



Hung Pham

Business Development Ultrason®



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 **BASF**

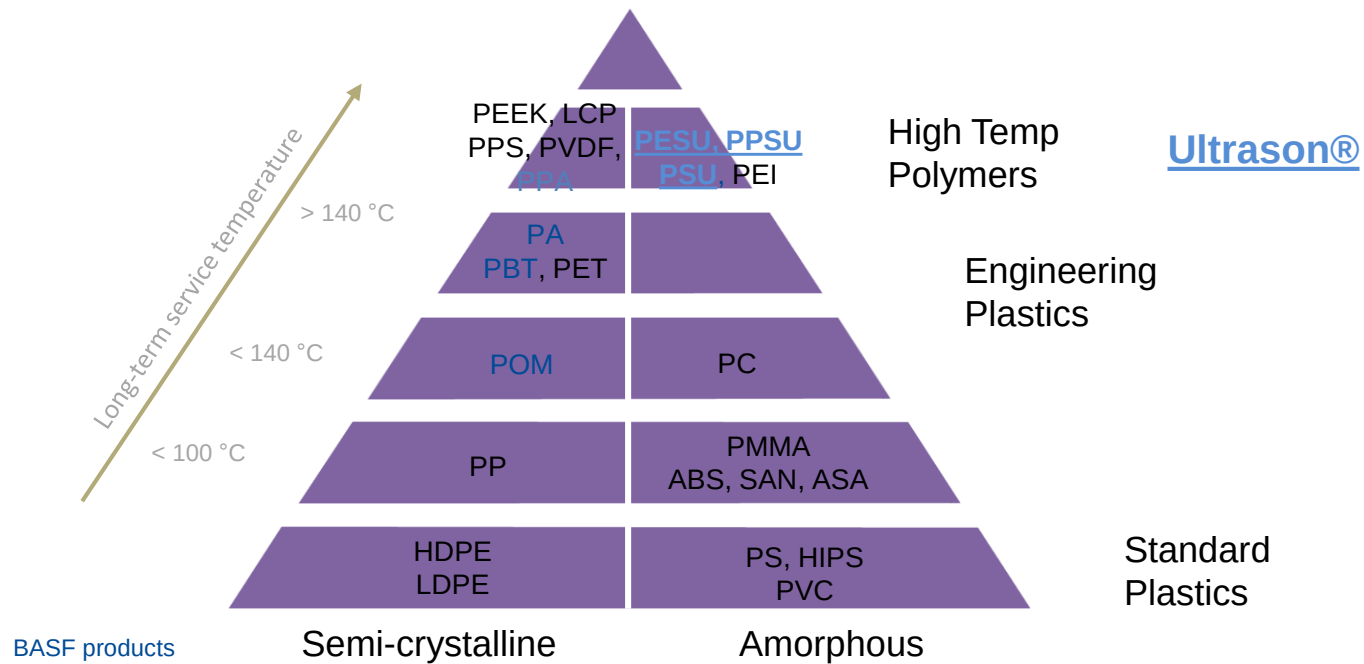
We create chemistry

**Healthcare applications
made of Ultrason®**

TOPICS

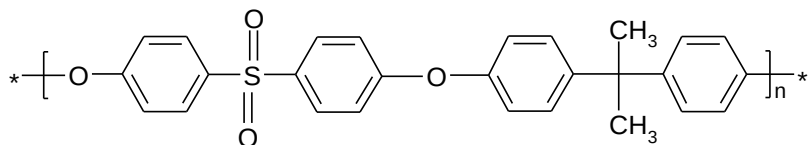
- General Product Info
- BASF Sales Policy
- Ultrason® Values and Target Applications
- Ultrason® Product Overview
- Available compliance and performance
 - ▶ ISO 10993
 - ▶ FDA FC
 - ▶ USP VI or V
 - ▶ Chemical Resistance
 - ▶ 134 °C Steam Resistance

Pyramid of plastics



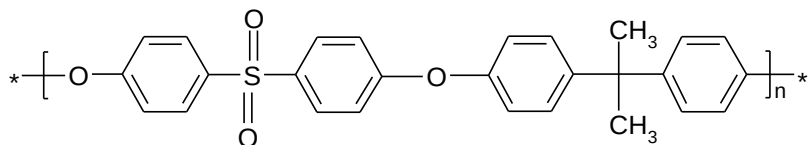
Ultrason®: Polyarylsulfone polymers

Polysulfone (PSU): Ultrason® S



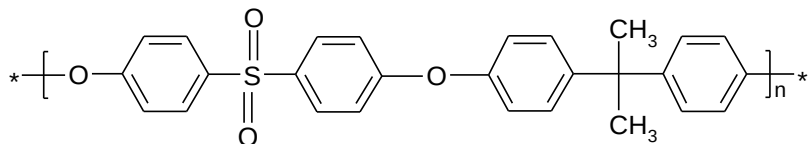
- $T_G = 187\text{ °C}$ / HDT/B = 186 °C
- Humidity uptake 0.3 %
- HB for 1.5 mm
- Yield stress 80 MPa
- Charpy impact notched 5 kJ/m²
- **Lowest cost**

