Creating a Leading Edge by Unique Combination.

Transparency × Heat Resistance × Releasability

High Insulation Properties
Chemical / Steam Resistance
Transparency
Heat Resistance
High Releasability (Surface Tension: 24mN/m)
Gas Permeability
Lower Density
Halogen Free Food Sanitation
**01 Heat Resistance**
TPX™ has a high melting point in the range from 220°C to 240°C and a high Vicat softening temperature. Hence, it can be used for high temperature applications. However, as heat distortion temperature of TPX™ is almost the same as that of polypropylene, the application under high-stress environment needs to be carefully considered.

**02 Releasability and Non-compatibility**
The surface tension of TPX™ (24 mN/m) is very low and this value is the second lowest as compared to fluorine polymers. Hence, TPX™ shows excellent releasability against various materials in hardening processes of thermosetting resins (urethane, epoxy, etc.). Furthermore, since TPX™ shows incompatibility against thermoplastic resins (PET, PP, etc.), it is used to create a porous structure in PET or membranes.

**03 Transparency**
Although TPX™ is a crystalline polymer, it exhibits excellent transparency (Haze < 5%) and light transmittance. In particular, TPX™ is used for optical analysis cells because of the higher UV transmittance as compared to glass and other transparent polymers.

**Crystal Structure of TPX™**

**04 Chemical Resistance**
Because of the rigid 6-membered loops, TPX™ has better chemical resistance as compared to polyolefins and aromatic polymers. TPX™ shows excellent chemical resistance, particularly against acids, alkalis, and solvents. Furthermore, TPX™ can be used in various applications which require chemical resistance, such as contact container caps and tubes, experimental apparatus and analytical cells.

**05 Gas Permeability**
TPX™ has the characteristic of excellent gas permeability derived from its molecular structure. Hence, TPX™ is widely used for gas permeative applications such as gas separation membranes.

**06 Low Dielectric Property**
Since TPX™ has a non-polar structure, its dielectric property is almost the same as fluorine polymers. It should be noted that dielectric property of TPX™ is hardly affected by frequency and TPX™ can be injection-molded and extruded into PTFE. TPX™ shows stable dielectric property in the wide range of frequency.

**07 Low Density**
The density of TPX™ is the lowest (0.93 g/cm³) among thermoplastic polymers, and its specific volume is larger than that of other transparent polymers. For this reason, it is possible to reduce the weight of injection-molded articles by using TPX™ or alloy TPX™ compounds.

**08 Steam Resistance**
TPX™ shows a very low water absorbance and therefore the dimension of a TPX™ product is hardly affected by water absorbance. Furthermore, since TPX™ does not hydrolyze in boiling water, it can be used for experimental apparatus and internal caps which require the steam sterilization.

**09 Food Sanitation**
Highly approved TPX™ grades (USP standards, FDA, and EU regulations) are also available and they are used for food wraps and microwave even 100°C heat.

**10 Low Refractive Index**
The refractive index of TPX™ is 1.4452, lower than fluorine polymers.
TPX™ is making good use of a variety of properties and it is being widely used in each industry. We introduce the useful examples here.

01 Food Containers
Heat Resistance | Translucency | Transparency

TPX™ has good reusability following flexible needs. It prevents the dates, colors, and smells of food from remaining in a container. Further, it has excellent heat resistance and can withstand cooking oil food in a microwave oven.
[Recommended Grades: R185/3390/SYM31/4034444]

02 Release Film for FPC
Heat Resistance | Releasability | Translucency

While boasting high heat resistance, TPX™ also features low heat distortion temperature, which enables it to form minute protrusions and release of FPC substrate surface. This stops adhesive leaking in the circuit section during the processing process. TPX™ is also more reusable than other materials, simplifying releasing tasks.
[Recommended Grades: R185/3390/SYM31/4034444]

03 Mandrel / Sheath
Heat Resistance | Releasability | Translucency

TPX™ features excellent heat resistance and enables high temperature sterilization. TPX™ mandrels ensure high precision of the tube's inner diameter while TPX™ sheaths enable minor bending of the tube's outer. Both mandrels and sheaths can be used repeatedly, enabling manufacturing costs to be lowered.
[Recommended Grades: R185/3390/SYM31/4034444]

04 Release Paper for Synthetic Leather
Heat Resistance | Translucency | Releasability

Because of its high heat resistance and pattern transferability, TPX™ is used widely for release paper for synthetic leather. It can also be used more repeatedly than other materials, helping to reduce the process cost.
[Recommended Grades: R185/3390/SYM31/4034444]

05 Experimental Apparatuses
Translucency | Releasability | Transparency

Because of its stable C/C bonds, TPX™ has better chemical resistance compared with PTFE/PEEK materials. TPX™ basically shows excellent chemical resistance, particularly against acids, alkalis, and alcohols. For this reason, TPX™ is also used for experimental apparatuses.
[Recommended Grades: R185/3390/SYM31/4034444]

