

## Polyethylene - High density (HDPE) - General

### General description

A semi-crystalline (typically 70 – 80 %) whitish, semi-opaque commodity thermoplastic with properties similar to LDPE but significantly stronger and stiffer and with even better chemical resistance. Its impact resistance is reasonably high, and is retained at low temperatures, though that of LDPE is much higher. Its electrical properties, particularly at high frequencies, are very good but LDPE's are even better. Its barrier properties, though indifferent, are better than those of LDPE. Applications include a wide range of containers, blown bottles for food, pipe and pipe fittings and packaging films.

### Chemical Resistance

|                          |           |
|--------------------------|-----------|
| Acids - concentrated     | Good-Fair |
| Acids - dilute           | Good      |
| Alcohols                 | Good      |
| Alkalis                  | Good      |
| Aromatic hydrocarbons    | Fair      |
| Greases and Oils         | Good-Fair |
| Halogenated Hydrocarbons | Fair-Poor |
| Halogens                 | Fair-Poor |
| Ketones                  | Good-Fair |

### TYPICAL PROPERTIES

| Property                                   | Value                               |
|--|-------------------------------------|
| <b>Electrical Properties</b>               |                                     |
| Dielectric constant @ 1 MHz                | 2.3 – 2.4                           |
| Dielectric strength (kV·mm <sup>-1</sup> ) | 22                                  |
| Dissipation factor @ 1 MHz                 | 1 – 10 x 10 <sup>-4</sup>           |
| Surface resistivity (Ohm/sq)               | 10 <sup>13</sup>                    |
| Volume resistivity (Ohm·cm)                | 10 <sup>15</sup> – 10 <sup>18</sup> |
| <b>Mechanical Properties</b>               |                                     |
| Coefficient of friction                    | 0.29                                |
| Hardness – Rockwell                        | D60-73 - Shore                      |
| Izod impact strength (J·m <sup>-1</sup> )  | 20 – 210                            |
| Poisson's ratio                            | 0.46                                |
| Tensile modulus (GPa)                      | 0.5 – 1.2                           |
| Tensile strength (MPa)                     | 15 – 40                             |
| <b>Physical Properties</b>                 |                                     |
| Density (g·cm <sup>-3</sup> )              | 0.95                                |
| Flammability                               | HB                                  |
| Limiting oxygen index (%)                  | 17                                  |
| Radiation resistance                       | Fair                                |

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# Goodfellow

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|   |             |
|---|-------------|
| Refractive index  | 1.54        |
| Resistance to Ultra-violet  | Poor        |
| Water absorption - over 24 hours (%)  | <0.01       |
| <b>Thermal Properties</b>   |             |
| Coefficient of thermal expansion ( $\times 10^{-6} \text{ K}^{-1}$ )                            | 100 – 200   |
| Heat-deflection temperature – 0.45 MPa ( $^{\circ}\text{C}$ )                                   | 75          |
| Heat-deflection temperature – 1.8 MPa ( $^{\circ}\text{C}$ )                                    | 46          |
| Specific heat ( $\text{J}\cdot\text{K}^{-1}\cdot\text{kg}^{-1}$ )                               | 1900        |
| Thermal conductivity @ 23 $^{\circ}\text{C}$ ( $\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ) | 0.45 – 0.52 |
| Upper working temperature ( $^{\circ}\text{C}$ )  | 55 – 120    |

Properties shown are typical values, they are not absolute material properties, and should be used for guidance only. It is recommended that materials and components are tested for their suitability for a specific application. For more information and advice please discuss your application with our sales staff.

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