The High Performance Thermoplastic Solution Provider

HT Materials CORPORATION

HT Materials Corporation is an innovative high performance thermoplastic developer and your partner for the future.

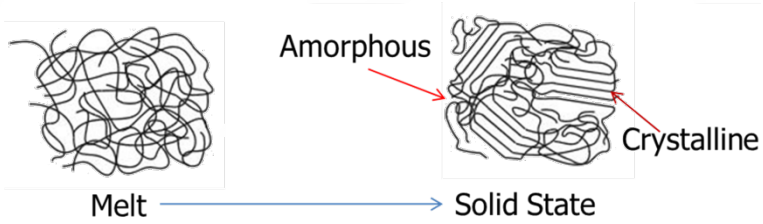
Founded in 2006, HT Materials is headquartered in Clifton Park, New York, with offices in USA and China. Through its proprietary and patented technologies, HT Materials is poised to address the growing demands that engineers face every day in automotive, aerospace, oil & gas, medical, and industrial applications.

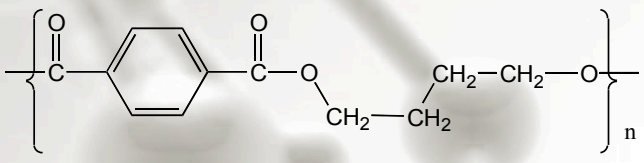
HT Materials offers an impressive range of high performance thermoplastic products including Polybutylene terephthalate (PBT), Polyphthalamide (PPA), Polyphenylene sulfide (PPS), and Polysulfones (PSU). Our innovative chemistry and proprietary formulation can be fully customized to deliver the following attributes: high heat resistance; good corrosion resistance; high strength and toughness; abrasion, corrosion, and wear resistance; electrical conductivity or insulation; non-combustibility, and many other properties.

HTM Polybutylene Terephthalate

PBT

Polybutylene terephthalate (PBT) polymer from HT Materials Corporation is a semicrystalline thermoplastic polyester with an excellent balance of properties. The PBT polymer is manufactured from polymerization of terephthalic acid and 1,4-butanediol.





The PBT polymer can be processed to have high crystallinity – typically as high as 60% – giving it many useful properties such as high hardness, stiffness, strength and chemical resistance.

With proper formulation and reinforcement, PBT based polyester compounds provide many application benefits including:

- ✓ High strength, stiffness and toughness to perform in mechanically demanding applications
- ✓ Superior electrical properties with high dielectric resistance and low dielectric loss
- ✓ Broad temperature capability, having impact resistance down to -40°F, high deflection temperatures under load above 392°F
- ✓ Low creep to retain key dimensions over time, even well above room temperature
- ✓ High temperature resistance to withstand long-term exposure in hot environments
- ✓ Minimal moisture absorption for dimensional stability under high humidity
- ✓ Superior chemical resistance to tolerate exposure to chemicals and solvents, oils and greases
- ✓ Easy colorability and good surface gloss for attractive appearance of parts
- ✓ Alloying compatibility to enable creation of highly flexible, high impact products

HTM Polybutylene Terephthalate

PBT

PBT exhibits almost instantaneous crystallization from the melt, enabling PBT and PBT based compounds, to be molded with short cycles in cooler tooling. The immediate high crystallinity also contributes to reduced post-molding shrinkage, thereby enhancing dimensional stability. HT Materials' PBT product line encompasses a broad array of standard and specialty grades for use in compounding, injection molding, and extrusion.

HT Materials PBT Resins for Compounding and Extrusion Application

Product Grade	Supply Form	Melt Flow Rate (g/10min @ 482°F/2.16kg)	Description
KH2120	Pellets	11±3	High viscosity flow for extrusion and injection molding
KH2110	Pellets	16±4	Standard flow for compounding and injection molding
KH2100	Pellets	30±4	Medium flow for compounding
KH2090	Pellets	45±5	High flow for compounding

