

CHEMICAL CHARACTERISTIC OF POLYETHYLENE NAPHTHALATE (PEN)



Our Material

FLXR products are 3D-printed with PEN, offering strong chemical resistance against common lab solvents. When uncontaminated, our PEN product can be recycled within the PET stream.

Method

The chemical resistance of PEN to chemicals is evaluated by the following test method:

1. Specimens are immersed in the respective chemical species (liquid) at 23 °C for 120 hours.
2. The specimens are removed from the solution, rinsed with distilled water, dried, weighed, and subjected to *ASTM D638 tensile testing, where ratings ranging from A to D are assigned.

Ranking Definition

- A:** weight change <1%, tensile strength retained >95% to standard
- B:** weight change between 1~10%, tensile strength retained >75%
- C:** weight change >10%, tensile strength retained <75%
- D:** swelled or dissolved within 120 hours

Tensile Testing

*ASTM D638 is conducted using Instron 3367 UTM, utilizing Type-I injection-molded specimen (3.2 mm thick x 165 mm length x 13 mm width x 50 mm gauge length).

PEN Material Highlights

- Superior chemical resistance & barrier properties for lab use
- Compatible with autoclave, gamma radiation & EtO sterilization
- FDA food-contact approved; meets USP 87 for bio-inertness
- PFAS-free, RoHS2 compliant & recyclable with PET stream
- Lower carbon footprint than PTFE
- Filament production: zero landfill, water, hazardous waste

3D-Print Labware for a Greener Tomorrow



Our Passion :

We're a group of scientists and engineers who absolutely love science and 3D-printing.



Our Mission :

We believe that scientific progress and environmental responsibility can (and should) go hand-in-hand.

Contact Us

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WWW

YOUTUBE

Table of Chemical Resistance

CHEMICAL RESISTANCE CHART

	PEN	PVDF	PTFE		PEN	PVDF	PTFE
Acetic acid (10%)	A	A	A	Hydrogen peroxide (30%)	A	A	A
Acetic acid (40%)	A	A	A	Isopropyl alcohol (IPA)	A	A	A
Acetone	B	D	A	Methanol	A	A	A
Ammonium chloride (25%)	A	A	A	Methyl ethyl ketone (MEK)	A	D	A
Benzene	B	A	A	Nitric acid (10%)	A	A	A
Chloroform	C	A	A	Nitric acid (20%)	A	A	A
Cyclohexane	A	A	A	Nitric acid (67%)	D	A	A
Cyclohexanol	A	A	A	Phosphoric acid (10%)	A	B	A
Calcium chloride (10%)	A	A	A	Phosphoric acid (85%)	D	B	A
Chromic acid (10%)	A	A	A	Potassium hydroxide (10%)	A	A	A
Citric acid	A	A	A	Potassium hydroxide (30%)	B	A	A
Diethyl ether	A	A	A	Sulfuric acid (10%)	A	A	A
Dimethyl sulfoxide (DMSO)	C	C	A	Sulfuric acid (30%)	C	A	A
Dimethyl formamide (DMF)	C	D	A	Sulfuric acid (>80%)	D	A	A
Ethanol	A	A	A	Sodium acetate (40%) sol.	A	A	A
Ethyl acetate	A	D	A	Sodium chloride (sat.) (32%)	A	A	A
Ethylene diamine	C	B	A	Sodium bicarbonate (sat.)	A	A	A
Ethylene glycol	A	A	A	Sodium hydroxide (10%) sol.	A	A	A
Formaldehyde (40%)	A	A	A	Sodium hydroxide (30%) sol.	A	C	A
Formic acid (10%)	A	A	A	Sodium hypochlorite	A	A	A
Formic acid (30%)	C	B	A	Styrene (monomer)	A	A	A
Gasoline	A	A	A	Tetrahydrofuran (THF)	B	B	A
Glycerol	A	A	A	Toluene	A	A	A
Heptane	A	A	A	Triethanolamine	C	A	A
Hexane	A	A	A	Vinyl chloride (monomer)	A	A	A
Hydrobromic acid (10%)	A	A	A	Xylene	A	A	A
Hydrobromic acid (47%)	A	A	A				
Hydrochloric acid (10%)	A	A	A				
Hydrochloric acid (37%)	A	A	A				
Hydrofluoric acid (5%)	A	A	A				
Hydrofluoric acid (50%)	D	B	A				

Resistance at 23°C, immersed for 30 days
 Ranking definition:
 A: weight change <1%, tensile > 95%
 B: weight change between 1~10%, tensile > 75%
 C: weight change >10%, tensile <75%
 D: dissolved or swelled

PRECAUTION

Hazard Identification:

Not classified as hazardous according to OSHA or GHS regulations.

Avoid exposure to DMSO, DMF, CHCl₃, CCl₄, and HF.

Disposal Considerations:

PEN (Polyethylene Naphthalate) can be recycled alongside PET (Polyethylene Terephthalate). Recycled as much as possible with PET or through incineration.

Disclaimer:

This information sheet has been prepared with the highest level of care. Otherwise stated, it is intended solely for general informational purposes. It should not be relied upon for any specific purpose, and no representations or warranties are made regarding its accuracy or completeness.

