

Polyimide Foam

UPILEX[®]-FOAM**UBE INDUSTRIES, LTD.**

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UPILEX-FOAM® is newly developed polyimide foam by UBE's exclusive polyimide technology. Combining our original foaming process and the excellent properties of polyimide which has one of the highest heat resistance among all engineering plastics, exceptional properties such as heat resistance, environmental resistance, low outgassing is available at the level never been achieved by any other foam products. Some of the wide range of applicable areas are transportation devices such as aerospace, vessels, automobiles and vibration, heat, acoustic insulation and weight reduction for nuclear to electronic facilities and equipments.

Features

- (1) High heat resistance (Tg. 360 deg. C.).
- (2) Excellent thermal insulation.
- (3) Easy processing.
- (4) Low density for weight savings.
- (5) Flame resistance.
- (6) Very low outgassing.
- (7) High acoustic absorption and insulation.
- (8) Excellent nuclear and UV radiation, resistance, chemical resistance and electric insulation.

Applications

- (1) Aircraft
Thermal and acoustic fuselage blankets, air-conditioning duct insulation, vibration damping for aircraft fuselage.
- (2) Aerospace
Cryogenic insulation for fuel tanks on major rocket propulsion systems, thermal insulation on the louvers of communications satellites.
- (3) Industrial
Heat and acoustic insulation for nuclear power plants, vessels and automobile engines.

Properties

1. Thermal and Electrical properties

Item	Unit	Typical Values				Test Method
		BF303	BP103	BP023	BP013	
Density	kg/ m ³	6~11	23~34	135	270	ASTM D 3574 (TestA)
Tg	°C	360	360	360	360	DMA Analysis
5%Weight Loss Temp.	°C	485	485	485	485	TGAAnalysis (Air)
Brittle Temperature	°C	<-150	<-150	<-150	<-150	
Thermal Conductivity	W/m·K	0.034	0.034	0.047	0.054	ASTM C 518
Flammability	—	V-0 equivalent	V-0 equivalent	V-0 equivalent	V-0 equivalent	
Oxygen Index	%	48	—	—	—	ASTM D 2863
Vacuum Degassing ^(※)	TML	0.86	—	—	—	ASTM E 595
	CVCM	0.21	—	—	—	
	WVR	0.18	—	—	—	
Dielectric Constant (1MHz)	—	1.01	—	1.23	—	Impedance Analyzer
Dissipation Factor (1MHz)	—	0.001	—	0.002	—	Impedance Analyzer

※) TML : Total Mass Loss
CVCM : Collected Volatile Condensable Materials
WVR : Water Vaper Regained

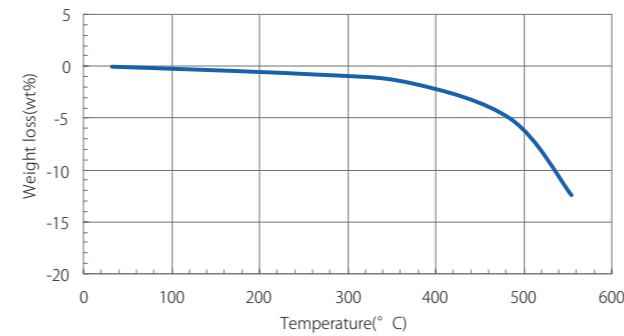


Fig.1 Thermal decomposition curve (air)

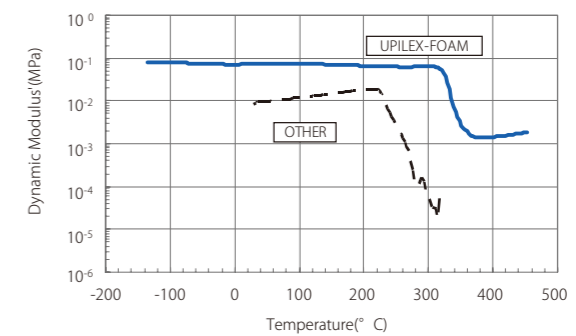


Fig.2 Dynamic modulus curve (N2)

2. Mechanical Properties

Item	Unit	Typical Values				Test Method
		BF303	BP103	BP023	BP013	
Tensile Strength	MPa	0.1	0.3	2.0	2.5	ASTM D 3574 (Test E)
Tensile Modulus	MPa	0.5	1.0	13	51	ASTM D 3574 (Test E)
Elongation	%	17	17	17	17	ASTM D 3574 (Test E)
Flexural Modulus	MPa	—	—	19	142	

3. Chemical resistance

Chemicals	BF303	BP103	BP023	BP013	Test Method
10% Sulfuric acid	○	○	○	○	RT, 24Hours immersed
10% Hydrochloric acid	○	○	○	○	//
Acetone	○	○	○	○	//
Methylene chloride	○	○	○	○	//
NMP	○	○	○	○	//
DMAc	○	○	○	○	//

○ : Changes in appearance and swelling are not observed.

Item	Unit	Typical Values				TestMethod
		BF303	BP103	BP023	BP013	
Foaming ratio	--	120~225	40~60	10	5	
Length(Width)	mm	~1000□	~500□	~500□	~500□	
Thickness	mm	~400	5, 10	1, 2	0.5, 1	

The data are not legally guaranteed.

Standard products