PATRICK YARNS

TECHNICAL FIBERS — ORGANIC

FIBER FACTS

Fiber Group	Tradename	Specific Gravity, g/cm³	Tenacity, g/denier	Elongation at Break, %	Moisture Regain, %	Heat Resistance (Highest Use Temperature before breakdown, °C)	Melt Point, °C NM= No melt	Limiting Oxygen Index, %	Resistance to Weak Acids	Resistance to Weak Alkali	Abrasion Resistance	Dyeable? (Fiber color)	Cost, * = Lower ****** = Higher
Aramid- Para (Poly-para-phenylene Terephthalamide)	**Kevlar 29®**	1.44	23- 25	2- 3	3.5- 4.5	200	NM	29	Fair	Good	Fair	No (Black or Yellow)	****
	Twaron® 1070	1.44	23-25	2- 4	4.5	200	NM	29	Fair	Good	Fair	No (Black or Yellow)	****
	Technora®	1.39	25- 28	4- 6	2	200	NM	29	Fair	Good	Fair	No (Yellow)	*****
Aramid- Meta (Poly-meta-phenylene Terephthalamide)	**Nomex®**	1.38	5.0- 5.9	32 - 37	6.5	210	NM	29	Good	Good	Excellent	Yes (White)	****
	HT Conex®	1.38	7.1	25	6.5	200	NM	29	Good	Good	Excellent	Yes (White)	*****
	Arawin®	1.38	4.0-5.0	40- 50	5.0- 6.0	200	NM	29	Good	Good	Excellent	Yes (White)	****
	Kermel®	1.38	3.0- 4.5	30- 35	4.0- 4.5	240	NM	29	Fair	Good	Excellent	No (Colors)	*****
HDPE (High Density polyethyelene)	**Spectra® 900 Dyneema® SK**	0.97	30- 40	2- 4	0.0	70	100	Melts	Excellent	Excellent	Excellent	No (White)	******
Polyimide	**P84®**	1.41	3.0 -4.0	18- 22	2.0- 3.0	250	NM	38- 40	Excellent	Fair	Good	No (Off-White	****
Polyarylate (Liquid Crystal Polyester)	**Vectran® HT**	1.41	25.9	3- 4	<0.1	195	280	35	Excellent	Good	Excellent	No (Cream)	*****
PBO (Polyphenylenebenzobisoxazole)	**Zylon®**	1.55	42.0	3- 4	1.5- 2.0	250	NM	68	Good	Good	Excellent	No (Golden)	******
PBI (Polybenzimdazole)	**PBI Gold®**	1.43	2.5- 3.2	25- 30	15.0	285	NM	40- 45	Good	Fair	Good	No (Golden)	******
PPS (Polyphenylene sulfide)	**Torcon® Axxel® ZetaOne®**	1.35	3.5- 4.9	40- 50	0.1	190	285	35	Excellent	Excellent	Good	No (Cream)	***
Melamine formaldehyde	**Basofil®**	1.44	1.5- 2.1	10- 18	5.0	200	NM	30- 34	Excellent	Excellent	Poor	No (Cream)	***
Homopolymer Acrylic	**Dolanit® Ricem®**	1.16- 1.18	4- 6	20- 30	1- 2	125	NM	18	Excellent	Good	Very Good	Yes (white)	**
Acrylic Co-polymer (Modacrylic)	**Protex® C, F12**	1.48	3.5- 3.8	32- 34	<2.5	135	NM	30- 34	Very Good	Good	Good	Yes (White)	**
	Protex® M, F13	1.57	2.5- 3.0	32-34	<2.5	135	NM	30- 34	Very Good	Good	Good	Yes (White)	**
Polyacrylate	**PyroTex®**	1.5	2.1	29	12	250	NM	43	Very Good	Very Good	Poor	Yes (Light Pink)	**
Polyacrylate (Co-Polymer Super Absorbent)	**Oasis®**	1.4	0.6- 0.7	15- 30	7 (dry) 10- 15 (dry) 100X- 160X (wet)	190	NM	40	Good	Good	Fair	Yes (Cream)	***

TECHNICAL FIBERS — ORGANIC (continued)

