



HighTemp
MATERIAL

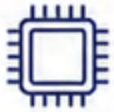
THE RIGHT MATERIAL. THE RIGHT PERFORMANCE.

TEMPERATURE RESISTANCE REFERENCE GUIDE

Continuous Operating Temperature
Reference for High Performance
Industrial Materials



PCB
Lamination



SMT
Assembly



Semiconductor



Solar PV



Battery



Energy
Storage



EV



Industrial
Furnace



High Temperature
Resistance



Stable Performance
& Reliability



Safe & Environmentally
Friendly



Premium Quality
Materials



Custom Solutions
Available



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HighTemp Material Co., Ltd.

Industrial High Temperature Insulation &
Thermal Materials Supplier



TEMPERATURE RESISTANCE COMPARISON

Continuous Operating Temperature vs. Short-term (Peak) Temperature

Material	Continuous Operating Temperature (°C)	Short-term / Peak Temperature (°C)	Color Code	Key Properties (Brief)
PET (Polyester)	150	180	●	Good electrical insulation, high strength, cost-effective
PEN (Polyethylene Naphthalate)	180	200	●	Better heat resistance than PET, excellent dimensional stability
PPS (Polyphenylene Sulfide)	220	240	●	Excellent chemical resistance, high mechanical strength
Silicone Rubber	220 – 250	300	●	Excellent flexibility, good thermal stability
PTFE (Polytetrafluoroethylene)	260	300	●	Outstanding chemical resistance, low friction, excellent insulation
PI (Polyimide)	260 – 300	400	●	Excellent electrical properties, high temperature stability
FKM (Fluoroelastomer)	220 – 250	300	●	Excellent oil & chemical resistance, good high-temp performance
Aerogel	650	800	●	Ultra-low thermal conductivity, fire & heat protection
Mica (Phlogopite Mica)	800	1000	●	Excellent dielectric strength, very high temperature stability
High Silica Cloth	1000	1200	●	High softening point, good insulation, corrosion resistance
Ceramic Fiber (Alumina Silicate)	1260	1400	●	Excellent thermal insulation, withstands extreme heat

