

## PTFE (POLYTETRAFLUOROETHYLENE) MATERIAL DATA SHEET

- high heat resistance
- high resistance to chemical agents and solvents
- high anti adhesiveness
- high dielectric properties
- low friction coefficient
- non-toxicity

PTFE is a high molecular weight polymer, one of the most versatile plastic materials known and useful for a large range of products for applications excluded to other materials. PTFE is generally considered a thermoplastic polymer; at 327°C it maintains a very high viscosity, thus requiring particular transformation techniques for manufacturing of finished and semi-finished goods. PTFE can be employed at any temperature from -200°C to +260°C.

PTFE possesses a high inertness towards nearly all known chemicals. It is only attacked by elemental alkali metals, chlorine trifluoride and elemental fluorine at high temperature and pressures.

PTFE is insoluble in all solvents up to temperatures as high as 300°C. Certain highly fluorinated oils only swell and dissolve PTFE at temperatures close to the crystalline melting point.

FDA Approved: (code of Federal regulation 21 CFR ch.1, revised as of April 1, 1999 Edition); sections 175.105 – 175.300 – 176.170 – 176.180 – 177.1520 – 177.1550 – 177.2600 – 178.3570. “Perfluorocarbon Resins” of the Food and Drug Administration/USA.P.

| PROPERTIES   | Test methods | Units              | VALUES               |
|--|--------------|--------------------|----------------------|
| Colour   | -            | -                  | white                |
| Density  | ISO 13000-2  | g/cm <sup>3</sup>  | 2.130-2.180          |
| Water absorption after 24h immersion in water of 23°C                | ASTM D570    | %                  | 0.01                 |
| <b>Thermal Properties</b>  |              |                    |                      |
| Coefficient of thermal expansion from 23 to 100°C                    | -            | °C                 | 85x10 <sup>-6</sup>  |
| Coefficient of thermal expansion from 23 to 150°C                    | -            | °C                 | 90x10 <sup>-6</sup>  |
| Coefficient of thermal expansion above 150°C                         | -            | °C                 | 155x10 <sup>-6</sup> |
| Thermal conductivity   | ASTM C177    | W/mK               | 0.24                 |
| Max. allowable service temperature in air for short periods          | -            | °C                 | 280                  |
| Max. allowable service temperature in air continuously for min. 20 h | -            | °C                 | 260                  |
| Min.service temperature  | -            | °C                 | -50                  |
| Flammability “Oxygen Index”  | UL 94        |                    | VE-0                 |
| <b>Mechanical Properties at 23°C</b>                                 |              |                    |                      |
| Tensile strength   | ISO 13000-2  | MPa                | ≥ 20                 |
| Elongation   | ISO 13000-2  | %                  | ≥ 200                |
| Hardness   | ISO 13000-2  | Shore D            | ≥54                  |
| Coefficient of static friction                                       | ASTM D1894   |                    | 0.08 – 0.10          |
| Coefficient of dynamic friction                                      | ASTM D1894   |                    | 0.06 – 0.08          |
| Compression strength at 1 % deformation                              |              | Kg/cm <sup>2</sup> | ≥70                  |
| Deformation under load (140 Kg/cm <sup>2</sup> for 24 hrs. at 23°C)  | ASTM D621    | %                  | 10 - 13              |
| Permanent deformation (after 24 hrs. Relaxation at 23° C)            | ASTM D621    | %                  | 6 – 7.5              |
| Ball Hardness  | ISO 13000-2  | MPa                | ≥ 23                 |
| <b>Electrical Properties at 23 °C</b>                                |              |                    |                      |
| Dielectric strength  | ASTM D149    | kV/mm              | 20 - 70              |
| Dielectric constant at 60 Hz to 2GHz                                 | ASTM D150    | -                  | 2.1                  |
| Volume resistivity   | ASTM D257    | Ohm cm             | 10 <sup>18</sup>     |

Note: 1 g/cm<sup>3</sup> = 1,000 kg/m<sup>3</sup> ; 1 MPa = 1 N/mm<sup>2</sup> ; 1 kV/mm = 1 MV/m.

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