Fiber Group	Tradename	Specific Gravity, g/cm³	Tenacity, g/denier	Elongation at Break, %	Moisture Regain, %	Heat Resistance (Highest Use Temperature before breakdown, °C)	Melt Point, °C NM= No melt	Limiting Oxygen Index, %	Resistance to Weak Acids	Resistance to Weak Alkali	Abrasion Resistance	Dyeable? (Fiber color)	Cost, * = Lower ****** = Higher
PTFE (Polytetrafluroethylene)	**Teflon®**	2.10	2.0- 2.2	19- 21	0	250	330	95	Excellent	Excellent	Excellent	No (Producer colors)	*****
	Profilen®	2.20	4.0- 4.7	5- 6	0	260	330	95	Excellent	Excellent	Excellent	No (Producer colors)	*****
	Rastex®	2.20	4.5- 5.0	20	0.0	280	330	95	Excellent	Excellent	Excellent	No (Brown)	*****
PVC (Polyvinyl chloride)	**Rhoyvl FR®**	2.10	3.1- 3.9	13	0	125	NM	38- 42	Excellent	Excellent	Good	Yes (White)	***
PVA (Polyvinyl alcohol)	**Kuralon PVA® (Soluble)**	1.19- 1.32	7- 11	11-20	Dissolves	80	NM	21- 23	Soluble	Very Good	Good	No	**
PEI (Polyetherimide)	**ULTEM®**	1.27	2.5- 3.,5	45- 55	2.0	200	375-400	31	Good	Good	Good	Yes (Cream)	****
Novaloid (Phenolic)	**Kynol®**	1.27	1.3- 1.8	25- 30	6.0	200	NM	30-34	Good	Good	Fair	No (Gold)	****
PEEK (Polyetheretherketone)	**Zyex®**	1.31	4.6- 6.5	18- 23	0.1	265	334	35- 40	Excellent	Excellent	Good	No (Golden)	******
Oxidized PAN (OPF)	**Pyron®**	1.37- 1.40	2.1	22- 28	6.0- 10.0	Carbonizes	NM	45- 55	Very Good	Poor	Poor	No (Black)	**
	Panox® SA	1.41	1.8	15 -27	6.0- 10.0	Carbonizes	NM	45- 55	Very Good	Poor	Poor	No (Black)	***
	TecGen®	1.32- 1.36	1.9	20- 25	6.0- 8.0	Carbonizes	NM	40- 50	Very Good	Poor	Poor	No (Black)	***
Carbon	**Panex® 30**	1.70- 1.90	15- 22	1- 2	9.0	200- 500	NM	55	Fair	Good	Poor	No (Black)	*****

TECHNICAL FIBERS — INORGANIC

Fiber Group	Tradename	Specific Gravity, g/cm³	Tenacity, g/denier	Elongation at Break, %	Moisture Regain, %	Heat Resistance (Highest Use Temperature before breakdown, °C)	Melt Point, °C NM= No melt	Limiting Oxygen Index, %	Resistance to Weak Acids	Resistance to Weak Alkali	Abrasion Resistance	Dyeable? (Fiber color)	Cost, * = Lower ****** = Higher
Stainless steel	**Bekinox®**	7.9	2.5- 3.5	1- 2	0.0	600- 700	1510	100	Excellent	Excellent	Excellent	No (Gray)	******
D, E Glass	**Fiberglass**	2.1- 2.6	13- 18	4.6- 4.8	0.0	460- 550	1050	100	Good	Fair	Poor	No (White)	**
Basalt	**Basalt**	2.7	15- 20	2- 4	0.0	560- 700	1450	100	Excellent	Excellent	Poor	No (Gray)	***

PROTEIN FIBERS

Fiber Group	Tradename	Specific Gravity, g/cm³	Tenacity, g/denier	Elongation at Break, %	Moisture Regain, %	Heat Resistance (Highest Use Temperature before breakdown, °C)	Melt Point, °C NM= No melt	Limiting Oxygen Index, %	Resistance to Weak Acids	Resistance to Weak Alkali	Abrasion Resistance	Dyeable? (Fiber color)	Cost, * = Lower ****** = Higher
Animal Fibers	**Sheep, goat, camel, alpaca**	1.3- 1.5	1- 3	25- 40	14- 19	150	NM	24 FR = 30	Good	Poor	Good	Yes (Tan- White)	***
Silk	**Silk**	1.2- 1.3	4 (Dry) 2 (wet)	15- 30	11.0	150	NM	23	Fair	Poor	Fair	Yes (White)	****