Polyphenylsulfone (PPSU): Ultrason® P



- $T_G = 220\text{ °C}$ / HDT/B = 214 °C
- Humidity uptake 0.6 %
- V-0 for 0.8 mm n.m.
- Yield stress 75 MPa
- Charpy impact notched 65 kJ/m²
- **Highest impact strength**

Polyethersulfone (PESU): Ultrason® E



- $T_G = 225\text{ °C}$ / HDT/B = 218 °C
- Humidity uptake 0.8 %
- V-0 for 1.5 mm
- Yield stress 90 MPa
- Charpy impact notched 7 kJ/m²
- **Highest tensile strength**

BASF Sales Policy in general

- No sales into implants

- ▶ From the FDA: *["Implant" means a device that is placed into a surgically or naturally formed cavity of the human body... intended to remain implanted continuously for a period of 30 days or more.]*

- BASF requests customer's use information:

- ▶ Information on intended uses and the associated risk class, of the final product to be marketed.
- ▶ BASF will assess the sales feasibility based on the risk from the information received and inform the customer.
- ▶ In the case of risk class II, customer to confirm receipt of above info prior to commercial shipment.

Ultrason® values and target applications

ULTRASON® VALUES:

- 134 °C steam durable
- HAI chemical tolerance
- Hydrolytic stability
- Heat Resistance
- Transparency
- Flame Retardancy

TARGETED APPLICATIONS: non-implant

- Mobile diagnostic/clinical equipment
- Handheld medical devices
- Surgical tools
- Orthopedic
- Instrument trays, autoclavable





Product overview: Ultrason® (S3010, P3010, E2010, E3010)

Ultrason®	Offset / Equiv. Chemistry	T _G	Charpy Impact Notched (kJ/m²)	FDA FC	USP Class	ISO 10993	Temp. Perform.	Chemical Resistance	Steam at 134°C at 1,000 hrs	Impact Resistance
S 3010	PSU, PEI	187 C	5	YES	VI	YES	+/-	++	++	+/-
P 3010	PPSU	220 C	65	YES	V	YES	++	+++	+++	+++
E 2010 E 3010	PEI, PESU	225 C	7	YES	VI	YES	+++	+++	+/-	+/-

+/- neutral

++ better

+++ best

Compliance Testing: Example

Ultrason[®] S3010 NAT

Summary of ISO Tests Performed

Test Facility: _____

Sponsor: _____

Hung Pham
BASF Corporation
1609 Biddle Avenue
Wyandotte, MI 48192

Test Article: _____

Ultrason S3010

Identification No. _____

COMPLETED TESTS

ISO 10993-2: Animal Welfare.....
ISO 10993-12: Sample Preparation
ISO 10993-5: Tests for Cytotoxicity.....
ISO 10993-10: Tests for Irritation and Delayed-Type Hypersensitivity
ISO 10993-11: Tests for Systemic Toxicity
ISO 10993-6: Tests for Local Effects after Implantation.....



Chemical resistance: Example

Ultrason® P3010 NAT

Chemical Agent	Visual Evaluation (specimen 1,2,3)	Visual Evaluation (specimen 1,2,3)
	0 % Strain	1 % Strain
Birex	4,4,4	4,4,4
CaviCide 1	4,4,4	4,4,4
Cidex OPA	4,4,4	4,4,4
Sani-Cloth AF3	4,4,4	4,4,4
Sani-Cloth Plus	4,4,4	4,4,4
MetriCide Plus	4,4,4	4,4,4
Virex TB	4,4,4	4,4,4
Virex II 256	4,4,4	4,4,4
Wexcide 128	4,4,4	4,4,4
Clorox Bleach (6 % undiluted)	4,4,4	4,4,4
Clorox Health Care Hydrogen Peroxide Cleaner	4,4,4	4,4,4
Isopropyl Alcohol (70 %)	4,4,4	4,4,4

Material	: Ultrason® P3010
Sample Type	: Tensile Bars
Exposure	: Wet surface contact at 23 °C. Chemicals re-applied every 24 hours
Exposure Time	: 96 Hours

Visual Key
 1 = Dissolved
 2 = Crazing/Cracking
 3 = Discoloration
 4 = No Change

Compliance letter: Example Ultrason® P3010 USP VI & ISO 10993



We create chemistry

BASF SE, 67056 Ludwigshafen, Germany

BASF Corporation
Ms./Mr. Hung Pham
N-PMN/IM

Mar 05, 2018 / ks
FEP/PF - LU-Danziger Hof
Dr. Kathrin Becker
Phone: +496216041904
Email: plastics.safety@basf.com
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Request No: 64912/1

Your Request of Mar 05, 2018

Dear Ms./Mr. Pham

ULTRASON® P 3010 NATURAL

US Pharmacopoeia:
Biological Reactivity Tests, USP Class V (USP V)

ISO 10993-5:
Biological Evaluation of Medical Devices Part 5: Test for Cytotoxicity

Yours sincerely
BASF SE

This product information was generated electronically and is valid without signature.



