



HighTemp Material Co., Ltd.

Industrial High Temperature Insulation &
Thermal Materials Supplier



**CHEMICAL
COMPATIBILITY
GUIDE**

CHEMICAL RESISTANCE GUIDE

HOW TO SELECT HIGH TEMPERATURE MATERIALS FOR CHEMICAL RESISTANCE

Quick Reference for Selecting High Temperature Materials
in Corrosive Environments



EXCELLENT
CHEMICAL
RESISTANCE



HIGH TEMPERATURE
PERFORMANCE



CORROSION
PROTECTION



WIDE MATERIAL
SELECTION



RELIABLE &
CONSISTENT

SUITABLE FOR MULTIPLE INDUSTRIES



PCB
MANUFACTURING



SMT
ASSEMBLY



SEMICONDUCTOR



CHEMICAL
PROCESSING



BATTERY &
ENERGY STORAGE



ELECTRIC
VEHICLE



INDUSTRIAL
EQUIPMENT

 www.hightempmaterial.com

BETTER CHEMICAL RESISTANCE
BETTER PERFORMANCE BETTER RELIABILITY





CHEMICAL COMPATIBILITY COMPARISON
MATERIAL CHEMICAL RESISTANCE MATRIX

Material		Acid (e.g. HCl, H ₂ SO ₄)	Alkali (e.g. NaOH, KOH)	Solvent (e.g. Acetone, MEK)	Oil (e.g. Mineral Oil)	Alcohol (e.g. Ethanol, IPA)	Water (DI Water, Steam)	Salt Spray (NaCl Solution)
	PTFE (Film / Sheet)	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
	PI (Polyimide Film)	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★★	★★★★☆
	PET (Polyester Film)	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆
	PPS (Film / Sheet)	★★★★★	★★★★★	★★★★★	★★★★★	★★★★☆	★★★★★	★★★★★
	PEN (Film)	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★★	★★★★☆
	Silicone (Sheet)	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★★★	★★★☆☆
	Mica (Sheet)	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
	Ceramic Fiber (Board / Cloth)	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

QUICK RECOMMENDATIONS



NEED EXCELLENT
CHEMICAL RESISTANCE

✓ PTFE
✓ PPS



STRONG ACID
ENVIRONMENT

✓ PTFE
✓ Ceramic Fiber



STRONG ALKALI
ENVIRONMENT

✓ PTFE
✓ PPS



ORGANIC SOLVENTS

✓ PTFE



OIL & FUEL
EXPOSURE

✓ PTFE
✓ PPS



OUTDOOR HUMIDITY
& MOISTURE

✓ Silicone
✓ PTFE



IMPORTANT NOTE

Chemical resistance can vary with temperature, concentration, exposure time and stress. Always verify material suitability under your actual operating conditions.

RATING
GUIDE

★★★★★

Excellent
(Recommended for
continuous exposure)

★★★★☆

Very Good
(Suitable for long-term
exposure)

★★★☆☆

Good
(Suitable for moderate
exposure)

★★☆☆☆

Limited
(Suitable for short-term
or low concentration)

★☆☆☆☆

Not Recommended
(Not suitable for general
use)



TEST CONDITIONS REFERENCE

- Temperature: 23 ± 2°C (Room Temperature)
- Chemical Concentration: Typical Industrial Concentration
- Exposure Time: 72 Hours
- Test Method: Immersion / Surface Contact
- Results for reference only. Please test under actual conditions.



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MATERIAL SELECTION BY CHEMICAL ENVIRONMENT

Different industries face different chemical exposure. Choose the right material for your application.



CHEMICAL PROCESSING & PLANTS

Typical Chemicals:
Strong acids, strong alkalis, solvents, oxidizers, salts

Recommended Materials

PTFE

ePTFE

PPS

Typical Applications

- Tank & Pipe Lining
- Valve Seats
- Gaskets & Seals
- Pump Components



BATTERY & ENERGY STORAGE

Typical Chemicals:
Electrolytes, organic solvents, salts, corrosive gases

Recommended Materials

PPS

PTFE

Silicone

Typical Applications

- Battery Cell Insulation
- Module Protection
- Gasket & Sealing
- Vent Valves & Membrane



SEMICONDUCTOR MANUFACTURING

Typical Chemicals:
Acids, alkaline solutions, photoresist, solvents, ultrapure water

