

# TOPAS® IT X1

Cyclic Olefin Copolymer

Topas Advanced Polymers, Inc.

## Message:

### Product Description

TOPAS IT X1 is an injection molding grade with heat and impact resistance. It is a moderately clear resin with high moisture barrier, chemical and heat resistance, making it suitable for products exposed to dishwashing or steam (121°C) temperatures.

### Selected Applications

Bottles & containers

Labware

Electronics

Food packaging

TOPAS COC Modifier

### Leading Attributes

Minimally reactive, EtO/gamma/steam sterilizable

Transparent; temperature resistance

Low dielectric constant, low moisture sensitivity

Not manufactured with BPA, phthalates, or halogens

Improve durability; maintain optics

Related Grades for Injection Molding, Healthcare, Optics and Diagnostics

TOPAS 6013M-07 - broad processing window, best for blow molding (IBM/ISBM)

TOPAS 6015S-04 - high heat distortion temperature (150°C) for 134°C protocols

TOPAS 6017S-04 - our most heat distortion resistant IM grade (HDT=170°C)

| General Information |                                    |
|---------------------|------------------------------------|
| Features            | Moisture proof                     |
|                     | Radiation disinfection             |
|                     | Copolymer                          |
|                     | Ethylene oxide disinfection        |
|                     | Impact resistance, good            |
|                     | Good chemical resistance           |
|                     | Heat resistance, high              |
|                     | Compliance of Food Exposure        |
|                     | BPA-free                           |
|                     | Halogen-free                       |
|                     | Disinfect with steam               |
|                     | Medium transparency                |
|                     |                                    |
| Uses                | Electrical/Electronic Applications |
|                     | Bottle                             |
|                     | Container                          |
|                     | Laboratory apparatus               |
|                     | Food packaging                     |
|                     | Plastic modification               |
|                     |                                    |
| Agency Ratings      | FDA FCN 405                        |

ISO 10993  
USP Class VI  
European 2002/72/EC

| Appearance                                | Clear/transparent |                   |                 |
|-------------------------------------------|-------------------|-------------------|-----------------|
| Forms                                     | Particle          |                   |                 |
| Processing Method                         | Injection molding |                   |                 |
| Physical                                  | Nominal Value     | Unit              | Test Method     |
| Density                                   | 1.00              | g/cm <sup>3</sup> | ISO 1183        |
| Melt Mass-Flow Rate (MFR) (260°C/2.16 kg) | 8.6               | g/10 min          | ASTM D1238      |
| Molding Shrinkage <sup>1</sup>            | 0.30 - 0.70       | %                 | Internal method |
| Hardness                                  | Nominal Value     | Unit              | Test Method     |
| Rockwell Hardness (R-Scale)               | 102               |                   | ASTM D785       |
| Mechanical                                | Nominal Value     | Unit              | Test Method     |
| Tensile Modulus                           | 2100              | MPa               | ISO 527-2/1A/1  |
| Tensile Stress                            |                   |                   | ISO 527-2/1A/50 |
| Yield                                     | 52.0              | MPa               | ISO 527-2/1A/50 |
| Fracture                                  | 32.0              | MPa               | ISO 527-2/1A/50 |
| Tensile Strain                            |                   |                   | ISO 527-2/1A/50 |
| Yield                                     | 4.5               | %                 | ISO 527-2/1A/50 |
| Fracture                                  | 6.7               | %                 | ISO 527-2/1A/50 |
| Flexural Modulus - Tangent                | 2110              | MPa               | ASTM D790       |
| Flexural Strength (5.0% Strain)           | 80.0              | MPa               | ASTM D790       |
| Impact                                    | Nominal Value     | Unit              | Test Method     |
| Charpy Notched Impact Strength (23°C)     | 2.5               | kJ/m <sup>2</sup> | ISO 179/1eA     |
| Charpy Unnotched Impact Strength (23°C)   | 25                | kJ/m <sup>2</sup> | ISO 179/1eU     |
| Notched Izod Impact                       | 40                | J/m               | ASTM D256A      |
| Unnotched Izod Impact                     | 320               | J/m               | ASTM D4812      |
| Thermal                                   | Nominal Value     | Unit              | Test Method     |
| Deflection Temperature Under Load         |                   |                   | ASTM D648B      |
| 0.45 MPa, not annealed                    | 131               | °C                | ASTM D648B      |
| 1.8 MPa, not annealed                     | 118               | °C                | ASTM D648B      |
| Glass Transition Temperature              | 138               | °C                | ISO 11357-2     |
| Electrical                                | Nominal Value     | Unit              | Test Method     |
| Volume Resistivity                        | > 1.0E+17         | ohms · cm         | ASTM D257       |
| Dielectric Constant (60 Hz)               | 2.25              |                   | ASTM D150       |
| Optical                                   | Nominal Value     | Unit              | Test Method     |
| Refractive Index                          | 1.530             |                   | ISO 489         |
| Transmittance                             | 90.0              | %                 | ASTM D1003      |
| Haze                                      | 8.5               | %                 | ASTM D1003      |
| Additional Information                    | Nominal Value     | Unit              | Test Method     |

| Puncture                                                                                                                                                            |               |      | ASTM D3763 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------|------------|
| Failure Mode                                                                                                                                                        | Ductile       |      | ASTM D3763 |
| Total Energy : 2.00 mm                                                                                                                                              | 27.1          | J    | ASTM D3763 |
| Puncture Resistance (2.00 mm)                                                                                                                                       | 2600          | N    | ASTM D3763 |
| Screw Speed                                                                                                                                                         | 50 - 200      | rpm  |            |
| Injection                                                                                                                                                           | Nominal Value | Unit |            |
| Drying Temperature                                                                                                                                                  | 80.0          | °C   |            |
| Drying Time                                                                                                                                                         | 4.0 - 6.0     | hr   |            |
| Rear Temperature                                                                                                                                                    | 190 - 220     | °C   |            |
| Middle Temperature                                                                                                                                                  | 200 - 260     | °C   |            |
| Front Temperature                                                                                                                                                   | 220 - 260     | °C   |            |
| Nozzle Temperature                                                                                                                                                  | 220 - 260     | °C   |            |
| Processing (Melt) Temp                                                                                                                                              | 220 - 260     | °C   |            |
| Mold Temperature                                                                                                                                                    | 70.0 - 100    | °C   |            |
| Injection Pressure                                                                                                                                                  | 50.0 - 110    | MPa  |            |
| Injection Rate                                                                                                                                                      | Moderate-Fast |      |            |
| Holding Pressure                                                                                                                                                    | 30.0 - 60.0   | MPa  |            |
| Back Pressure                                                                                                                                                       | < 15.2        | MPa  |            |
| Injection instructions                                                                                                                                              |               |      |            |
| Feed temperature: <60°C (<140°F)Max. Residence Time: 10 minutes, reduce Tx = 170°C (338°F)Injection Speed: 50 - 150 mm/sec (2.0 - 6.0 in/sec)Nozzle type: Free flow |               |      |            |
| NOTE                                                                                                                                                                |               |      |            |

1. Dependent on process conditions and part design.

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### Susheng Import & Export Trading Co.,Ltd.

Tel: +86 21 5895 8519

Phone: +86 13424755533

Email: sales@su-jiao.com

No. 215, Lianhe North Road, Fengxian District, Shanghai, China

