# PHYSICAL PROPERTIES OF PTFE AND FILLED PTFE PRODUCTS

**Technical Data Sheet**

**Physical properties of Virgin PTFE & Filled Grade of PTFE are dependent upon many factors such as Grades of PTFE - Conventional, Modified PTFE or Filled PTFE, Particle size of resin - Fine Cut or Coarse, Particle Shape of Resin - Spherical, Flake, irregular, Type & content of filler, Manufacturing Process - Compression Molding, Ram Extrusion, Isostatic, Paste Extrusion. Due to this - Physical Properties of PTFE & Filled PTFE Products - have the wide range of Values:-**

| Sr. No. | Property | Unit | Test Method | Virgin PTFE | Chemically Modified PTFE | 25% Carbon Filled PTFE (23% Carbon + 2% Graphite) | 25% Glass Filled PTFE | 15% Glass +5% MoS2 Filled PTFE | 15% Graphite Filled PTFE | 40% Bronze/ TSQ Filled PTFE | 40% Bronze + 5% MoS2 Filled PTFE | 60% Bronze Filled PTFE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1 | Density | gm / cc | ASTM D-792 | 2.1 – 2.2 | 2.15 – 2.2 | 2.0 – 2.2 | 2.22– 2.25 | 2.20– 2.24 | 2.10– 2.16 | 3.0 – 3.2 | 3 – 3.2 | 3.8 – 4.0 |
| 2 | Tensile Strength | kgf/cm$^2$ | ASTM D-638 | 210 – 375 | 300 – 325 | 125–200 | 125– 200 | 150– 220 | 150– 200 | 125– 225 | 125-225 | 100– 200 |
| 3 | Elongation of Break | % | ASTM D-638 | 250 – 400 | 400 – 450 | 80–150 | 200-300 | 220-320 | 150-250 | 200-350 | 200-350 | 150-300 |
| 4 | Compressive Strength | kgf/cm$^2$ | ASTM D-695 | 40-50 | 45-55 | 75–85 | 75-85 | 65-75 | 65-75 | 85-100 | 80-95 | 115-125 |
| 5 | Deformation under load (Max.) | | | | | | | | | | | |
| a | 2 Hrs. 23$^0$C 113 kgf | % | | 12 | 3.5 | 5 | 9 | 10 | 6 | 5 | 5 | 4 |
| b | 24 Hrs. 23$^0$C 113 kgf | | ASTM D-621 | 15 | 5 | 7 | 11 | 12 | 8 | 6 | 6 | 5 |
| c | Permanent | | | 8 | 2.5 | 3.5 | 7 | 7.5 | 4.5 | 3 | 3 | 2.5 |
| d | 2 Hrs. 150$^0$C 113 kgf | | | 55 | 40 | 35 | 50 | 50 | 43 | 42 | 42 | 40 |
| 6 | Impact strength | J/cm | ASTM D-256 | 1.4 – 1.5 | 1.6 – 1.75 | 0.7 – 0.8 | 1.0 – 1.1 | 1.2 – 1.3 | 0.8 – 0.9 | 0.9 – 1.0 | 0.9 – 1.0 | 0.8 – 0.9 |
| 7 | Hardness | Shore D | ASTM D-2240 | 58 – 62 | 56 – 62 | 60 – 65 | 58 – 63 | 60 – 65 | 60 – 65 | 62 – 66 | 62 – 66 | 64 – 68 |
| 8 | Coefficient of Friction | | ASTM-D-1894 | | | - | | | | | | |
| a | DynamicP-7 kg/cm$^2$V-0.5 | | | 0.04-0.06 | 0.02-0.03 | 0.12-0.17 | 0.5-0.54 | 0.15-0.20 | 0.11-0.16 | 0.11-0.15 | 0.1-0.14 | 0.12-0.16 |
| b | Static P-35 kg/cm$^2$ | | | 0.05-0.08 | 0.04-0.06 | 0.09-0.11 | 0.11-0.13 | 0.08-0.01 | 0.08-0.10 | 0.08-0.10 | 0.075-0.09 | 0.08-0.10 |
| 9 | Wear Rate (Max.) | gm/s | ASTM-G-137 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| 10 | Water Absorption (Max.) | % | ASTM D-570 | 0 | 0 | 0 | 0.013 | 0.015 | 0 | 0 | 0 | 0 |
| 11 | Continuous Service Temperature | $^0$ C | ASTM-D-648 | +260 | +260 | +260 | +260 | +260 | +260 | +260 | +260 | +260 |
| 12 | Heat Resistance (Max.) | % | ASTM-D-648 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| 13 | Linear Thermal Expansion (Max.) | | | A R | A R | A R | A R | A R | A R | A R | A R | A R |
| a | 30 – 150$^0$ C | % | ASTM D-696 | 1.5 1.5 | 1.5 1.5 | 1.2 1 | 1.5 0.7 | 1.5 1 | 1.3 1 | 1.15 0.95 | 1.15 0.95 | 1.1 0.9 |
| b | 30 – 200$^0$ C | | | 2.4 2.3 | 2.4 2.3 | 1.9 1.5 | 2.2 1 | 2.3 1.8 | 2 1.7 | 1.85 1.55 | 1.85 1.55 | 1.8 1.5 |
| c | 30 – 250$^0$ C | | | 3.4 3.6 | 3.4 3.6 | 2.7 2.4 | 3.2 1.4 | 3.3 2.2 | 3 2.5 | 2.55 2.25 | 2.55 2.25 | 2.5 2.2 |
| 14 | Dielectric Strength | Kv/mm | ASTM D-149 | 22 – 24 | 30 – 35 | 1 – 2 | 11 – 12 | 15 – 16 | 1 – 2 | Conductive | Conductive | Conductive |
| 15 | Dimensional stability | | | | | | | | | | | |
| a | Length | % | ASTM-D-1710 | 1.5 – 3 | 1.5 – 3 | 1.5 – 3 | 1.5 – 3 | 1.5 – 3 | 1.5 – 3 | 1.5 – 3 | 1.5 – 3 | 1.5 – 3 |
| b | Diameter | % | | 0.5 – 1 | 0.5 – 1 | 0.5 – 1 | 0.5 – 1 | 0.5 – 1 | 0.5 – 1 | 0.5 – 1 | 0.5 – 1 | 0.5 – 1 |
| 16 | Chemical Resistance (Max.) | | | | | | | | | | | |
| a | Permeability | % | ASTM-D-543 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| b | Dissolution | % | | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| c | PTFE is chemically inert & unaffected by all known chemicals except molten or dissolved alkali metals–Sodium; Potassium; Rubidium; Cesiurn; Francium & Fluorine gas, certain fluorine compounds & complexes at elevated temperatures. Filled PTFE has inferior chemicalresistance depending upon the particular filler. | | | | | | | | | | | |
| | **The physical properties of Standard & Non-standard filled grade composition not mentioned in above table are to be referred on the basis of Material Test Certificate issued by Raw Material Supplier / Manufacturer. Data quoted are average values only & should not be used for designed purpose.** | | | | | | | | | | | |


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