Recommended Materials

PTFE

PI

PFA

Typical Applications

- Wet Process Equipment
- Wafer Handling
- Etching & Cleaning
- Chemical Tanks



PCB MANUFACTURING & SMT

Typical Chemicals:
Etchants, developers, cleaners, fluxes, alkalis, acids

Recommended Materials

PTFE

PPS

Silicone

Typical Applications

- Lamination Press Protection
- Conveyor Belts
- Chemical Tank Liners
- Cleaning Fixtures



INDUSTRIAL FURNACES & HEAT TREATMENT

Typical Chemicals:
High temperature gases, oxidizing atmosphere, refractory dust

Recommended Materials

Ceramic Fiber

Mica

High Silica Fabric

Typical Applications

- Furnace Lining
- Expansion Joints
- Thermal Insulation
- Heat Shields



CHEMICAL SELECTION CHECKLIST



- 1. IDENTIFY CHEMICAL EXPOSURE**
List all chemicals the material will contact, including concentration and pH.



- 2. CHECK OPERATING CONDITIONS**
Confirm temperature, pressure, and exposure time.



- 3. EVALUATE EXPOSURE DURATION**
Continuous exposure requires higher chemical resistance.



- 4. CONSIDER CHEMICAL MIXTURES**
Mixtures may be more aggressive than single chemicals.



- 5. CHECK MECHANICAL LOAD**
Ensure material maintains strength under chemical exposure.



- 6. OUTDOOR & ENVIRONMENTAL FACTORS**
Consider UV, humidity, salt spray and weathering.



- 7. TEST & VALIDATE**
Always verify performance through real application testing before final selection.



ENGINEERING TIP
When in doubt, contact our technical team for material recommendations and sample testing.

WHY CHEMICAL RESISTANCE MATTERS?



EXTEND SERVICE LIFE
Reduce corrosion and material degradation.



IMPROVE RELIABILITY
Prevent leaks, failures and unexpected downtime.



LOWER TOTAL COST
Reduce maintenance costs and replacement frequency.



ENHANCE SAFETY
Protect equipment and ensure safe operations.



NEED HELP?
Our engineering team is ready to support you with material selection, sample testing and custom solutions.



EXCELLENT
CHEMICAL
RESISTANCE



HIGH
TEMPERATURE
PERFORMANCE



CORROSION
PROTECTION



WIDE MATERIAL
SELECTION



CUSTOM
SOLUTIONS



COMMON CHEMICAL RESISTANCE MISTAKES



✗ USING PET IN STRONG ACID

PET has limited acid resistance.
It may swell, soften or even dissolve.



✓ BETTER CHOICE: PTFE

PTFE offers excellent resistance
to almost all acids.



✗ USING SILICONE IN ORGANIC SOLVENTS

Silicone can swell and lose
mechanical strength.



✓ BETTER CHOICE: PTFE

PTFE has outstanding resistance
to most organic solvents.



✗ CHECKING ONLY ROOM TEMPERATURE DATA

Many materials perform well at room
temperature but fail at high temperature.



✓ BETTER CHOICE: EVALUATE AT ACTUAL WORKING TEMPERATURE

Chemical resistance changes
significantly with temperature.



✗ IGNORING COMBINED EFFECTS OF TEMPERATURE & CHEMICALS

High temperature + chemicals
accelerate material degradation.



✓ BETTER CHOICE: EVALUATE BOTH TEMPERATURE & CHEMICALS

Always test under real working
conditions.



✗ SELECTING BASED ONLY ON CHEMICAL CHARTS

Chart data is generic and may not
reflect your actual conditions.



✓ BETTER CHOICE: VERIFY WITH REAL-WORLD TESTING

Lab or field testing ensures
true compatibility.

KEY FACTORS AFFECTING CHEMICAL RESISTANCE



TEMPERATURE

Higher temperature
can reduce chemical
resistance.



CONCENTRATION

Higher concentration
often increases
corrosiveness.



EXPOSURE TIME

Longer exposure
causes more
material degradation.



PRESSURE

High pressure may
increase chemical
penetration.



CHEMICAL MIXTURE

Mixtures may be more
aggressive than single
chemicals.



MECHANICAL LOAD

Stress, friction or
vibration can accelerate
chemical attack.