BASF
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Added Benefits of Techmer PM for Ultrason®

Jack Chiang – Director Of Application Development

Who We Are



Color
Concentrates

Additive
Concentrates

Custom-
Engineered
Compounds

Color
Compounds

Techmer PM Product Lines

ELECTRAFIL®

- Conductive
- Static dissipation
- EMI/RFI shielding

HIFILL®

- High strength
- Heat resistance
- Custom color
- High stiffness
- Impact resistance
- Medical grades

HIFILL FR®

- HIFILL ++++
- UL 94
- UL yellow card

PLASLUBE®

- Internally lubricated products
- Wear resistance
- Low coefficient of friction



- ELECTRAFIL[®] compounds provide cost-effective solutions to ESD
- Many grades are colorable in both dissipative and conductive ranges
- EMI/RFI shielding is also available
- Typical additives include carbon powder, carbon fiber, metal fibers, and ICP

Carbon Fiber in Plastics



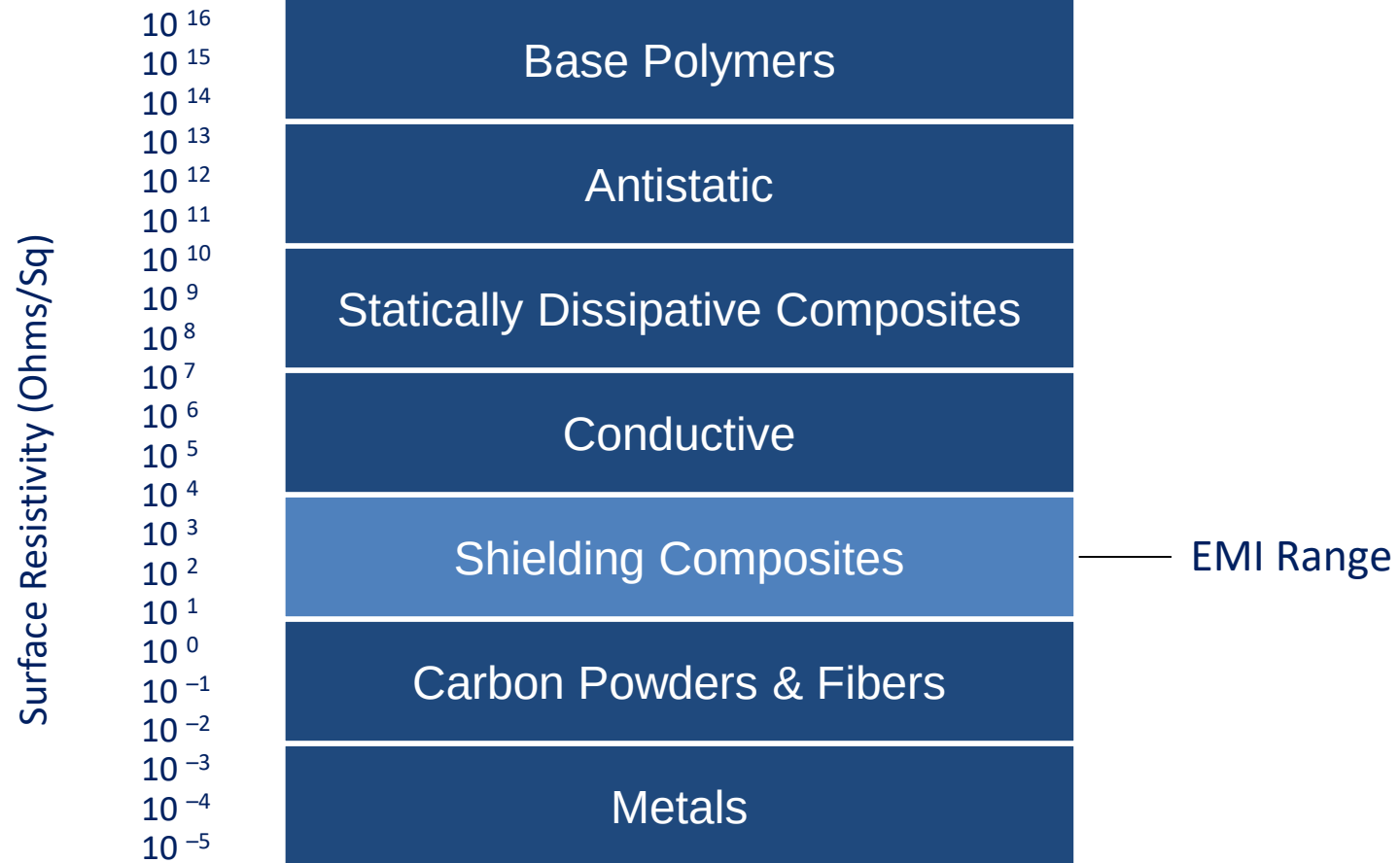
Carbon Fiber vs. Carbon Black

- + CF cleaner
- + CF easier to process
- + CF higher properties
- CF higher cost
- CF differential shrink

Carbon Fiber vs. Glass Fiber

- + CF less abrasive
- + CF lower weight
- + CF stronger
- CF higher cost

ELECTRAFIL[®] for EMI/RFI



EMI/RFI Shielding



www.cybershieldinc.com

- + Saving money by a systems cost approach. Reducing overall lead time and costly secondary operations of masking and plating operations
- - Colorability is reduced and stainless steel fibers can show on surface of parts



PLASLUBE compounds improve adhesive wear resistance through the use of internal lubricants including PTFE, silicone, graphite, MoS₂, etc.

