MINIFIBERS, INC.

IACMI Introduction

2019

MINIFIBERS, INC.
CELEBRATING 50 YEARS

Our History

- Founded in 1967 by G.B. Keith
  - G.B. , then an engineer at Eastman Chemical, designed and patented what later became known as the Lummus cutter. (US Patent 3,485,120)
  - MiniFIBERS was founded upon this fiber cutting technology.
- MiniFIBERS produces precision cut fibers from all synthetics except carbon and glass

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Four Business Platforms

- Precision Cut Fibers
  - A broad range of fibers in precision cut lengths.
- Fybrel® Synthetic Wood Pulp
  - HDPE fibrillated fibers in wet lap sheets.
- Short Stuff® Fibrillated HDPE
  - Fybrel® in a dried form.
- Specialty Extruded Yarns
  - Multifilament LOY, POY made to order.

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Precision Cut Fibers

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Fiber Type	Specific Gravity (g/cm3)	Melt Point	Moisture Regain (%)	Tenacity (gpd)	Chemical Reactivity
Acrylic Fiber	1.14 - 1.19	Does not melt. Degradation begins at ~290°C / 554°F.	1.0 - 2.5	1.9 - 3.4	Resists most acids, oxidants, and solvents. Sensitive to nitric acid, dimethyl formamide, and hot alkalis.
Basofil Fiber	1.4	Does not melt.	< 5.0	~2.0	Excellent resistance to alkalis. Poor resistance to strong acids.
Cellulose (for comparison)	1.5	Does not melt.	10.7 - 16.1	–	Resists most organic solvents, acetone, and formic acid. Sensitive to other acids, strong alkalis, cuprammonium compounds, and certain oxidants.
E-Glass Fiber (for comparison)	2.58	Does not melt. Softens at ~840°C / 1550°F.	< 1.0	~15.3	Unaffected by bleaches and solvents. Fair resistance to most acids at low concentrations.
Meta-Aramid Fiber	1.37 - 1.38	Does not melt. Degradation begins at ~300°C / 572°F. Carbonizes at ~425°C / 800°F.	3.5 - 5.1	2.6 - 5.0	Good resistance to acids and bases.
Nylon 6,6 Fiber	1.14	Sticks at ~230°C / 445°F. Melts at 255-265°C / 491-509°F.	3.5 - 5.0	2.3 - 9.3	Resists most organic solvents and bleaching agents. Sensitive to concentrated acids, phenol, hot dimethyl formamide, and hot, concentrated bases.
Para-Aramid Fiber	1.44	Does not melt. Degradation begins at ~482°C / 900°F.	3.5 - 5.0	~22.6	Good resistance to diluted acids and bases. Degraded by strong mineral acids.
PLA Fiber	1.25	225°C / 437°F	< 1.0	3.3 - 4.0	Poor resistance to bases.
Polyester Fiber	1.38	Sticks at 227-241°C / 440-465°F. Melts at 250-288°C / 482-550°F.	< 1.0	6.9 - 9.1	Resists most antioxidants. Sensitive to strong bases, concentrated nitric and sulfuric acids, nitrobenzene, and phenols.
Polyester Fiber - Undrawn	1.38	Sticks at 227-241°C / 440-465°F. Melts at 250-288°C / 482-550°F.	< 1.0	< 1.5	Resists most antioxidants. Sensitive to strong bases, concentrated nitric and sulfuric acids, nitrobenzene, and phenols.
Polyethylene Fiber - Low Melt	0.96	121-129°C / 250-265°F	< 1.0	< 1.5	Resists most bases, acids, and solvents. Sensitive to hot, chlorinated hydrocarbons.
Polyethylene Fiber - UHMW	0.96	~147°C / 296 °F	< 1.0	25.5 - 30.5	Resists most bases, acids, and solvents.
Polypropylene Fiber	0.90	Softens at 141-177°C / 285-350°F. Melts at 163-168°C / 325-335°F.	< 1.0	2.0 - 5.5	Resists common solvents, strong acids and alkalis. Sensitive to chlorinated solvents at high temperatures and aromatic compounds.
PolyVinyl Alcohol Fiber	1.30	~230°C / ~446°F	1.0 - 5.0	~14.0	Excellent resistance to acids and bases.
Rayon Fiber - Regular Tenacity	1.50 - 1.55	Does not melt. Chars and decomposes at 175-204°C / 347-400°F.	10.7 - 16.0	1.6 - 2.6	Poor resistance to strong acids and bases.
Rayon Fiber - High Tenacity	1.50 - 1.55	Does not melt. Chars and decomposes at 175-204°C / 347-400°F.	10.7 - 16.0	4.3 - 5.3	Poor resistance to strong acids. Excellent resistance to strong bases.