CELLULOSE FIBERS

Fiber Group	Tradename	Specific Gravity, g/cm³	Tenacity, g/denier	Elongation at Break, %	Moisture Regain, %	Heat Resistance (Highest Use Temperature before breakdown, °C)	Melt Point, °C NM= No melt	Limiting Oxygen Index, %	Resistance to Weak Acids	Resistance to Weak Alkali	Abrasion Resistance	Dyeable? (Fiber color)	Cost, * = Lower ****** = Higher
Cotton	**Cotton**	1.54- 1.56	3.0- 4.5	3- 7	7- 11	95	NM	19 FR = 28	Poor	Good	Fair	Yes (white)	*
Bast	**Flax, Jute, Hemp, Knaf, Bamboo**	1.3- 1.5	2.0- 6.0	2- 4	7- 14	105	NM	18- 20	Poor	Fair	Fair	Yes (Cream/ White)	**
Viscose Rayon (Regular Modulus)	**Lenzing®**	1.5	2.5 (dry) 1.5 (wet)	14 (dry) 20 (wet)	8- 11	100	NM	18- 19	Poor	Good	Good	Yes (white)	**
	Lenzing FR®	1.6	2.9 (dry) 1.6 (wet)	14 (dry) 20 (wet)	9- 10	100	NM	28- 29	Poor	Good	Good	Yes (white)	***
VViscose Rayon (High Wet Modulus)	**Modal®**	1.5	4.2 (dry) 2.3 (wet)	14 (dry) 15 (wet)	11- 13	100	NM	18- 19	Poor	Good	Good	Yes (white)	**
Lyocell	**Tencel® A100**	1.5	3.7 (dry) 2.1 (wet)	11 (dry) 15 (wet)	9.5	100	NM	20	Poor	Good	Good	Yes (white)	**

COMMON FIBERS

Fiber Group	Tradename	Specific Gravity, g/cm³	Tenacity, g/denier	Elongation at Break, %	Moisture Regain, %	Heat Resistance (Highest Use Temperature before breakdown, °C)	Melt Point, °C NM= No melt	Limiting Oxygen Index, %	Resistance to Weak Acids	Resistance to Weak Alkali	Abrasion Resistance	Dyeable? (Fiber color)	Cost, * = Lower ****** = Higher
Polyamide (Nylon)	**Nylon 6 Staple**	1.1	4- 7	45- 60	4.0- 5.0	90- 120	210- 225	21- 22	Fair	Good	Very Good	Yes (White)	**
	Nylon 66 Staple	1.1	5- 8	35- 65	4.0- 5.0	90- 120	250- 265	21- 22	Fair	Good	Very Good	Yes (White)	**
Nylon 12	**Grilamid®**	1.0	5- 6	90	1.5	70	178	21	Fair	Good	Good	Yes (White)	****
FR Nylon 66	**Nexylon FR®**	1.1	5- 6	50- 60	4.0	90- 130	250- 260	28	Fair	Good	Very Good	Yes (White)	***
Polyester (Polyethylene terephthalate)	**PET Staple**	1.4	4- 7	35- 55	0.4	50- 150	240- 260	18- 20	Good	Good	Very Good	Yes (White)	*
FR Polyester	**Trevira CS®**	1.3- 1.4	4- 5	35- 50	0.4	50- 150	235- 255	27- 32	Good	Good	Very Good	Yes (White)	**
PTT (Polytrimethyl terephthalate)	**Sorona®**	1.36	4- 5	35- 40	0.4	85- 105	240	18- 21	Good	Good	Good	Yes (White)	**
PLA (Polylactic Acid)	**Ingeo®**	1.3	4- 5	20- 25	0.5	95	170- 180	24- 26	Good	Good	Good	Yes (White)	**
Olefin (Regular Tenacity)	**Polypropylene**	0.9	2- 7	20- 80	<0.1	60- 90	160- 175	17- 19	Excellent	Excellent	Excellent	No (White)	*
	Polyethylene	0.9	2- 6	15- 30	<0.1	50- 80	110- 135	17- 19	Excellent	Excellent	Excellent	No (White)	*
Elastane	**Lycra® Creora®**	1.05- 1.10	1- 2	450- 550	1.0- 1.3	110	230.0	---	Good	Good	Good	Yes (White)	***

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