FEP Encapsulated Silicone O-Rings

MATERIAL ANALYSIS

Colour	Red
Temperature Range	FEP Encapsulation: -60°C to +205°C (-75°F to +400°F) Short Duration to +260°C (+500°F)
Encapsulation Material	Dupont Teflon® FEP Fluoropolymer Resin or Equivalent
Core Material	AH3188U Silicone Compound

Physical Properties

Tensile Strength	
Dupont FEP 160	ASTM E-1708: 5000 PSI
Silicone AH3188U	ASTM D412: 110 KGF/CM2
Silicone AH3188U: Elongation of Break	ASTM D412: 410%
Silicone AH3188U: Durometer	ASTM D2240: 75+/- 5 Shore A
Silicone AH3188U: Density Value	ASTM D792: 1.19-1.25 G/CM3
Silicone AH3188U: % Shrinkage	ASTM DIE B D624: 3.6%
Silicone AH3188U: Tear Strength	ASTM DIE B D624: 18 KGF/CM

Compression Set Test	
Silicone AH3188U	ASTM D 395-03 (2008) Method B
Lab Temperature	
23+/-2°C	Relative Humidity = 50+/-5%
Test One	
Amount of Compression =25%	Compression Condition 175°C, 24HR
Recovery Condition= RT, 30 mins	Result = 46.7%
Test Two	
Amount of Compression =25%	Compression Condition 23°C, 24HR
Recovery Condition= RT, 30 mins	Result = 4.7%
Durometer	
FEP/PFA Encapsulated Solid Core Silicone	85-90 Shore A

MATERIAL TEST DATA – FEP

Gas Permeability (GM/2540MM²/24hrs Based on 40MU FEP)

	23°	35°	50°
Carbon Dioxide	None	None	None
Helium	None	None	None
Hydrogen Chloride	None	None	None
Nitrogen	0.18	None	None
Oxygen	None	None	None

Vapour Permeability (GM/2540MM²/24hrs Based on 40MU FEP)

	23°	35°	50°
Acetic Acid (Ethanoic Acid)	None	0.42	None
Acetone (Ethanone)	None	0.42	None
Benzene	0.15	0.64	None
N-Butylether	0.08	None	0.65
Decane	0.72	None	1.03
Ethanol	0.11	0.69	None
Ethylacetate (Ethylethanoate)	0.06	0.77	2.90
Hexane	None	0.57	None
Hydrochloric Acid 20%	None	None	None
Methanol	None	None	5.61
Piperidine (Pentamethyleneamine)	0.04	None	None
Sodium Hydroxide 50%	None	None	None
Sulphuric Acid	None	None	None
Tetrachloromethane	0.11	0.31	None
Toluene	0.37	None	2.93
Water	0.09	0.45	0.89

Absorption (168hrs at temperature stated, PFA & FEP)

	Test Temp °C	Range Of Weight Gain
Aniline	185	0.3 to 0.4%
Acetophenone	201	0.6 to 0.8%
Benzaldehyde	179	0.4% to 0.5%
Bromine	22	0.5% (PFA Only)
Chlorine	120	0.5to 0.6%
Chlorosulphonic Acid	150	0.7 to 0.8%
Chromic Acid 50%	120	0.01% Both
Dimthyl Sulphoxide	190	0.1 to 0.2%
Ferric Chloride 25%	100	0.1% Both
Freon 113	47	1.2% (PFA Only)
Hydrochloric Acid 37%	120	0.01 to 0.03%
Iso-Octane	99	0.7 to 0.8%
Nitrobenzene	210	0.7to 0.9%
Perchloroethylene	121	2.0 to 2.3%
Phosphoric Acid	100	0.01% Both
Sulphuryl Chloride	68	1.7 to 2.7%
Tetrachloromethane	78	2.3 to 2.4%
Toluene	110	0.7 to 0.8%
Tributyl phosphate	200	1.8 to 2.0%
Zinc Chloride	100	0.01 to 0.03%

Absorption (Long Term at temperature stated, PFA & FEP)

	Test Temp °C	Range Of Weight Gain
Acetone (Ethanone)	50	0.4% on 12 Months
Ammonium Hydroxide	70	0.1% on 12 Months
Ethanol 95%	50	0.01% on 12 Months
Ethanol 95%	70	0.01% on 2 Weeks
Ethylacetate (Ethylethanoate)	50	0.7% on 12 Months
Hydrochloric acid 10%	70	0.01% on 12 Months
Nitric acid 10%	70	0.1% on 12 Months
Sodium hydroxide 10%	70	0.1% on 12 Months
Sulphuric acid 30%	70	0.01% on 12 Months
Tetrachloromethane	50	1.6% on 12 Months
Tetrachloromethane	70	1.9% on 2 Weeks
Toluene	50	0.6% on 12 Months
Toluene	70	0.6% on 2 Weeks

Specifications

Manufactured to meet the requirements of AS568/BS 1806 tolerance specifications.

Restriction of Hazardous Substances (ROHS)

The restrictions of the use of certain Hazardous Substances (ROHS) Directives 2002/95/EC and 2002/96/EG came into force on 1st July 2006.

We recognise these requirements and declare that all products sold by us do comply with the European Directives.

Registration, Evaluation, Authorisation and Restriction of Chemicals (Reach).

The EU Regulations (EC 1907/2006) came into force on 1st June 2007. We are familiar with the European Regulation on chemicals being the producer of products from raw materials. The elements of our product that could be considered chemical based are in actual fact rubber, being silicone and is classified in the regulations as polymers and is therefore exempt.

COMPLIANCES – FEP/PFA ENCAPSULATION

FDA

The clear Teflon FEP/PFA Encapsulation of our Encapsulated O-Ring complies with Part 177 of title 21 of the food and drug administration regulations for safe use as articles or components of articles of producing, manufacturing, processing, preparing, treating, packing, transporting, or holding food in accordance with FDA regulation 21.CFR.177.1550.

3A® Sanitary Standard

Further, we can advise that Table One (attached) of number 20-22 3A® Sanitary Standard documents that FEP and Pfa materials, to the previously mentioned FDA 21.CFR.177.1550 compliance standard, is also compliant to this 3A® Sanitary Standard 20-22.

USP Class VI

Teflon® FEP/PFA fluoropolymers have been tested in accordance with USP protocol and meet the requirements of a USP class VI plastic.

EU VO 1935/2004

We have researched and evaluated BFR documentation especially “Recommendations of the Federal Institute for risk assessment on plastics intended to come in to contact with food”.

The principal underlying this regulation is that any material or article intended to come into contact directly or indirectly with food must be sufficiently inert to preclude substances from being transferred to food in quantities large enough to endanger human health or to bring about an unacceptable change in the composition of the food or a deterioration in its organoleptic properties.

On our encapsulated O-rings encapsulate materials and their manufacture are compliant with all relevant sections 1 to 21 of the E.C regulation number 1935/2004 and the subsequent articles.

FEP/PFA encapsulated O-rings are compliant to EU VO 1935/2004 certification.

COMPLIANCES – SILICONE CORE

FDA

The silicone core (silicone AH3188U) of our encapsulated O-ring complies with part 177 of title 21 of the food and drug administration regulations for safe use as articles or components of articles for producing, manufacturing, processing, preparing, treating, packing, transporting, or holding food in accordance with FDA regulation 21.CFR.177.2600.

The above test results are based on test slabs/buttons. The results from the actual parts may be different.