Reduce wear

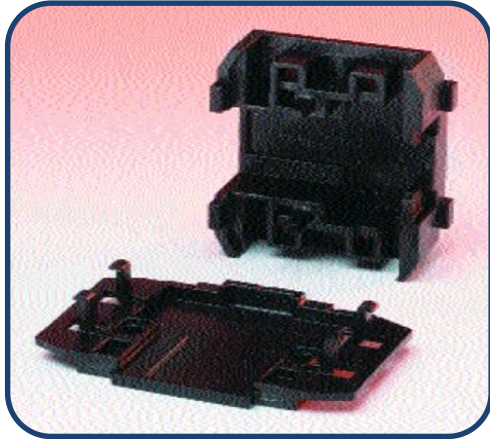
Minimize frictional losses

Reduce noise and vibration

Eliminate need for external lubricants

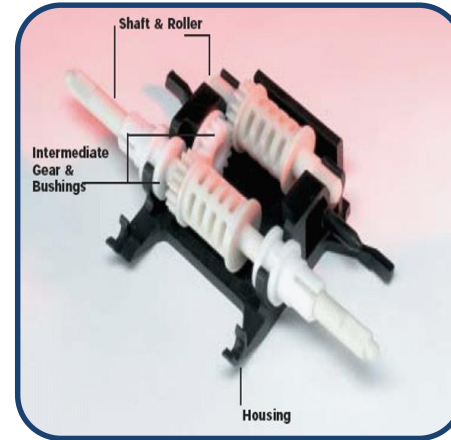
Minimize maintenance from wear

PLASLUBE® Applications



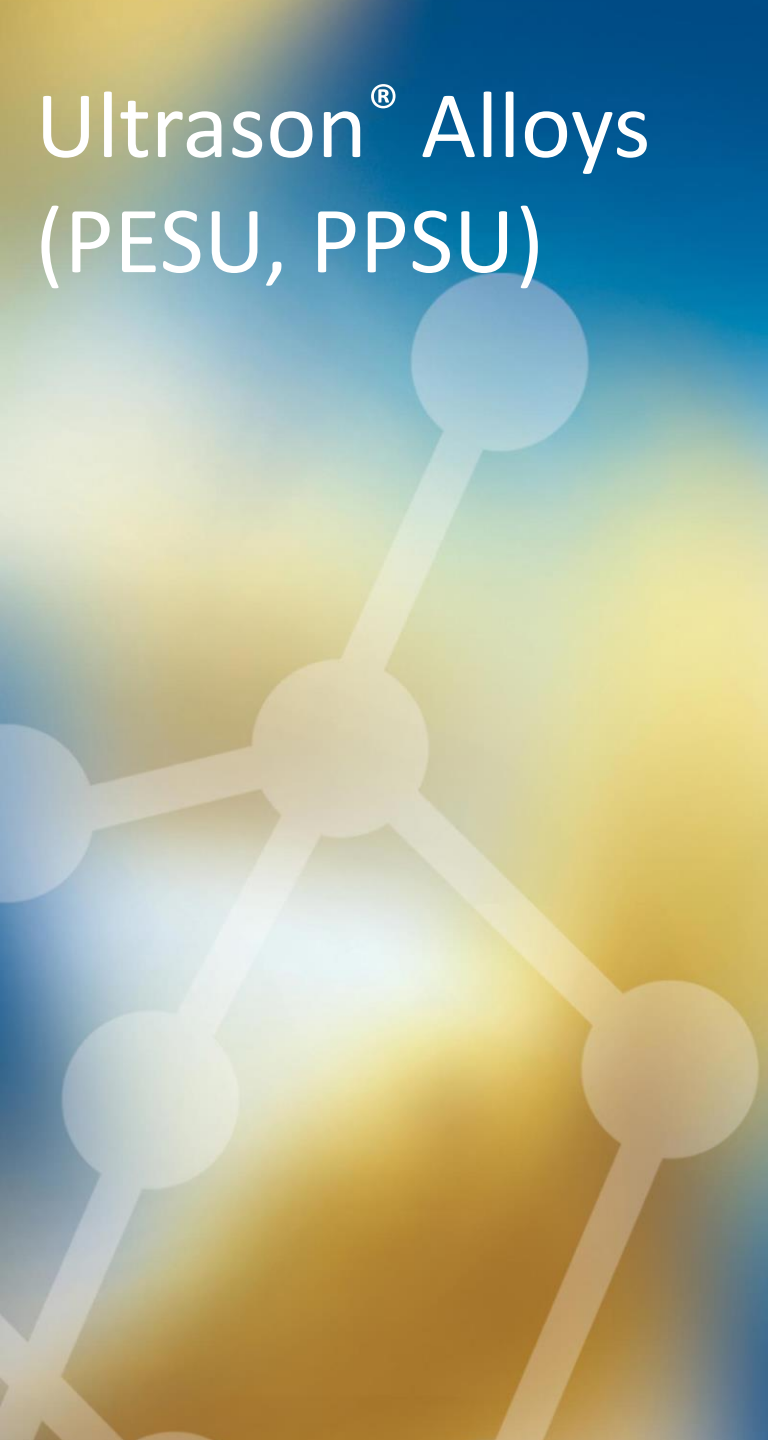
Switch cartridge case and cover molded from PLASLUBE PES TF15

Low coefficient of friction, dimensional stability, toughness, and low wear



Paper feed roller assembly molded (six pieces) from PLASLUBE J-1/30/TF/15 and AC-80/TF/20

Low noise, low coefficient of friction, and low wear



Ultrason[®] Alloys (PESU, PPSU)

Polymer alloys are a class of **polymer** blends where the addition of the second **polymer** is tailored to provide controlled morphology, and thus specific performance characteristics.

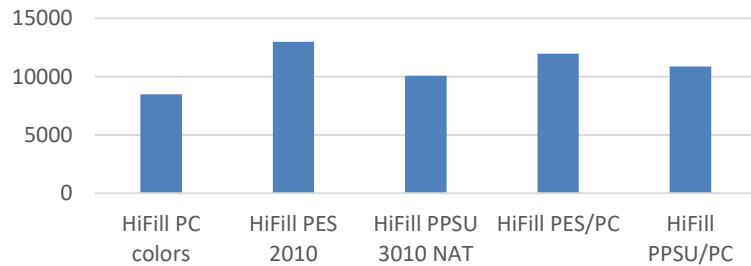
Technical Datasheet Properties

ASTM & ISO Properties							
Physical	HiFill® PC	HiFill® PES 2010	HiFill® PPSU 3010	HiFill® PES/PC	HiFill® PPSU/PC	Unit	Test Method
Density / Specific Gravity	1.19	1.37	1.28	1.30	1.26		ASTM D792
Molding Shrinkage - Flow (0.125 in)	6.0E-3	8.0E-3	7.0E-3	7.0E-3	7.0E-3	in/in	ASTM D955
Mechanical	HiFill® PC	HiFill® PES 2010	HiFill® PPSU 3010	HiFill® PES/PC	HiFill® PPSU/PC	Unit	Test Method