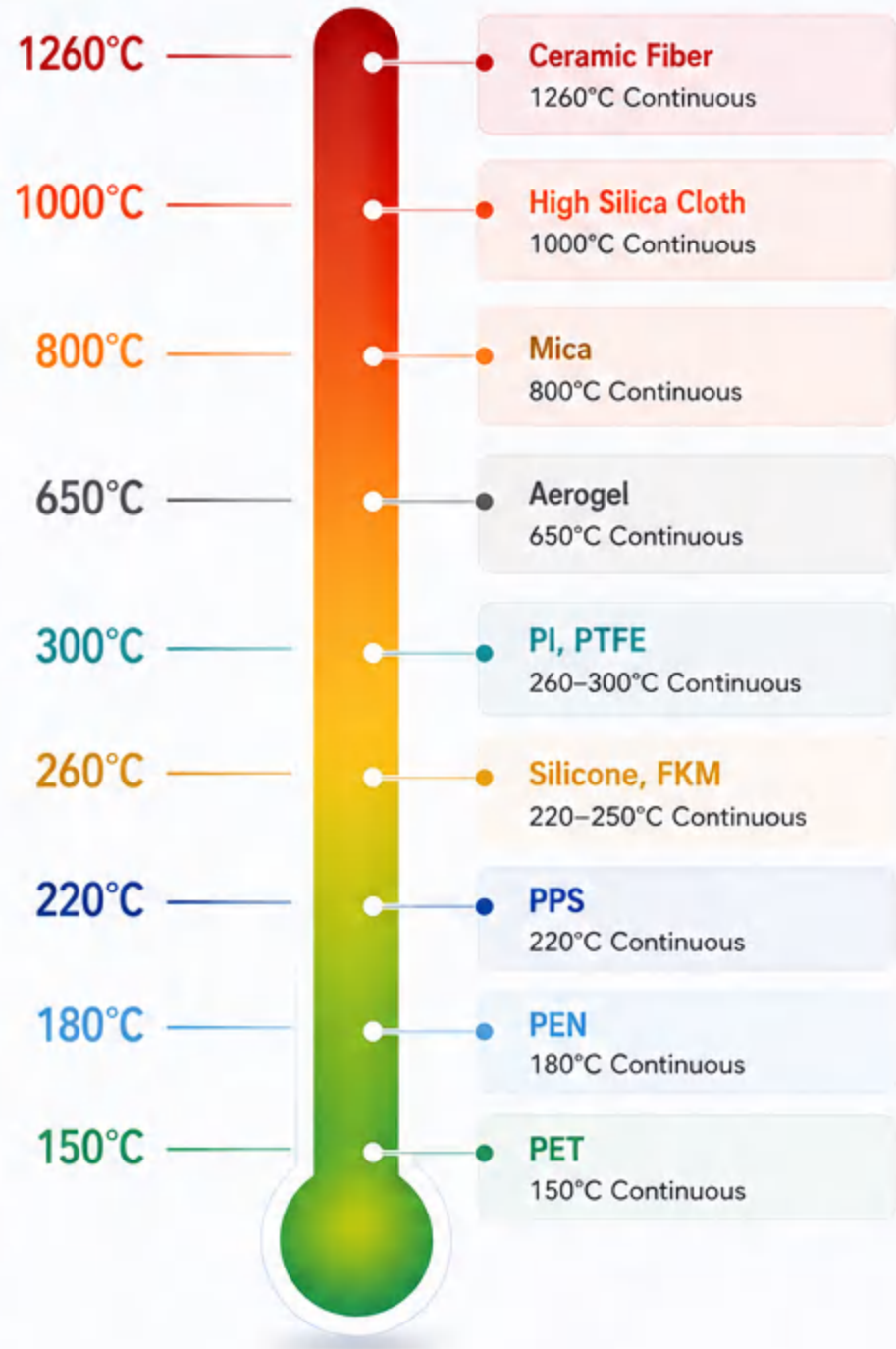


IMPORTANT NOTES

- Continuous operating temperature indicates the long-term safe working temperature.
 - Short-term / peak temperature is the maximum temperature the material can withstand for a short duration.
- Actual performance may vary depending on thickness, environment, stress and service conditions.
 - Always allow a safety margin of 20–30°C for reliable performance.

TEMPERATURE RESISTANCE TIMELINE

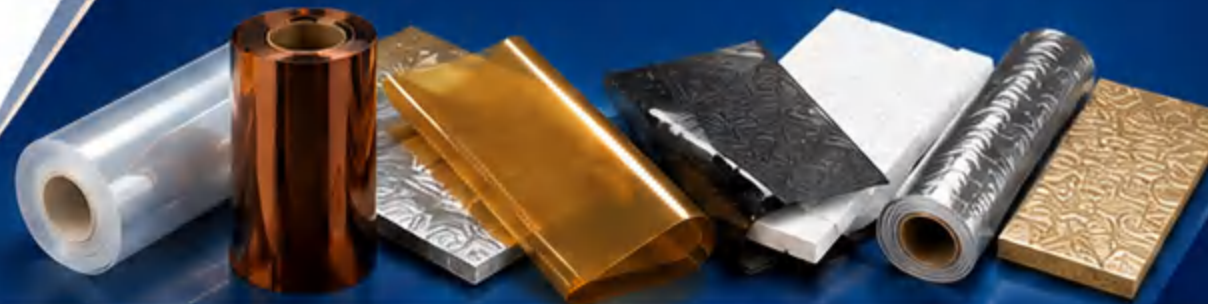
Quick visual reference by maximum continuous operating temperature





TEMPERATURE RESISTANCE REFERENCE GUIDE

Quick Selection Guide for High Temperature Insulation
& Thermal Protection Materials



03

Material Selection
by Temperature
Range

MATERIAL SELECTION BY TEMPERATURE RANGE

Choose the right material based on continuous operating temperature for optimal performance and reliability.



BELOW 150°C

Recommended Materials

- PET Film
- Adhesive PET Tape

Typical Applications

- General Electrical Insulation
- Cable & Wire Protection
- Low Temperature Masking



150°C – 200°C

Recommended Materials

- PEN Film
- High Temperature PET Film

Typical Applications

- Solar PV Module
- Motor & Transformer Insulation
- Electronic Component Protection



200°C – 260°C

Recommended Materials

- PPS Film / Sheet
- Silicone Rubber Sheet
- PTFE Film

Typical Applications

- Battery Pack Insulation
- PCB Lamination Cushion & Protection
- Power Electronics Insulation



ABOVE 260°C – 400°C

Recommended Materials

- PI Film (Polyimide)
- PTFE Film

Typical Applications

- SMT High Temperature Protection
- Semiconductor Process
- High Temperature Electrical Insulation