ENVIRONMENTAL FACTORS

UV, humidity and salt
spray affect durability.

BEST MATERIAL BY CHEMICAL

Chemical / Environment	Recommended Material	Notes
Sulfuric Acid (H ₂ SO ₄)	PTFE	Excellent resistance to strong acids at high temperature
Hydrochloric Acid (HCl)	PTFE	Stable in both dilute and concentrated solutions
Nitric Acid (HNO ₃)	PTFE	High chemical stability
Sodium Hydroxide (NaOH)	PTFE / PPS	PTFE for strong alkali, PPS for high temperature
Ammonia (NH ₃)	PTFE / PPS	Good resistance to ammonia and alkaline gases
Alcohols (Ethanol, IPA)	PTFE	Excellent resistance to most alcohols
Ketones (Acetone, MEK)	PTFE	Weakens many plastics, PTFE remains stable
Mineral Oil	PTFE	No swelling, excellent stability
Diesel / Fuel	PTFE / PPS	PTFE for chemical resistance, PPS for high temperature
Coolants / Cutting Fluids	PPS	Resistant to water-glycol and oil-based coolants
Salt Water / Seawater	PTFE	Excellent corrosion resistance
Cleaning Chemicals (Alkaline / Acidic)	PTFE	Suitable for most cleaning chemicals



IMPORTANT NOTICE

Chemical compatibility depends not only on the chemical itself, but also on concentration, temperature, pressure, exposure time, and mechanical stress. Always **verify material suitability through actual application testing** before final selection.

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RATING GUIDE

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Excellent
Chemical
Resistance



High
Temperature
Performance



Corrosion
Protection



Wide Material
Selection



Custom
Solutions



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05
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OUR CHEMICAL RESISTANT MATERIALS



PTFE FILM

- Excellent resistance to almost all chemicals
- Wide temperature range: -196°C to 260°C
- Ideal for aggressive chemical environments



PPS FILM

- Outstanding resistance to acids, alkalis and solvents
- High temperature performance up to 220°C
- Ideal for HCl, NaOH and harsh environments



PI FILM

- Good chemical resistance and thermal stability
- Continuous use up to 260°C
- Suitable for electronics & semiconductor processes



SILICONE SHEET

- Resistant to water, alkalis and many chemicals
- Excellent flexibility and weatherability
- Operating temperature: -60°C to 230°C



ePTFE MEMBRANE

- Chemically inert and highly durable
- Waterproof & breathable
- Used for ventilation, filtration and protection



MICA PRODUCTS

- Excellent resistance to acids and alkalis
- High dielectric strength and thermal stability
- Used in furnaces, heating elements, insulation



CERAMIC FIBER MATERIALS

- Chemically stable in most environments
- High temperature resistance up to 1260°C
- Ideal for furnace lining and thermal protection

OEM & CUSTOM ENGINEERING SERVICES



DIE CUTTING



Precision die cutting for gaskets, washers and custom shapes.



SLITTING



Slitting to exact width with clean edges and tight tolerance.



LAMINATING



Lamination of films, foams and adhesives for enhanced performance.



CNC CUTTING



CNC cutting for complex shapes with high dimensional accuracy.



ADHESIVE COATING



Single or double-sided adhesive coating to meet application needs.



PRECISION CONVERTING



From raw material to finished parts, we deliver complete solutions.



STRICT QUALITY
CONTROL



ADVANCED
EQUIPMENT



CUSTOM
SOLUTIONS



FAST
DELIVERY



GLOBAL
SUPPORT

CONTACT US

HighTemp Material Co., Ltd.

Industrial High Temperature Insulation &
Thermal Materials Supplier



WEBSITE

www.hightempmaterial.com



EMAIL

info@hightempmaterial.com



WHATSAPP

+86 132 4387 2142



ADDRESS

Building A, No. 26, Sanjiang Road,
Qiaolin Town, Huojia County,
Xinxiang City, Henan Province, China



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WHY CHOOSE US?

- ✓ Excellent Chemical Resistance
- ✓ Wide Temperature Range
- ✓ Custom Solutions
- ✓ Stable Quality & Reliable Supply



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Always verify material suitability through actual application testing before final selection.

YOUR RELIABLE PARTNER FOR HIGH PERFORMANCE MATERIALS



PCB / SMT



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BATTERY &
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CHEMICAL
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