Technical Data Sheet – TDS – Physical Properties of PTFE and Filled PTFE Products

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	15% Glass Filled PTFE	25% Glass Filled PTFE	5% Glass +5% MoS2 Filled PTFE	15% Glass +5% MoS2 Filled PTFE	25% Carbon / 23% Carbon + 2% Graphite Filled PTFE	35% Carbon / 33% Carbon + 2% Graphite Filled PTFE	15% Graphite Filled PTFE	40% Bronze/ TSQ Filled PTFE	40% Bronze + 5% MoS2 Filled PTFE	60% Bronze Filled PTFE	55% Bronze + 5% MoS2 Filled PTFE
				1	2	3	4	5	6	7	8	9	10	11	12	13
1	Density	gm / cc	ASTM D-792	2.1 – 2.2	2.15 – 2.2	2.15– 2.22	2.22– 2.25	2.20 – 2.24	2.20– 2.24	2.0 – 2.2	2.0 – 2.14	2.10– 2.16	3.0 – 3.2	3 – 3.2	3.8 – 4.0	3.8 – 4
2	Tensile Strength	kgf/cm^2	ASTM D-638	210 – 375	300 – 325	180– 260	125– 200	175– 250	150– 220	125–200	100– 175	150– 200	125– 225	125-225	100– 200	100-200
3	Elongation of Break	%	ASTM D-638	250 – 400	400 – 450	225-325	200-300	200-300	220-320	80–150	100-150	150-250	200-350	200-350	150-300	150-300
4	Compressive Strength	kgf/cm^2	ASTM D-695	40-50	45-55	65-75	75-85	60-70	65-75	75–85	80-90	65-75	85-100	80-95	115-125	115-125
5	Deformation under load (Max.)		ASTM D-621													
a	2 Hrs. 23^0C 113 kgf	%		12	3.5	10	9	11	10	5	4	6	5	5	4	4
b	24 Hrs. 23^0C 113 kgf			15	5	12	11	13	12	7	6	8	6	6	5	5
c	Permanent			8	2.5	7.5	7	8.5	7.5	3.5	3	4.5	3	3	2.5	2.5
d	2 Hrs. 150^0C 113 kgf			55	40	52	50	52	50	35	30	43	42	42	40	40
6	Impact strength	J/cm	ASTM D-256	1.4 – 1.5	1.6 – 1.75	1.2 – 1.3	1.0 – 1.1	1.25 – 1.35	1.2 – 1.3	0.7 – 0.8	0.6 – 0.7	0.8 – 0.9	0.9 – 1.0	0.9 – 1.0	0.8 – 0.9	0.85 – 0.95
7	Hardness	Shore D	ASTM D-2240	58 – 62	56 – 62	58 – 62	58 – 63	60 – 65	60 – 65	60 – 65	60 – 65	60 – 65	62 – 66	62 – 66	64 – 68	64 – 68
8	Coefficient of Friction		ASTM-D-1894							-						
a	DynamicP-7 kg/cm^2V-0.5			0.04-0.06	0.02-0.03	0.31-0.37	0.5-0.54	0.15-0.20	0.15-0.20	0.12-0.17	0.13-0.18	0.11-0.16	0.11-0.15	0.1-0.14	0.12-0.16	0.11-0.14
b	Static P-35 kg/cm^2			0.05-0.08	0.04-0.06	0.01-0.12	0.11-0.13	0.08-0.01	0.08-0.01	0.09-0.11	0.01-0.12	0.08-0.10	0.08-0.10	0.075-0.09	0.08-0.10	0.07-0.09
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	0.01	0.01	0.01	0.01
10	Water Absorption (Max.)	%	ASTM D-570	0	0	0.015	0.013	0.015	0.015	0	0	0	0	0	0	0
11	Continuous Service Temperature	^{0} C	ASTM-D-648	+260	+260	+260	+260	+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	0.01	0.01	0.01	0.01
13	Coefficient of Linear Thermal Expansion– 10^{-6} X	%	ASTM D-696	250 – 275	250 – 275	240 – 265	235 – 255	245 – 270	240 – 265	225 – 250	215 – 240	240 – 265	200 – 225	200 – 225	175 – 200	175 – 200
14	Linear Thermal Expansion (Max.)	%	ASTM D-696	A / R	A / R	A / R	A / R	A / R	A / R	A / R	A / R	A / R	A / R	A / R	A / R	A / R
a	30 – 150^0 C			1.5 / 1.5	1.5 / 1.5	1.5 / 1	1.5 / 0.7	1.5 / 1	1.5 / 1	1.2 / 1	1.1 / 0.9	1.3 / 1	1.15 / 0.95	1.15 / 0.95	1.1 / 0.9	1.1 / 0.9
b	30 – 200^0 C			2.4 / 2.3	2.4 / 2.3	2.3 / 1.8	2.2 / 1	2.3 / 1.8	2.3 / 1.8	1.9 / 1.5	1.8 / 1.4	2 / 1.7	1.85 / 1.55	1.85 / 1.55	1.8 / 1.5	1.8 / 1.5
c	30 – 250^0 C			3.4 / 3.6	3.4 / 3.6	3.3 / 2.2	3.2 / 1.4	3.3 / 2.2	3.3 / 2.2	2.7 / 2.4	2.5 / 2.3	3 / 2.5	2.55 / 2.25	2.55 / 2.25	2.5 / 2.2	2.5 / 2.2
15	Dielectric Strength	Kv/mm	ASTM D-149	22 – 24	30 – 35	15 – 16	11 – 12	15 – 16	15 – 16	1 – 2	1 – 2	1 – 2	Conductive	Conductive	Conductive	Conductive
16	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	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	0.5 – 1	0.5 – 1	0.5 – 1	0.5 – 1
17	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	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	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 chemical resistance 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.															
	Company has in-house test facility / Laboratory to test above properties. The testing equipments are calibrated as per procedures laid down in QMS-ISO-9001:2008, having traceability with NPL. The test procedures are self designed, similar to above referred ASTMs.															