ABOVE 400°C – 800°C

Recommended Materials

- Aerogel Insulation Blanket / Board
- Mica Sheet / Mica Tape

Typical Applications

- Battery Thermal Runaway Protection
- High Temperature Equipment Insulation
- Heat Shielding & Thermal Barrier



ABOVE 800°C – 1400°C+

Recommended Materials

- Ceramic Fiber Products
- High Silica Fiberglass Cloth
- Rock Wool / Boards

Typical Applications

- Industrial Furnace Lining
- Fireproof & Heat Insulation System
- Extreme High Temperature Protection



TEMPERATURE SELECTION TIPS



1. FOCUS ON CONTINUOUS OPERATING TEMPERATURE

Continuous temperature is more important than short-term peak.



2. LEAVE SAFETY MARGIN

Always keep a 20–30°C safety margin for long-term reliability.



3. CONSIDER THERMAL CYCLING

Material performance can degrade under repeated temperature changes.



4. CHECK MECHANICAL IMPACT

High temperature may affect strength, hardness and dimensional stability.



5. VERIFY CHEMICAL COMPATIBILITY

Ensure the material is resistant to chemicals in your operating environment.



6. TEST BEFORE FINAL SELECTION

Always conduct real application testing to confirm performance and service life.



Selecting the right material by temperature range helps reduce failures, extend product life, and improve overall system safety and efficiency.



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04

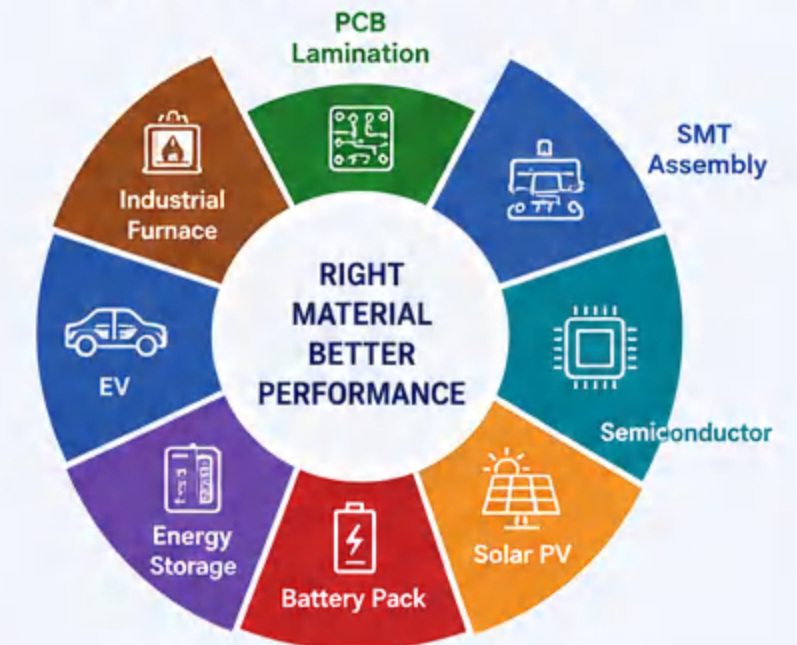
Material Selection
by Industry Application

MATERIAL SELECTION BY INDUSTRY APPLICATION

Different industries have different temperature requirements and operating environments.
Use the table below to quickly find the most suitable high temperature materials for your application.