Platform 2 - Fybrel®

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Fybrel®

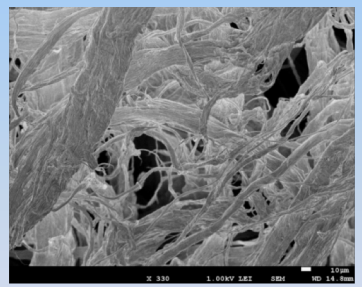
Process for Production of Fibrillated HDPE

(Process patent by Crown Zellerbach – 1970s)

HDPE/hexane + PVOH/water —emulsification→ HDPE/PVOH/water/hexane

HDPE/PVOH/water/hexane —pressure extrusion / into vacuum→ fibrillated polymer/water + hexane

fibrillated polymer/water —cut / refining→ fibrillated synthetic pulp/water



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What is Fybrel ?

Fybrel (Polyolefin Synthetic Pulp) is

a hydrophilic,

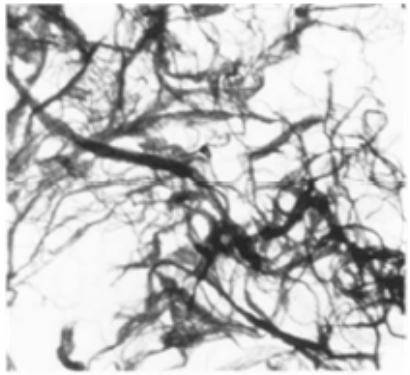
highly fibrillated,

polyolefin fiber

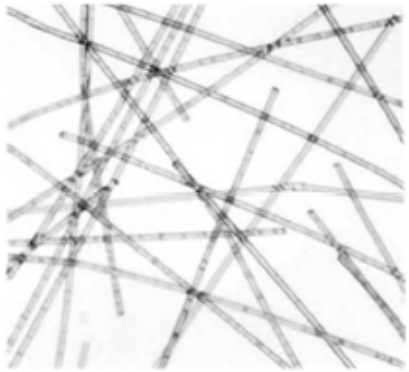
Used For Heat Sealing!

Used for particle trapping – filtration!

Wood pulp



Fybrel



Polyolefin cut fiber

Platform 3 – Short Stuff®

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Range of Sizes

Physical Properties of SHORT STUFF® HDPE Fibers

GRADE	ESS5F	ESS50F	ESS2F	E380F	E505F	E780F
Average Fiber Length Expressed in millimeters (mm)	~0.1	~0.1	~0.6	~0.7	~0.9	~1.6
Fiber Diameter Expressed in microns	5	5	5	15	15	25
Surface Area (m^2/gm) Measured by gas absorption	12	12	12	8	8	8
Melting Point	←	←	~135° C ~275° F	→	→	→
Moisture Content (%)	←	←	<2.0	→	→	→
Specific Gravity (g/cm^3)	←	←	0.96	→	→	→
Polypropylene glycol treated for use in aqueous systems		*			*	

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Benefits for Coatings, Adhesives, Sealants

- ✓Improves particle suspension and dispersion
- ✓Improves flexibility and crack resistance
- ✓Improves impact and freeze thaw performance
- ✓Improves water resistance
- ✓Imparts predictable rheology
- ✓Improves coalescence and compatibilization

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Platform 4 – Specialty Extrusion

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Specialty Extruded Yarns

- Multifilament LOY, POY
  - Hytrel® TPC-ET
  - Kynar® PVDF
  - Low Melt LLDPE
  - PBT
  - PPS
- Hybrid Yarns made to order
- Used in composites, refractories, textiles

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Thank You

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