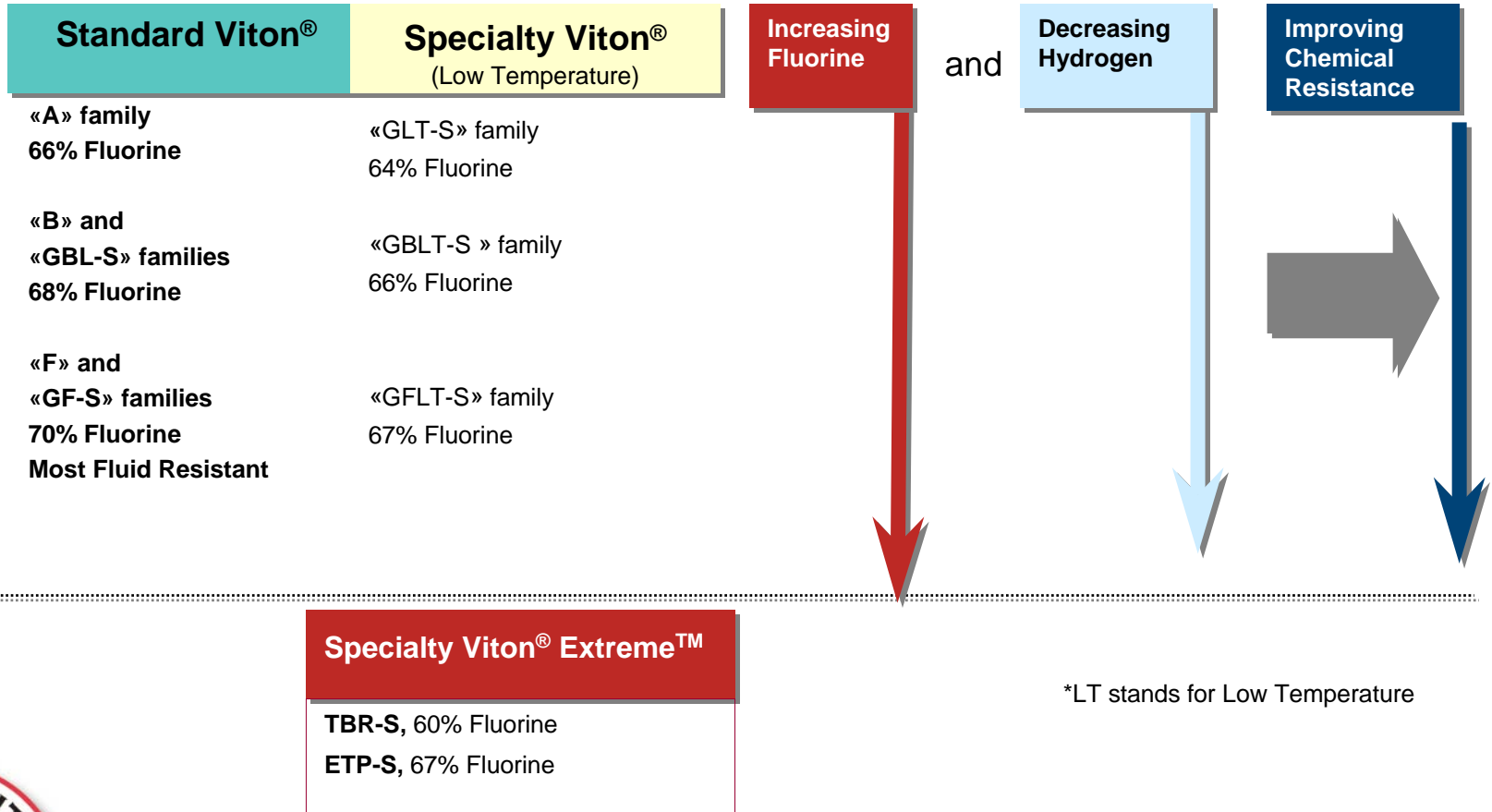
Monomer Composition Impacts

- Chemical resistance
- Low temperature properties



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Viton® Polymer Types



*LT stands for Low Temperature



Viton® Relative Performance

	Standard Products					Specialty Products				
Viton® product	A	B	F	GBL-S*	GF-S *	GLT-S *	GBLT-S *	GFLT-S *	TBR-S *	ETP-S *
									Extreme™	Extreme™
Curing system	bisphenol	bisphenol	bisphenol	peroxide	peroxide	peroxide	peroxide	peroxide	bisphenol	peroxide
Fluorine content	66%	68.5%	69.5%	68%	70%	64%	66%	67%	60%	67%
Heat resistance	All Viton® products have outstanding thermal properties									
Chemical resistance* *	○	★	★★	★	★★	○	★	★★	○	BEST
Base resistance	✘	✘	✘	○	○	★	★	★	BEST	BEST
Low temperature properties	★	★	○	★	○	BEST	★★	★★	✘	○
Compression set resistance	BEST	★★	★	★★	★★	★★	★★	★★	★	★