Tensile Strength (Yield)	8500	13000	10100	12000	10900	psi	ASTM D638
Tensile Elongation (Yield)	6.0	7.0	7.0	6.9	7.0	%	ASTM D638
Tensile Elongation (Break)	140	75	30	100	80	%	ASTM D638
Stiffness (Flexural Modulus)	330000	380000	355000	394000	345000	psi	ASTM D790
Flexural Strength	12000	19000	12900	16200	14500	psi	ASTM D790
Impact	HiFill® PC	HiFill® PES 2010	HiFill® PPSU 3010	HiFill® PES/PC	HiFill® PPSU/PC	Unit	Test Method
Impact Strength (Izod Notched Impact Strength)							ASTM D256
73°F, 0.125 in	10	2.0	11	1.5	12	ft-lb/in	
Hardness	HiFill® PC	HiFill® PES 2010	HiFill® PPSU 3010	HiFill® PES/PC	HiFill® PPSU/PC	Unit	Test Method
Rockwell Hardness (R-Scale)- change to Shore D	118	123	120	120	120		ASTM D785
Thermal	HiFill® PC	HiFill® PES 2010	HiFill® PPSU 3010	HiFill® PES/PC	HiFill® PPSU/PC	Unit	Test Method
Deflection Temperature Under Load (66 psi, Unannealed)	270	400	405	400	403	°F	ASTM D648
Deflection Temperature Under Load (264 psi, Unannealed)	260	401	385	367	367	°F	ASTM D648
CLTE - Flow	3.8E-5	2.8E-5	4.0E-5	--	--	in/in/°F	ASTM D696
Electrical	HiFill® PC	HiFill® PES 2010	HiFill® PPSU 3010	HiFill® PES/PC	HiFill® PPSU/PC	Unit	Test Method
Volume Resistivity	>1.0e+15	>1.0e+15	>1.0e+15	>1.0e+15	>1.0e+15	ohms-cm	ASTM D257