Industry	Operating Temperature Range (°C)	Key Requirements	Recommended Materials	Typical Applications
PCB Lamination	180 – 220°C	- High temperature resistance - Dimensional stability - Non-stick & easy release	- PTFE Film / Sheet - Silicone Rubber Sheet - Release Film	- CCL Lamination - Multilayer PCB Pressing - FPC Lamination
SMT Assembly	250 – 300°C	- Heat resistance - Low outgassing - Excellent electrical insulation	- PI Film (Polyimide) - PTFE Film - High Temperature Tape	- Reflow Soldering Protection - Wave Solder Pallet - Masking & Protection
Semiconductor	260 – 300°C	- Chemical resistance - Cleanroom compatible - Low particle generation	- PTFE Film / Sheet - PI Film - PFA / FEP Film	- Wafer Processing - Etching & Coating Protection - Equipment Insulation
Solar PV	150 – 180°C	- Weather resistance - Electrical insulation - Long-term stability	- PEN Film - PET Film - Adhesive PET Tape	- Solar Cell Back Sheet - Junction Box Insulation - Module Protection
Battery Pack	180 – 250°C	- Insulation & flame retardant - Thermal stability - Compression resistance	- PPS Film / Sheet - Silicone Rubber Sheet - PI Film	- Cell Insulation - Module Insulation - Thermal Management
Energy Storage	300 – 800°C	- High temperature insulation - Fire resistance - Thermal barrier	- Aerogel Insulation - Mica Products - Ceramic Fiber Products	- Fire Protection Barrier - Thermal Insulation Layer - Battery Safety System
Electric Vehicle	180 – 250°C	- Vibration resistance - Electrical insulation - Flame retardant	- PPS Film / Sheet - Silicone Rubber Sheet - PI Film	- Power Battery Protection - Inverter Insulation - Motor Insulation
Industrial Furnace	800 – 1260°C+	- Extreme temperature resistance - Mechanical strength - Thermal shock resistance	- Ceramic Fiber Products - High Silica Fabric / Cloth - Mica Sheet	- Furnace Lining - High Temp Sealing - Heat Shielding

QUICK INDUSTRY RECOMMENDATION MAP



SELECTION TIPS

- 1. Understand Your Real Operating Conditions**
Consider continuous temperature, peak temperature, and the entire thermal cycle.
- 2. Consider the Whole System**
Temperature, chemicals, pressure, and mechanical stress all affect material performance.
- 3. Safety First**
Always leave a 20–30°C safety margin to ensure long-term reliability and safety.
- 4. Test Before Full Scale Use**
Verify material performance under real working conditions before final selection.



WIDE TEMPERATURE RANGE
-200°C to 1400°C+



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For Demanding Industrial Environments



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TEMPERATURE RESISTANCE REFERENCE GUIDE

Quick Selection Guide for High Temperature
Insulation & Thermal Protection Materials

05

Common Mistakes
& Contact
Information



COMMON MISTAKES IN MATERIAL SELECTION



✗ ONLY CHECKING PEAK TEMPERATURE

Selecting a material based only on short-term peak temperature may lead to early failure.

✓ Better Choice

Focus on continuous operating temperature, which determines real service life.



✗ IGNORING SAFETY MARGIN

Using materials at their limit temperature without any safety margin increases risk.

✓ Better Choice

Always keep a 20–30°C safety margin to ensure stable and long-term performance.



✗ OVERLOOKING CHEMICAL COMPATIBILITY

High temperature materials may react with chemicals, oils or solvents.

✓ Better Choice

Check chemical resistance and compatibility with your operating environment.



✗ IGNORING THERMAL CYCLING

Repeated heating and cooling can cause fatigue, warping or cracking.

✓ Better Choice

Select materials with excellent thermal stability and low thermal expansion.



✗ FOCUSING ONLY ON PRICE

Low-cost materials may lead to frequent replacement and higher total cost.

✓ Better Choice

Consider total cost of ownership (including lifespan, reliability and maintenance).



✗ NO REAL-WORLD TESTING

Relying only on datasheet values without actual application testing can be risky.

✓ Better Choice

Always test under real operating conditions before final confirmation.

TEMPERATURE SELECTION REMINDER



CONTINUOUS TEMPERATURE MATTERS MOST

It defines long-term reliability and service life.



SAFETY MARGIN SAVES COST

20–30°C margin prevents unexpected failure.



TESTING ENSURES REAL RELIABILITY

Real-world testing is the key to correct selection.



RIGHT MATERIAL IMPROVES PERFORMANCE

Better stability, higher efficiency, longer product life.



RELIABLE MATERIALS DRIVE SAFER AND GREENER FUTURE

Quality materials protect people, systems and environment.

SELECTION CHECKLIST



1. Define Operating Conditions

Continuous temperature, peak temperature, and exposure time.



2. Check Chemical Environment

Ensure material is compatible with chemicals, oils, and gases.



3. Consider Mechanical Requirements

Strength, flexibility, hardness and wear resistance.



4. Evaluate Thermal Cycling

Account for repeated heating and cooling conditions.



5. Apply Safety Margin

Keep 20–30°C safety margin below continuous limit.



6. Test & Validate

Perform real application testing to verify performance and lifespan.



7. Review Total Cost

Consider durability, maintenance and replacement frequency.



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NEED HELP SELECTING THE RIGHT MATERIAL?

Our engineering team is ready to support you with professional material recommendations, sample testing, and custom solutions for your applications.



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