

Viton

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Viton is a brand of synthetic rubber and fluoropolymer elastomer commonly used in O-rings and other molded or extruded goods. The name is a registered trademark of DuPont Performance Elastomers L.L.C..

Viton fluoroelastomers are categorized under the ASTM D1418 and ISO 1629 designation of FKM. This class of elastomers is a family comprising copolymers of hexafluoropropylene (HFP) and vinylidene fluoride (VDF or VF2), terpolymers of tetrafluoroethylene (TFE), vinylidene fluoride (VDF) and hexafluoropropylene (HFP) as well as perfluoromethylvinylether (PMVE) containing specialties. The fluorine content of the most common Viton grades varies between 66 and 70%.



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Varieties

There are four families of viton polymers:

1. A (Dipolymers of VF2/HFP): General purpose sealing. Automotive, Aerospace fuels & lubricants. Nominal polymer fluorine content: 66%.
2. B (Terpolymers of VF2/HFP/TFE): Chemical Process plant, Power Utility Seals & Gaskets. Nominal polymer fluorine content: 68%.
3. F (Terpolymers of VF2/HFP/TFE): Oxygenated Automotive fuels. Concentrated aqueous inorganic acids, water, steam. Nominal polymer fluorine content: 70%.
4. Specialty types include GLT, GBLT, GFLT & Viton Extreme (Copolymers of TFE/Propylene and Ethylene/TFE/PMVE): Automotive, Oil Exploration, Special Sealing & Ultra Harsh

Applications

The performance of fluoroelastomers in aggressive chemicals depends on the nature of the base polymer and the compounding ingredients used for molding the final products (e.g. O-rings). This performance can vary significantly when end-users purchase Viton polymer containing rubber goods from different sources. Viton is generally compatible with hydrocarbons, but incompatible with ketones such as acetone, and organic acids such as acetic acid. O-rings made of Viton are typically color-coded as black, but new gaskets, seals and O-rings should be green FKM or black FKM, but with a green mark on the outer edge.

Viton O-rings have been used safely for some time in SCUBA diving by divers using gas blends referred to as Nitrox. Viton is used because it has a lower probability of catching fire, even with the increased percentages of oxygen found in Nitrox. It is also less susceptible to decay under increased oxygen conditions.

Viton tubing or Viton lined hoses are commonly recommended in automotive and other transportation fuel applications when high concentrations of biodiesel are required. Studies indicate that types B and F (FKM-GBL-S and FKM-GF-S) are more resistant to acidic biodiesel. (This is biodiesel fuel that is unstable and oxidising.)

Viton o-rings are an alternative to Buna-N seals in BMW's automobile engine variable timing units, known as VANOS. In the VANOS, the Buna-N o-rings deteriorate. The Viton fluorocarbon o-rings have similar functional characteristics to Buna-N, but with much higher temperature and chemical resistance characteristics.

Precautions

At high temperatures or in a fire, fluoroelastomers decompose, and may release hydrogen fluoride. Any residue must be handled using protective equipment.

Competing materials

Other brands that compete with Viton are:

- Dyneon by 3M, USA.
- Dai-El by Daikin, Japan.
- Tecnoflon by Solvay Specialty Polymers, Italy.
- Fluoroelastomer by Alpha Associates (<http://www.alphainc.com>), Inc., USA

See also

- Magnesium/Teflon/Viton

References

External links

- DuPont Performance Elastomers L.L.C. (<http://www.dupontelastomers.com/viton?id=wikiviton>)
- Designing with fluoroelastomers (<http://www.zrunek.at/viton-fkm-fpm-fluorelastomere/download/zruelast-fpm-designing-with-fluoroelastomers.pdf>)
- Informative Source: Viton Gasket Materials (<http://gasketmaterial.net/viton-gasket-material.php>)

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