Relative cost of polymer	low	low	low	low	low	medium	medium	medium	low	high

BEST Excellent ★★ Very good ★ Good ○ Fair ✘ poor

* "S" indicates products made with Advanced Polymer Architecture

** Consult the Chemical Resistance Guide at www.dupontelastomers.com or contact your Viton® specialist.



Viton® Polymers and Typical Applications

High fluorine for best
chemical resistance
(e.g., steam and acid)

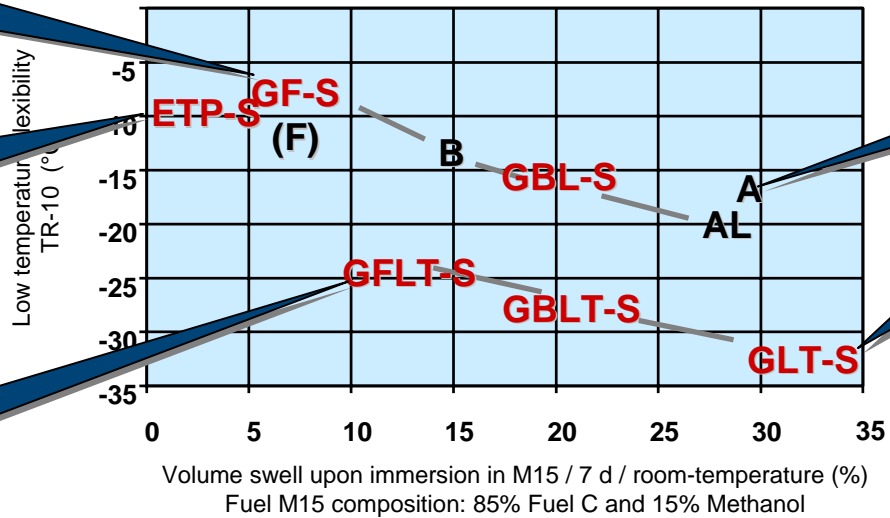
Broadest fluid resistance
(e.g., down hole)

High fluorine with low
temperature functionality
(e.g., fuel systems)

Best compression set and processing

Easy processing
low fluorine
(e.g., standard o-rings)

Best Low
temperature
performance
(e.g., fuel injector o-rings)



Best fluid resistance

red for Viton® made with APA (« -S » for APA technology)



APA Polymers and Typical Market Segments

Fuel Transportation (Automotive)