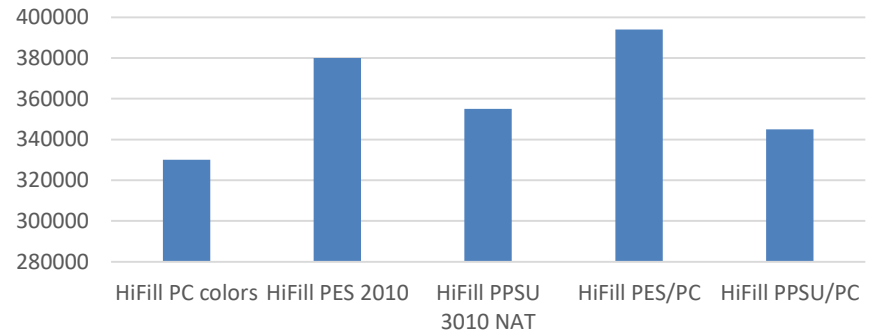
Overview of Properties



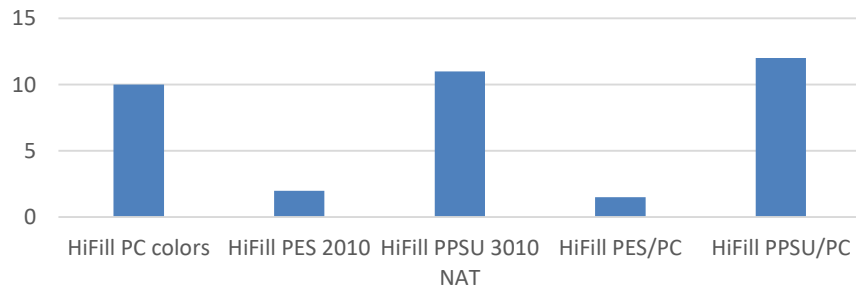
Tensile Strength at Yield (ASTM D638)
psi



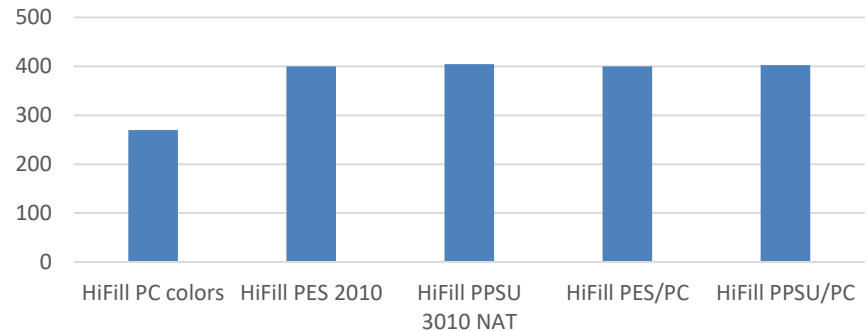
Stiffness (Flexural Modulus) (ASTM D790) psi



