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Explosion Suppressant Foam

Description:

This is an open pore reticulated polyurethane foam for explosion suppression applications that prevents catastrophic fuel vapor explosions.

Typical Physical Properties

Physical Property	Test Method	Typical Results
Color		Light Blue
Density range	MIL-DTL-83054C	1.20-1.40 lbs/ft³
Porosity	MIL-DTL-83054C	20-30 pores per inch
Constant Deflection Compression Set	MIL-DTL-83054C	30% max.
25% Compression Force Deflection	MIL-DTL-83054C	0.35 min
65% Compression Force Deflection	MIL-DTL-83054C	0.60 min
Fuel Displacement	MIL-DTL-83054C	2.5% volume max.
Fluid Retention, Fuel	MIL-DTL-83054C	5% volume max
Tensile Strength	MIL-DTL-83054C	15 psi min.
Volume Increase After Fluid Age *Type I Fluid* *Type III Fluid* *JP-4 Turbine Fuel*	MIL-DTL-83054C	 0-15% volume 0-37% volume 0-25% volume
Elongation @ Break	MIL-DTL-83054C	100%
Tear Strength	MIL-DTL-83054C	3 lbs/in min
Air Pressure Drop	MIL-DTL-83054C	0.270-0.370 in. water
Flammability	MIL-DTL-83054C	15 in/min. max
Extractable Materials	MIL-DTL-83054C	3.0% weight max
Low Temperature Flexibility	MIL-DTL-83054C	No cracking
Entrained Solid Contamination	MIL-DTL-83054C	11.0 milligrams/ft³
Tensile Strength Loss After Steam Autoclave	MIL-DTL-83054C	30% max
Fluid Immersion, Tensile Loss *JP-4 @ 71.1°C* *JP-5 @ 71.1°C* *JP-5 @ 93.3°C* *JP-4 @ 23.9°C*	MIL-DTL-83054C	 8 weeks: 30% (dry) max, 24 weeks: 50% (dry) max 24 weeks: 60% (wet) max 4 weeks: 30% (dry) max 4 weeks: 60% (wet) max
Age	MIL-DTL-83054C	12 months max
Hydrolytic Stability, Dry Heat Tensile Loss	MIL-DTL-83054C	75% max
Flame Arrestor Characteristics	MIL-DTL-83054C	15 psid max
Corrosion and Adhesion	MIL-DTL-83054C	No adherence or evidence of pitting, erosion or corrosion

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This material contains a network of skeletal strands with 98% void space at any pore size. The material functions essentially as a three dimensional fire screen similar to a safety screen over a lighted Bunsen burner. In a fuel tank, the empty space above the fuel level may readily contain an explosive mixture of fuel vapor and air. It is in this area where an explosion can occur, should it be ignited by any source. Since the liquid fuel itself does not explode, a completely full tank is far less likely to explode than one that is not full. The lower the fuel level in the tank, the greater amount of explosive vapor is present. When an ignition source is present, the vapor adjacent to the spark ignites rapidly. This ignition, in turn, ignites the vapor around it, creating a chain reaction as the ignition gets larger and moves faster as it propagates through the vapor. The rapid ignition and propagation of the flame results in an ever growing compression wave in front of it, compressing the unignited vapor, thus adding even greater force to an explosion. This sequence occurs in milliseconds. It prevents this chain reaction from occurring; instead, vapor ignition is confined to the area immediately around the ignition source. Flame and wave propagation are mitigated by the foam to below propagation levels, thus preventing a catastrophic explosion.

*Certified to QPL-83054 (Baffle and Inerting Material, Aircraft Fuel Tank), Mil-DTL-83054C

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