- Lower permeation
- Longer seal life



Chemical Process Industry

- More heat
- Lower maintenance



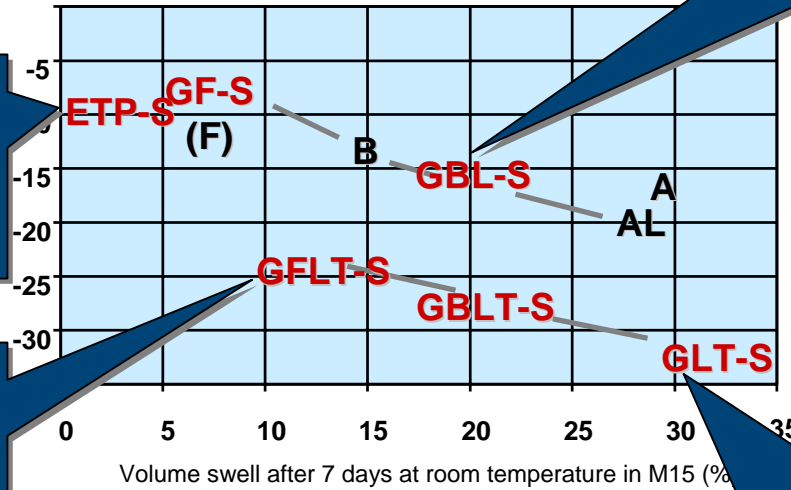
Oil & Gas

- Superior/Broad chemical resistance
- Explosive decompression



Automotive

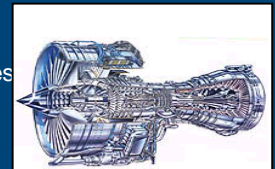
- New fuel generations
- Lower temperature



Best chemical and fuel resistance

Aerospace

- Extreme temperatures
- Aviation lubricants leak free



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Viton® made with APA

Application Guide is on the Internet

www.dupontelastomers.com/Products/VitonAPA/apaMatrix.aspx

DuPont Performance Elastomers When it Matters

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Products > Viton® made with APA > Technical Literature > Application Guide

Viton® Made with APA

Application Guide for Viton® made with Advanced Polymer Architecture

APA polymers improve processing characteristics without sacrificing end-use performance. The following Application Guide matches either the APA polymer with its application or an application is matched with the polymer.

Search By Market/ Application Search By Polymer Type

Market / Application for Polymer Types

Market: Application:

Aerospace
Automotive Fuel System
Automotive Other
Automotive Powertrain
Molded goods
Oil & Gas
Pulp & Paper

Search

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Viton® Made with APA

Application Guide for Viton® made with Advanced Polymer Architecture

APA polymers improve processing characteristics without sacrificing end-use performance. The following Application Guide matches either the APA polymer with its application or an application is matched with the polymer.

Search By Market/ Application Search By Polymer Type

Market / Application for Polymer Types

Market: Application:

Search

Suggested Polymer Type and Benefits for: Oil & Gas/O-rings and seals

Market	Application	Polymer	Benefits
Oil & Gas	O-rings and seals	1. GF-S	Water resistance, oil resistance, solvent resistance, base resistance
		2. TBR-S	Water resistance, oil resistance, base resistance
		3. ETP-S	Water resistance, oil resistance, ultimate solvent resistance, base resistance, low temperature

DuPont Performance Elastomers When it Matters

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Products > Viton® made with APA > Technical Literature > Application Guide

Viton® Made with APA

Application Guide for Viton® made with Advanced Polymer Architecture

APA polymers improve processing characteristics without sacrificing end-use performance. The following Application Guide matches either the APA polymer with its application or an application is matched with the polymer.

Search By Market/ Application Search By Polymer Type

Viton® Polymer Type for Market / Application

Viton® Polymer Type:

Search

Suggested Application for: GFLT-S

Market	Application	Polymer	Benefits
Automotive Fuel System	O-rings - Quick Connect	GFLT-S	Very low temperature, low permeation
Automotive Other	Seals - Coolant system	GFLT-S	Coolant resistance, Base resistance, RME resistance, very low temp



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The Viton® Selection Guide is on the Internet

<http://www.dupontelastomers.com/Products/Viton/selectionGuide.asp>

The screenshot shows the main page of the Viton Selection Guide. At the top, it features the DuPont Performance Elastomers logo and the slogan "When it Matters". A navigation menu includes links for Products, Applications, Technical Info, News, Careers, About Us, Contact Us, Site Map, Customer Connection, and Home. The left sidebar contains a "Viton®" menu with options for Technical Info, Applications, News, and a search bar. The main content area is titled "Viton® Selection Guide" and includes an image of a Viton seal. Below the image, it provides instructions on how to choose the right Viton type based on application requirements, listing factors like resistance to amines, hydrocarbon fluids, and low temperatures. A "Submit" button is visible at the bottom of the instructions section.

Viton® Selection Guide

Does The Application Require Resistance to Low Molecular Weight Carbonyls (MEK, Acetone or MTBE (100%))?