Impact Strength (Izod Notched Impact Strength) (ASTM D256) ftlb/in



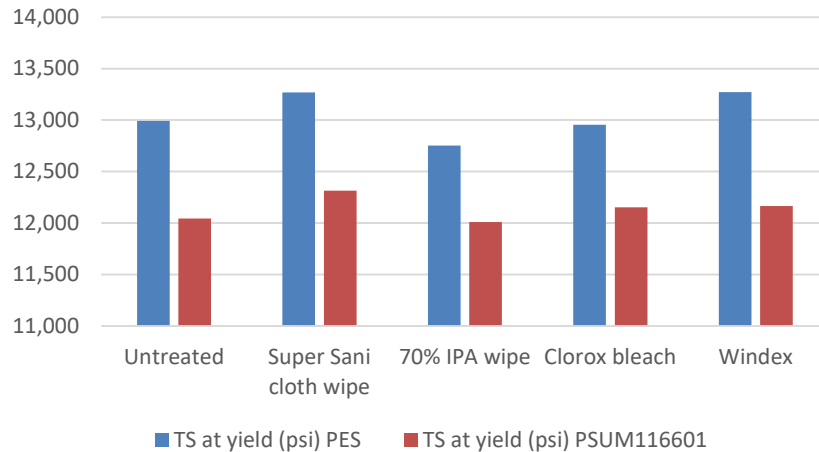
DTUL @ 66psi - Unannealed (ASTM D648) F



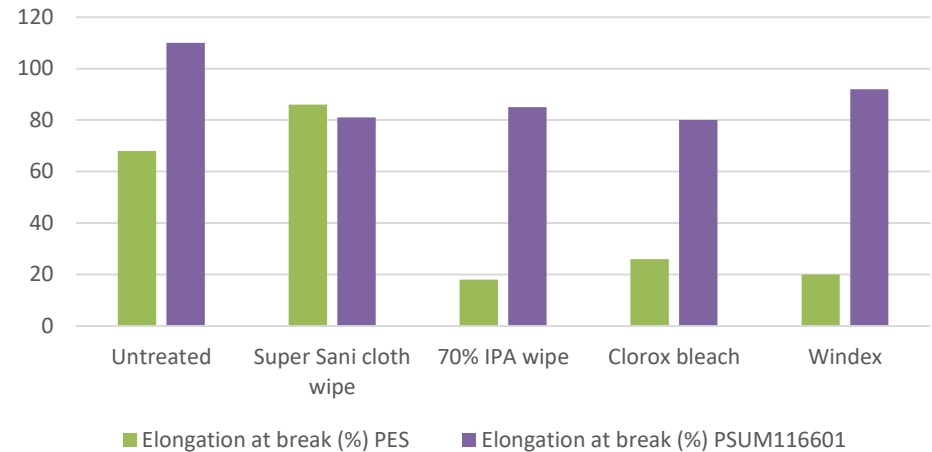
Overall Properties are not affected vs. Ultrason base Resins

PES/PC based alloy- Chemical Testing

Tensile strength comparison



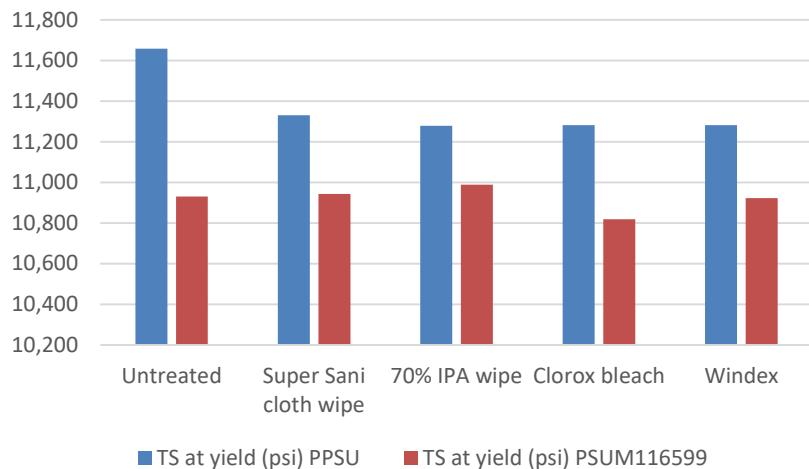
Elongation at break comparison



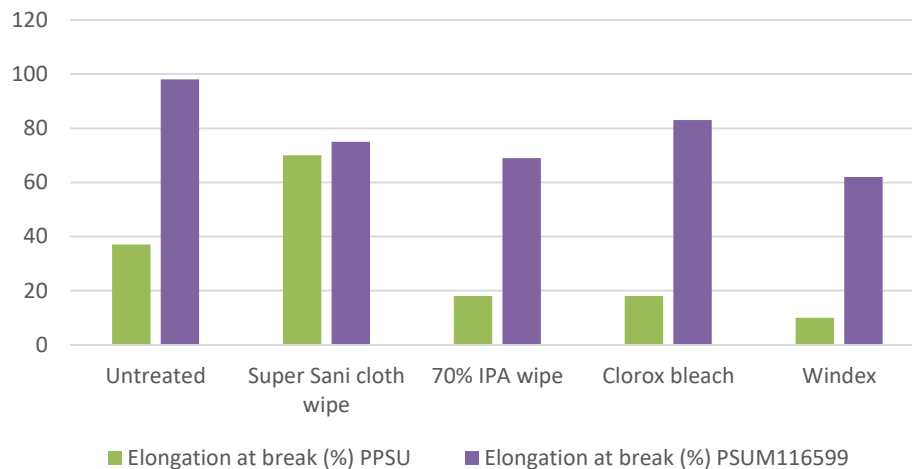
Ultrason base resin properties are not adversely affected