06 Hollow Fiber
Translucency | Releasability | Heat Resistance

TPX™ is characterized by its excellent gas permeability, which stems from its molecular structure. This gives TPX™ broad gas permeative applications, such as hollow fiber for artificial lungs and gas separation membranes for sewage treatment facilities.
[Recommended Grades: R185/3390/SYM31/4034444]

07 Resin Modification
Translucency | Releasability | Heat Resistance

As a resin modifier, TPX™ is mainly used for the purpose of improving heat resistance. Further, we have some achievements even on the production of synthetic paper and air, making use of its insusceptibility.
[Recommended Grades: R185/3390/SYM31/4034444]

08 Heat-Resistant Wraps
Heat Resistance | Releasability | Transparency

Wraps made by using TPX™ remain excellent at higher temperatures compared to conventional wraps (PETG and PE wraps). Hence, they can be used safely for cooking or re-heating food in a microwave oven.
[Recommended Grades: R185/3390/SYM31/4034444]

09 LED Mold
Heat Resistance | Releasability | Translucency

Harnessing its heat resistance and reusability, TPX™ is used for the release molds of LED. Moreover, these molds can be used repeatedly, helping to reduce manufacturing costs.
[Recommended Grades: R185/3390/SYM31/4034444]

10 Animal Cage
Translucency | Releasability | Heat Resistance

Taking advantage of its heat resistance, transparency, and light weight, TPX™ is also used for animal cages. TPX™ has also found medical-related applications, signifying that the cages have a minimal impact on living things.
[Recommended Grades: R185/3390/SYM31/4034444]
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<tr>
<th>Physical Properties</th>
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That's right! Let's ask Mitsui Chemicals!

Our Global Network

- Mitsui Chemicals Europe GmbH
  Ostbase, 34-1, 48111 Düsseldorf, Germany
  TEL: +49-211-175309  FAX: +49-211-17532-791

- Mitsui Chemicals (CHINA) Co., Ltd.
  21F, Capital Square, 288 Nanjing West Road. Jinqiao District, Shanghai, 200122, P. R. China
  TEL: +86-21-68864396  FAX: +86-21-68864367

- Mitsui Chemicals Korea, Inc.
  15F, Building B, PNI AVEO, 100, Euljiro, Jung-gu, Seoul, 110-117, Korea
  TEL: +82-2-6881-8209  FAX: +82-2-6881-8208

- Mitsui Chemicals Asia Pacific, Ltd.
  2 Harbourfront Plaza 4B-01 Harbourfront Tower
  2 Singapore 949234, Singapore
  TEL: +65-6594-2621  FAX: +65-6535-5181

- Mitsui Chemicals Korea, Inc.
  10F, Building B, PNI AVEO, 100, Euljiro, Jung-gu, Seoul, 110-117, Korea
  TEL: +82-2-6881-8209  FAX: +82-2-6881-8208

- Mitsui Chemicals India Pvt. Ltd.
  3rd Floor, B-Wing, D3, District Centre, Saket, New Delhi 110037, India
  TEL: +91-11-40101200  FAX: +91-11-40107493

- Mitsui Chemicals China Co., Ltd.
  21F, Capital Square, 288 Nanjing West Road. Jinqiao District, Shanghai, 200122, P. R. China
  TEL: +86-21-68864396  FAX: +86-21-68864367

- Mitsui Chemicals America, Inc.
  60 Hawthorne Avenue, Suite 508, Rye Brook, NY 10573, U.S.A.
  TEL: +1-914-253-8777  FAX: +1-914-253-8790

Our Japan Network

- Head Office
  Performance Polymers Bldg.
  Mobility Business Sector
  Showa City Center 1-1-2 Higashishinbash, Minato-ku, Tokyo 105-0003
  TEL: +81-3-5474-6299  FAX: +81-3-5474-6282

- Osaka Branch
  Shinanbashisho Bldg. 8F, 11-7, Utsuboshimachi 1-chome,
  Naniwa-ku, Osaka 550-8004
  TEL: +81-6-4466-3602  FAX: +81-6-4466-3638

[Precautions]

1. General Precautions
   The data and/or the information here are representative values obtained by our own testing methods. Furthermore, the written contents in this brochure are based on the correct available information and data. Therefore, we do not provide any warranty about the accuracy or reliability thereof for any particular applications.
   - The detailed technical information will be given to you when you contact us.
   - For the detailed safety information, please refer to Materials safety data sheet of TPX™.
   - Please pay attention to industrial property rights about applications listed in this brochure referring to TPX™, please exercise the practical applicability of TPX™ and make sure whether any problems will not be caused.
   - Please avoid the sudden changes of TPX™ in long period of time as it may cause the color change or the stability deterioration.
   - These precautions are given on the assumption that TPX™ is used under normal use. If TPX™ is used in any special way, please take additional safety measures.

2. Use of TPX™ for Medical-related applications and Food contact applications
   - Please contact us when you intend to use TPX™ in such applications.