- Yes
 No

How I Arrived Here

Does The Application Require Base Resistance?
-Yes

Viton® Selection Guide

The Viton® Family Best Suited For Your Application Is:

ETP-600S

How I Arrived Here

Does The Application Require Base Resistance?
-Yes

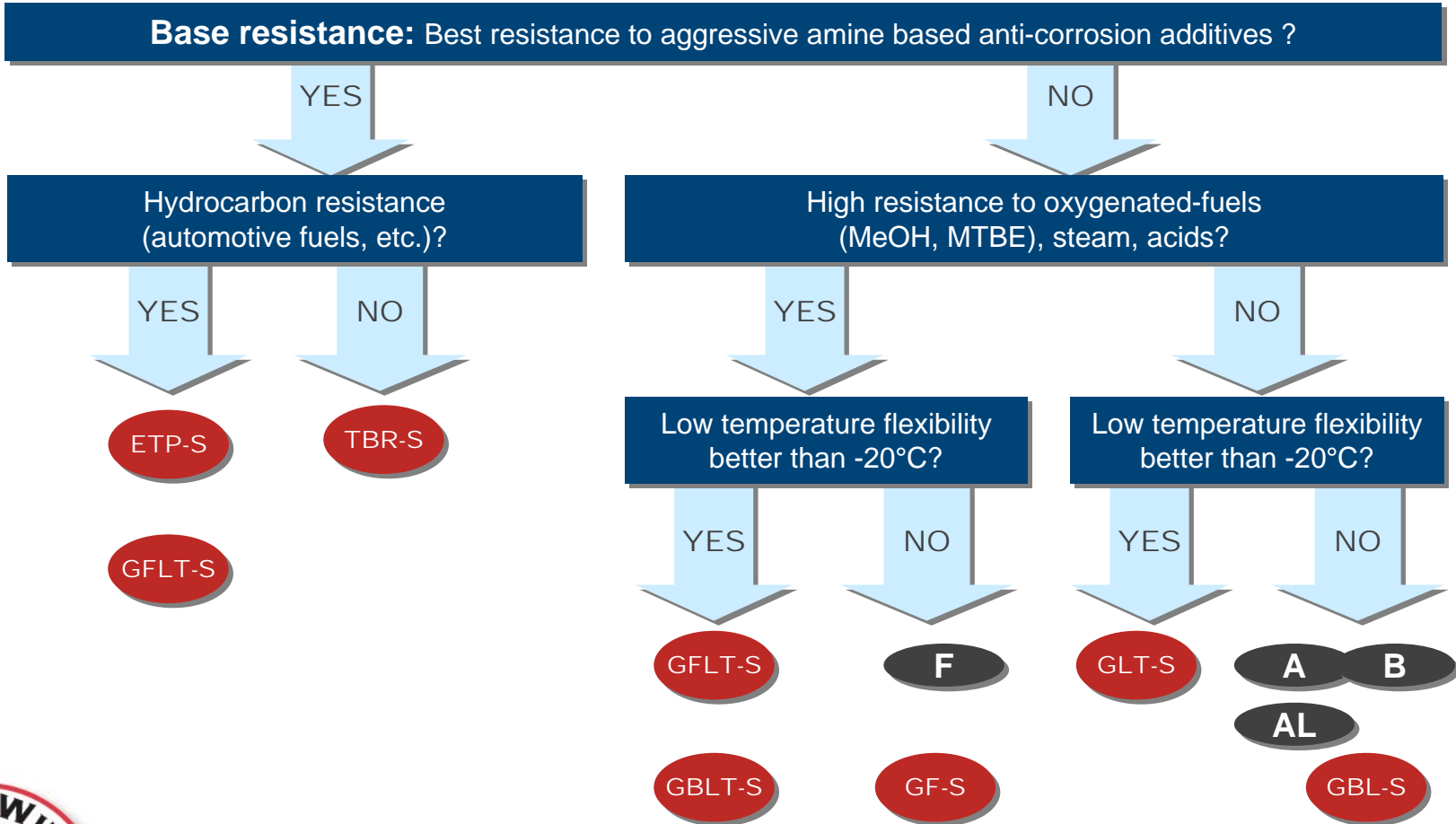
Does The Application Require Resistance to low molecular weight carbonyls (MEK, Acetone, MIBK) or MTBE (100%)?
-Yes

The Family Of Viton Best Suited For Your Application Is:
-ETP-S



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Selection Based on Application Needs



red for Viton® made with APA (« -S » for APA technology)



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