

# Hytrel® SC976 NC010

## THERMOPLASTIC POLYESTER ELASTOMER

Common features of Hytrel® thermoplastic polyester elastomer include mechanical and physical properties such as exceptional toughness and resilience, high resistance to creep, impact and flex fatigue, flexibility at low temperatures and good retention of properties at elevated temperatures. In addition, it resists many industrial chemicals, oils and solvents. Special grades include heat stabilised, flame retardant, food contact compliant, blow molding and extrusion grades. Concentrates offered include black pigments, UV protection additives, heat stabilisers, and flame retardants. Hytrel® thermoplastic polyester elastomer is plasticiser free.

The good melt stability of Hytrel® thermoplastic polyester elastomer normally enables the recycling of properly handled production waste. If recycling is not possible, we recommend, as the preferred option, incineration with energy recovery (-24 kJ/g of base polymer) in appropriately equipped installations.

For disposal, local regulations have to be observed.

Hytrel® thermoplastic polyester elastomer typically is used in demanding applications in the automotive, fluid power, electrical/electronic, consumer goods, appliance and power tool, sporting goods, furniture, industrial and off-road transportation/equipment industry.

Hytrel® SC976 NC010 is a high modulus grade with nominal hardness of 72D, contains a non-discoloring stabilizer and can be processed by various thermoplastic processing techniques. Developed for applications such as parts for the healthcare industry.

### SPECIAL CONTROL for HEALTHCARE APPLICATIONS

This product is manufactured according to Good Manufacturing Practice (GMP) principles and generally accepted in food contact applications in the USA when meeting applicable use conditions. This product is also tested against ISO 10993-5 and -11 and selected parts of USP Class VI. For details, individual compliance statements are available from our representative.

### Product information

|                      |          |           |
|----------------------|----------|-----------|
| Resin Identification | TPC-ET   | ISO 1043  |
| Part Marking Code    | >TPC-ET< | ISO 11469 |

### Rheological properties

|                              |                           |                 |
|------------------------------|---------------------------|-----------------|
| Melt volume-flow rate        | 12 cm <sup>3</sup> /10min | ISO 1133        |
| Melt mass-flow rate          | 13 g/10min                | ISO 1133        |
| Temperature                  | 240 °C                    |                 |
| Load                         | 2.16 kg                   |                 |
| Moulding shrinkage, parallel | 1.6 %                     | ISO 294-4, 2577 |
| Moulding shrinkage, normal   | 1.6 %                     | ISO 294-4, 2577 |

### Typical mechanical properties

|                           |         |              |
|---------------------------|---------|--------------|
| Tensile Modulus           | 550 MPa | ISO 527-1/-2 |
| Stress at 5% strain       | 14 MPa  | ISO 527-1/-2 |
| Stress at 10% strain      | 23 MPa  | ISO 527-1/-2 |
| Stress at 50% strain      | 24 MPa  | ISO 527-1/-2 |
| Stress at break           | 50 MPa  | ISO 527-1/-2 |
| Nominal strain at break   | 530 %   | ISO 527-1/-2 |
| Strain at break           | >300 %  | ISO 527-1/-2 |
| Flexural Modulus          | 550 MPa | ISO 178      |
| Tensile creep modulus, 1h | 360 MPa | ISO 899-1    |



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|                                       |                       |                    |
|---------------------------------------|-----------------------|--------------------|
| Tensile creep modulus, 1000h          | 310 MPa               | ISO 899-1          |
| Charpy notched impact strength, 23°C  | 33 kJ/m <sup>2</sup>  | ISO 179/1eA        |
| Charpy notched impact strength, -30°C | 10 kJ/m <sup>2</sup>  | ISO 179/1eA        |
| Charpy notched impact strength, -40°C | 7 kJ/m <sup>2</sup>   | ISO 179/1eA        |
| Tensile notched impact strength, 23°C | 300 kJ/m <sup>2</sup> | ISO 8256/1         |
| Izod notched impact strength, 23°C    | 38 kJ/m <sup>2</sup>  | ISO 180/1A         |
| Izod notched impact strength, -40°C   | 7 kJ/m <sup>2</sup>   | ISO 180/1A         |
| Poisson's ratio                       | 0.47                  |                    |
| Brittleness temperature               | -97 °C                | ISO 974            |
| Shore D hardness, 15s                 | 64                    | ISO 48-4 / ISO 868 |
| Shore D hardness, max                 | 68                    | ISO 868            |
| Tear strength, parallel               | 180 kN/m              | ISO 34-1           |
| Abrasion resistance                   | 100 mm <sup>3</sup>   | ISO 4649           |

### Thermal properties

|                                             |               |                |
|---------------------------------------------|---------------|----------------|
| Melting temperature, 10°C/min               | 218 °C        | ISO 11357-1/-3 |
| Glass transition temperature, 10°C/min      | 25 °C         | ISO 11357-1/-3 |
| Temp. of deflection under load, 1.8 MPa     | 50 °C         | ISO 75-1/-2    |
| Temp. of deflection under load, 0.45 MPa    | 100 °C        | ISO 75-1/-2    |
| Vicat softening temperature, 50°C/h, 50N    | 140 °C        | ISO 306        |
| Vicat softening temperature, 50°C/h 10N     | 200 °C        | ISO 306        |
| Coeff. of linear therm. expansion, parallel | 180 E-6/K     | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal   | 180 E-6/K     | ISO 11359-1/-2 |
| Thermal conductivity of melt                | 0.15 W/(m K)  | Internal       |
| Spec. heat capacity of melt                 | 2150 J/(kg K) | Internal       |

### Flammability

|                                      |          |       |
|--------------------------------------|----------|-------|
| Burning Behav. at 1.5mm nom. thickn. | HB class | UL 94 |
| Thickness tested                     | 1.5 mm   | UL 94 |

### Other properties

|                                 |                        |                |
|---------------------------------|------------------------|----------------|
| Humidity absorption, 2mm        | 0.2 %                  | Sim. to ISO 62 |
| Water absorption, 2mm           | 0.6 %                  | Sim. to ISO 62 |
| Water absorption, Immersion 24h | 0.3 %                  | Sim. to ISO 62 |
| Density                         | 1260 kg/m <sup>3</sup> | ISO 1183       |
| Density of melt                 | 1110 kg/m <sup>3</sup> | Internal       |

### Injection

|                                 |         |          |
|---------------------------------|---------|----------|
| Drying Recommended              | yes     |          |
| Drying Temperature              | 110 °C  |          |
| Drying Time, Dehumidified Dryer | 2 - 3 h |          |
| Processing Moisture Content     | ≤0.08 % |          |
| Melt Temperature Optimum        | 245 °C  | Internal |
| Min. melt temperature           | 240 °C  |          |



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|                          |        |
|--------------------------|--------|
| Max. melt temperature    | 260 °C |
| Mold Temperature Optimum | 45 °C  |
| Min. mould temperature   | 45 °C  |
| Max. mould temperature   | 55 °C  |

### Extrusion

|                                 |              |
|---------------------------------|--------------|
| Drying Temperature              | 100 - 120 °C |
| Drying Time, Dehumidified Dryer | 2 - 3 h      |
| Processing Moisture Content     | ≤0.06 %      |
| Melt Temperature Optimum        | 235 °C       |
| Melt Temperature Range          | 225 - 245 °C |