HT Materials PBT Resins - Basic Properties

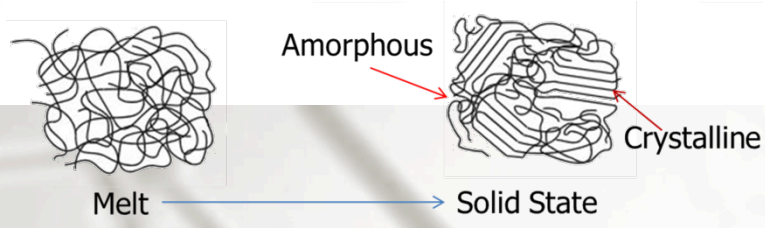
Product Grade	KH2120	KH2110	KH2100	KH2090
Melt flow rate (g/10min @ 482F/2.16kg)	11	16	30	45
Intrinsic viscosity, dL/g	1.20	1.10	1.00	0.90
Melting temperature, °F	437	437	437	437
Glass transition temperature, °F	140	140	140	140
Ash content, ppm	< 300	< 300	< 300	< 300
Color (L)	> 90	> 90	> 90	> 90
Color (B)	3	3	3	3
Moisture absorption, %	0.20	0.20	0.20	0.20
Tensile Elongation @ Break, %	> 200	> 200	> 100	> 100

NHU® Polyphthalamide

PPA

NHU® polyphthalamide (PPA) is a semicrystalline high performance thermoplastic polyamide with an excellent balance of properties. PPA resin has excellent mechanical properties, outstanding dimensional stability, exceptional elevated thermal performance, and good processing characteristics.

NHU® PPA resins bridge the cost/performance gap between the high-volume, moderate performance engineering resins, such as thermoplastic polyesters and nylons, and the low-volume, high-cost specialty thermoplastics, such as polyetheretherketone (PEEK).



Compared to typical nylons, NHU® PPA resin has higher thermal capabilities and is stronger, stiffer and less sensitive to moisture. It retains its excellent mechanical properties (including fatigue and creep resistance) over a broad temperature range in humid and chemically aggressive environments. NHU® PPA outperforms typical Nylons and delivers long-life performance that includes:

- ✓ Higher strength and stiffness at elevated temperatures
- ✓ Better retention of properties in humid environments
- ✓ Greater resistance to a broader range of chemicals

These property advantages are manifested as improvements in:

- ✓ Dimensional stability
- ✓ Improved solvent (and hydrolysis) resistance
- ✓ Better high temperature mechanical property retention.

NHU® PPA resin is made with aromatic acid and aliphatic acid with aliphatic diamine.

With the versatile chemistry, NHU® PPA resins offer a broad range of base resin family, each offering unique processing and performance features.

NHU® Polyphthalamide

PPA

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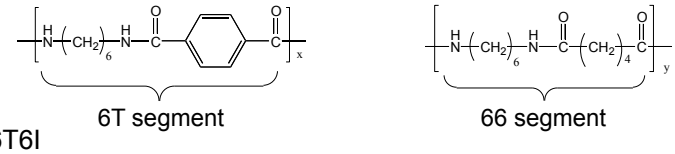

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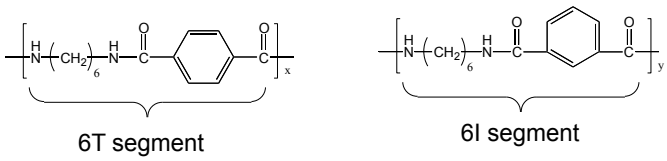

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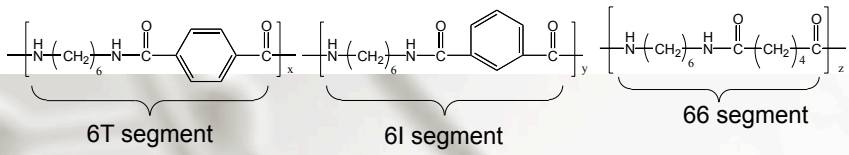


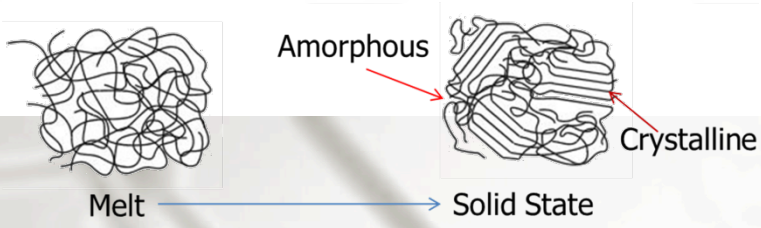
NHU® PPA Resins for Compounding Application