PPSU/PC based alloy- Chemical Testing

Tensile strength comparison



Elongation at break comparison



Ultrason base resin properties are not adversely affected



Techmer PM in 3DP Additive Manufacturing

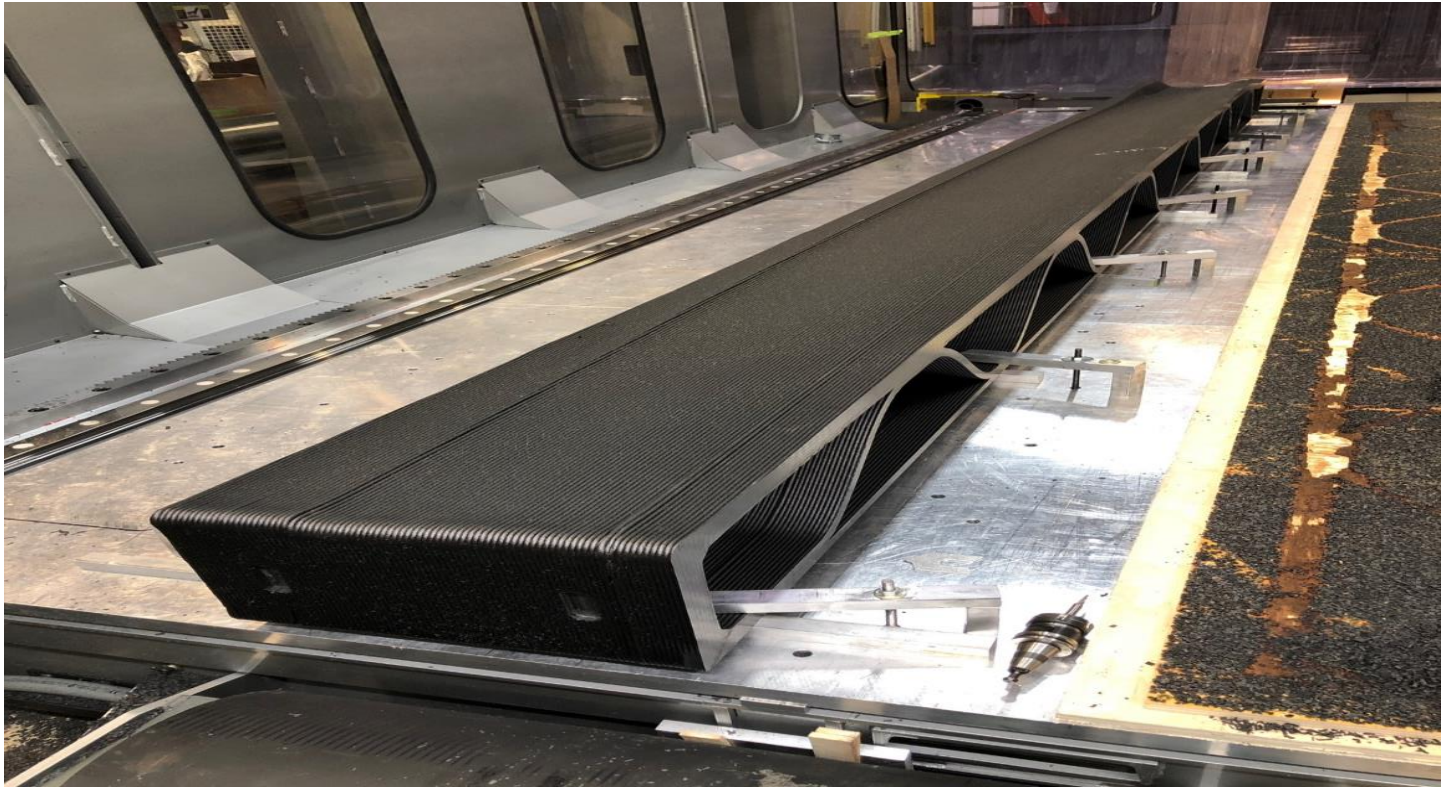
Standing Inside one of the Large Part 3D Printers (LSAM) (~1,000 Lb PESU/CF Aerospace tool printed in <8 hrs.)



Bell Helicopter Blade 350 F Autoclave Tooling

18' long Electrafil® PESU 1810 3DP (PESU/CF)

Printed on Thermwood LSAM



2017 R&D 100 Award

Autoclavable 3D Printable Engineered Compounds



For More Information Please Contact Us:



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