Heat-shrink sleeve material properties

Fluoro-Clear (FEP), Fluoro-Flex (PFA), Fluoro-Wear (virgin PTFE) and Fluoro-Stat (carbon-filled PTFE), side by side.

Property	Fluoro-Clear FEP	Fluoro-Flex PFA	Fluoro-Wear Virgin PTFE	Fluoro-Stat Carbon-filled PTFE
Fluoron sleeve ratings Our product ratings for the finished heat-shrink sleeve.				
Base material	FEP (fluorinated ethylene propylene)	PFA (perfluoroalkoxy)	Virgin PTFE (polytetrafluoroethylene)	Carbon-filled PTFE (conductive)
Color / appearance	Clear, transparent	Translucent (natural)	Opaque white	Opaque black
Max continuous service temp Fluoron rating	375°F / 190°C	500°F / 260°C	500°F / 260°C	500°F / 260°C
Wall thickness	0.020″ or 0.060″	0.060″	0.060″	0.060″
Construction / roll diameter	Seamless to 18″; seamed beyond	Seamless to 18″; seamed beyond	Seamed, 5″–48″	Seamed, 5″–48″ (to 60″ on request)
Coefficient of friction Fluoron, typical	~0.18	~0.10	≤ 0.05	~0.08
Release / non-stick	Good	Good	Excellent	Excellent
Abrasion resistance	Good	Better	Excellent	Excellent: over 10× FEP in Fluoron wear testing
Bonding	Etched for adhesive bonding, or unetched	Selected with Fluoron engineering	Heat-shrink fit; bonded when service requires	Heat-shrink fit; bonded to a grounded roll for static control
Compliance				
FDA food contact 21 CFR 177.1550	Yes	Yes	Yes	Yes
Medical grade (USP Class VI)	On request	On request	On request	Not offered
Flammability UL 94	VTM-0 (film)	V-0	V-0	V-0 *

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Property	Fluoro-Clear FEP	Fluoro-Flex PFA	Fluoro-Wear Virgin PTFE	Fluoro-Stat Carbon-filled PTFE
Electrical and static Resin typicals, except Fluoro-Stat surface resistivity (Fluoron test).				
Static behavior	Insulator: builds static on dry webs	Insulator: builds static on dry webs	Insulator: builds static on dry webs	Static-dissipative: bleeds charge to a grounded roll
Surface resistivity ASTM D257, Ω/sq	> 10^{16}	> 10^{18}	10^{18}	10^{2} (Fluoron test)
Volume resistivity ASTM D257, Ω·cm	> 10^{18}	> 10^{18}	> 10^{18}	10^{4} *
Dielectric constant ASTM D150, 1 MHz	2.0	2.03	2.1	Not applicable (conductive)
Dielectric strength ASTM D149, short time	70 kV/mm (1,800 V/mil), 0.5 mm film	80 kV/mm (2,000 V/mil), 0.25 mm film	16 kV/mm (Chemours typical)	Not applicable (conductive)
Thermal Resin typicals.				
Thermal conductivity W/m·K (Btu·in/h·ft²·°F)	0.195 (1.35)	0.19 (1.32)	0.25 (1.7)	0.65 (4.5) *
Melting point	500–536°F (260–280°C)	581°F (305°C)	627°F (331°C)	635°F (335°C) *
Physical and mechanical Resin typicals.				
Specific gravity ASTM D792	2.15	2.15	2.2	2.08 *
Tensile strength, 73°F	21 MPa (3,000 psi)	25–28 MPa (3,600–4,000 psi)	20 MPa (2,900 psi)	13 MPa (1,900 psi) *
Elongation at break	300%	300%	200–400%	75% *
Hardness Shore D, ASTM D2240	55	55	60	62 *
Water absorption, 24 h ASTM D570	< 0.01%	< 0.03%	< 0.01%	0.05% *
Optical Resin typicals.				
Light transmission	96% (ASTM E424, film)	91–96% visible (1-mil film)	Opaque	Opaque
Refractive index ASTM D542	1.341–1.347	1.350	—	—

What usually decides the material

Running above 375°F?

Fluoro-Clear FEP is rated to 375°F. Above that, choose Fluoro-Flex, Fluoro-Wear or Fluoro-Stat, all rated to 500°F.

Dry web or static shocks?

FEP, PFA and virgin PTFE are insulators. Fluoro-Stat, at 10^2 Ω/sq, bleeds charge into a grounded roll.

Need to see the roll underneath?

Fluoro-Clear FEP is transparent, with about 96% light transmission.

Abrasive or high-wear position?

Fluoro-Wear and Fluoro-Stat carry the best release and abrasion resistance. Fluoro-Stat showed over 10× the wear resistance of FEP in our testing.

Notes

Sleeve ratings, coefficient of friction and Fluoro-Stat surface resistivity and abrasion are Fluoron values. Other values are typical published values for the base resin, measured on molded or film samples. They are for comparison, not specification limits. Finished-sleeve values can differ with wall thickness, processing and service conditions.

* Typical published values for 25% carbon-filled PTFE. Fluoro-Stat filler content is proprietary; contact Fluoron engineering for application data.

FEP, PFA and PTFE sleeves are made from resins that comply with FDA 21 CFR 177.1550 (perfluorocarbon resins). Fluoro-Stat is FDA compliant. Compliance letters and medical-grade (USP Class VI) material are available on request.

Sources

1. Chemours, Teflon™ FEP Fluoropolymer Film Properties Bulletin: https://www.chemours.com/en/-/media/files/teflon/teflon-fep-film-properties-bulletin.pdf
2. Chemours, Teflon™ PFA Properties Handbook: https://www.tetrachim.com/wp-content/uploads/2020/11/C11546_Teflon_PFA_Properties_Handbook.pdf
3. Chemours, Properties of Teflon™ fluoropolymers (PTFE, FEP, PFA): https://www.teflon.com/en/products/coatings
4. Typical properties of unfilled and 25% carbon-filled PTFE: https://www.professionalplastics.com/professionalplastics/Teflon_PTFE.pdf
5. U.S. FDA, 21 CFR 177.1550 Perfluorocarbon resins: https://www.ecfr.gov/current/title-21/section-177.1550
6. Fluoron, Fluoro-Stat 102 technical sheet (surface resistivity, abrasion testing): https://www.fluoron.com/fluoro-stat-conductive-ptfe-roll-covers/

Send roll diameter, face length, temperature and what is failing. Fluoron engineering recommends the sleeve within one business day: fluoron.com/contact