Product Grade	Processing	IV (dL/g)	Tg (°C)	Tg (°F)	Tm (°F)	Tm (°F)	Description
NHU® PPA N600	Hot water moldable (mold temp <100°C)	0.70 – 1.00	90	194	308	587	Excellent processing characteristics and surface appearance
NHU® PPA N201	Hot water moldable (mold temp <100°C)	0.70 – 1.00	102	216	323	613	Provides the fast crystallization for short cycle times
NHU® PPA N200	Hot oil moldable (mold temp >135°C)	0.70 – 1.00	123	253	315	599	Delivers the highest long-term thermal performance
NHU® PPA N100	Hot oil moldable (mold temp >135°C)	0.70 – 1.00	133	271	313	595	Delivers the highest long-term thermal performance

NHU® Polyphenylene Sulfide

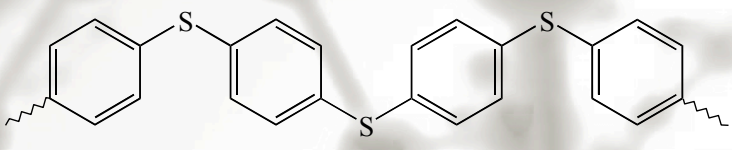
PPS

NHU® polyphenylene sulfide (PPS) is a semi-crystalline high performance thermoplastic with an excellent balance of properties. It is stiff, strong, hard, tough, and has outstanding chemical and oxidative resistance. It retains these properties at temperatures well above 200°C, i.e., its continuous service temperature extends to 240°C. It absorbs little moisture and is both dimensionally stable and inherently flame retardant. It also has excellent electrical properties, is highly impermeable to most liquids and gases, has minimal creep, even at elevated temperatures, and flows well in molding to fill long, thin and complex parts.



NHU® PPS is a linear, partially aromatic plastic containing a phenylene ring and a sulfur atom, which are linked alternating in para-position. NHU® PPS has the following distinct features:

- ✓ Uniform chemical structure (100% linear)
- ✓ Narrower molecular weight distribution
- ✓ Fast crystallization
- ✓ Lower chloride content
- ✓ Good melt stability
- ✓ Wide range of grades available (from low viscosity to high viscosity)



The NHU® PPS product line encompasses a broad array of standard and specialty grades for use in injection molding, extrusion, and fiber spinning. Compounding grades are available as free-flowing granules for easy feeding.

Given its affinity for fillers, NHU PPS compounding grades can carry as much as 70% in fillers and/or reinforcements. In Addition to the linear PPS resin, NHU also supplies crosslinked PPS resin when it is needed.

NHU® Polyphenylene Sulfide

PPS

NHU® PPS Resins for Compounding Application

Resin Type	Product Grade	Supply Form	Melt Flow Rate (g/10 minutes) (ISO 1133, 316°C/5kg)	Ash Content (%) (ISO 3451 750°C)	Volatile Content (%) (300°C/1hr)
Linear	NHU® PPS 1110C	Granules	100	0.25	0.30
	NHU® PPS 1130C	Granules	250	0.30	0.35
	NHU® PPS 1150C	Granules	450	0.35	0.40
	NHU® PPS 1170C	Granules	750	0.35	0.40
	NHU® PPS 1190C	Granules	1050	0.35	0.40
	NHU® PPS 11100C	Granules	1800	0.35	0.45
Crosslinked	NHU® PPS 21605C	Granules	50	0.30	0.35
	NHU® PPS 21110C	Granules	100	0.30	0.35
	NHU® PPS 21330C	Granules	250	0.30	0.35
	NHU® PPS 21150C	Granules	450	0.30	0.40

NHU® PPS Resin for Compression Molding Application

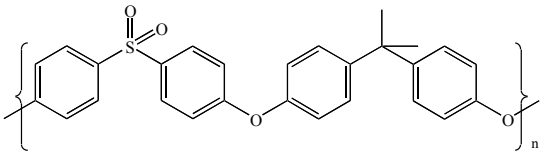
Resin Type	Product Grade	Supply Form	Melt Flow Rate (g/10 minutes) (ISO 1133, 316°C/5kg)	Ash Content (%) (ISO 3451 750°C)	Volatile Content (%) (300°C/1hr)
Cross-linked	21605F	Powder	50	0.30	0.35
	21610F	Powder	100	0.30	0.35
	21330F	Powder	250	0.30	0.35

NHU® PPS Resin for Coating Application

Resin Type	Product Grade	Supply Form	Melt Flow Rate (g/10 minutes) (ISO 1133, 316°C/5kg)	Ash Content (%) (ISO 3451 750°C)	Volatile Content (%) (300°C/1hr)
Cross-linked	21330F	Powder	250	0.30	0.35
	21150F	Powder	450	0.30	0.35
Linear	10200F	Powder	3000	0.35	0.45

HTM Polysulfone

PSU



HTM polysulfone PSU is an amorphous rigid and strong, high temperature thermoplastic that can be injection molded, extruded or thermoformed into a wide range of shapes and parts for various applications. HTM PSU resins offer a superior combination of high-performance properties that include:

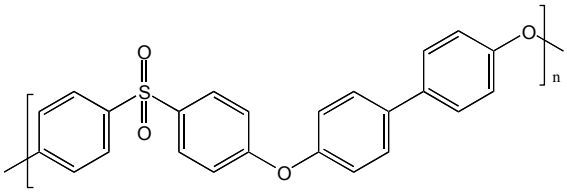
- ✓ Excellent thermal stability
- ✓ High toughness and strength
- ✓ Good environmental stress cracking resistance
- ✓ High heat deflection temperature, 174°C (345°F)
- ✓ Combustion resistance
- ✓ Dimensional stability
- ✓ Low shrinkage
- ✓ Transparency
- ✓ Low creep

HTM PSU Resins for Extrusion, Compounding and Injection Molding Applications

Product Grade	Supply Form	Melt Flow Rate (g/10min, @ 345°C/5.0 kg)	Description
PSU-1000	Pellets	15	High viscosity for extrusion and injection molding
PSU-1200	Pellets	25	Medium viscosity for extrusion, compounding and injection molding
PSU-1600	Pellets	35	Medium viscosity with higher flow for compounding and injection molding

HTM Polyphenylsulfone

PPSU



HTM PPSU polyphenylsulfone is an amorphous rigid and strong, high temperature thermoplastic with superior impact resistance. It can be injection molded, extruded or thermoformed into a wide range of shapes and parts for various applications. HTM PPSU polyphenylsulfone resins offer a superior combination of high-performance properties that include:

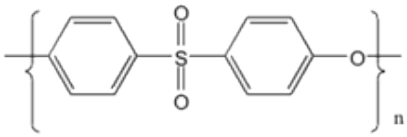
- ✓ High heat deflection temperature of 207°C (405°F)
- ✓ Superior toughness and impact strength
- ✓ Exceptional long-term hydrolytic stability
- ✓ Withstands repeated steam sterilization without meaningful loss of properties
- ✓ Better chemical resistance than polysulfone (PSU) and polyetherimide (PEI)
- ✓ Inherently flame retardant
- ✓ Transparent
- ✓ Colorable

HTM PPSU Resins for Injection Molding, Extrusion and Compounding Applications

Product Grade	Supply Form	Melt Flow Rate (g/10min, @ 365°C/5.0 kg)	Description
PPSU-3200	Pellets	18	General purpose low flow for extrusion and injection molding
PPSU-3400	Pellets	30	Medium flow for extrusion, compounding and injection molding
PPSU-3600	Pellets	40	High flow for compounding and injection molding

HTM Polyethersulfone

PESU



HTM PESU polyethersulfone is a high temperature polyethersulfone thermoplastic suitable for continuous use temperatures up to 400° F (204° C). It is resistant to oxidation and hydrolysis, and withstands

prolonged exposure to high temperatures and repeated sterilization, making it a good fit for baby bottles and other food service applications.

This resin is also inherently flame retardant for use in electronic components and testing devices.

- ✓ Excellent thermal stability
- ✓ Good chemical resistance
- ✓ High heat deflection temperature, 174°C (345°F)
- ✓ Excellent electrical properties
- ✓ Combustion resistance
- ✓ Dimensional stability
- ✓ Low shrinkage
- ✓ Transparency

HTM PESU Resins for Compounding and Injection Molding Applications

Product Grade	Supply Form	Melt Flow Rate (g/10min, @ 360°C/10.0 kg)	Description
PESU-2000	Pellets	35	High viscosity for extrusion and injection molding
PESU-2200	Pellets	45	Medium viscosity for extrusion, compounding and injection molding
PESU-2600	Pellets	100	Medium viscosity with higher flow for compounding and injection molding

Contact Information

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