



# Solutions for **Aerospace** Applications

High-performance polymer components for next-generation aerospace, commercial, defense, and space technology.



# Critical Applications

*Diverse products for use when materials are exposed to difficult working conditions and environmental extremes.*

## *Accelerate Performance*

**WEIGHT REDUCTION:** Replace heavier metals with performance plastics such as PEEK. This extruded resin has one of the highest strength-to-weight ratios of any thermoplastic. Available in convoluted tubing, spiral wrap, heat shrink, insulated wire, extruded tubing, and more.

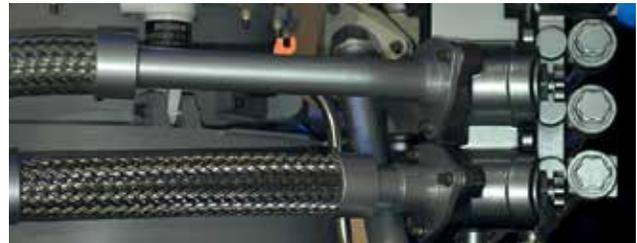
**RADIATION:** PEEK and PVDF are excellent material choices for space components or other applications where radiation resistance is needed to enhance performance.

**REDUCE FRICTION:** Through the extrusion of micro-structured channels along the tube, Engineered Surface tubing decreases friction and strain on fiber optics when used as sheathing.



## *Motor/Magnet Winding*

PEEK insulated wire and heat shrink is abrasion resistant and has excellent dielectric properties of up to 3000 V/mil with thermal endurance reaching 500 °F / 260 °C. Due to their superior abrasion resistance, these products are often utilized in motor winding applications to drive motor performance. PEEK wire coating options include round, solid, stranded, square, hexagon, and rectangle profiles. We extrude over copper, silver-plated, nickel-plated, and other materials. PEEKshrink™ is often used to splice wires. Wire coatings in PTFE, PFA, ETFE, or FEP are available as well as custom extrusions.



## *Wire Harness*

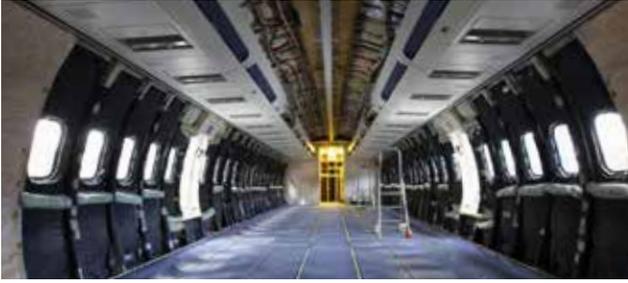
**SPIRAL WRAP:** This product is an expandable, highly flexible wrap for wire harnessing and insulating wires, cable, hoses, bundles, and more.

**CONVOLUTED TUBING:** Commonly referred to as flexible conduit, convoluted tubing is used for housing multiple wires to prevent chafing. The extrusion can be drilled with holes that act as drain passages, marked with part numbers, or slit to easily wrap and protect wires. AS81914 certification or special sizing is available by request.

**HEAT SHRINK:** Our tubing provides a state-of-the-art method for the application of a tight, protective covering to items subjected to heat, corrosion, shock, moisture, and other adverse conditions. We manufacture heat shrink tubing from a variety of polymer resins including PTFE (AMS-DTL-23053™/12), FEP (AMS-DTL-23053™/11), PFA, PEEK, ETFE, PTFE/FEP Dual-Shrink™, and FEP/EFEP Low-Temp Dual-Shrink™.

**DRAWN FIBER:** PEEK, PFA, FEP, ECTFE, PVDF, and ETFE are excellent braiding fibers which increase chafe resistance while minimizing weight. Tensile elongation and shrinkage can be customized for braiding applications.

**CUSTOM EXTRUSIONS:** Spline shapes are used to center wiring, reduce vibration impact, and allow air or moisture to pass. Other specialized shapes provide isolation of wires in multiple lumens or geometries.



## Composite Forming

**HEAT SHRINK RELEASE AIDS:** FEP is an approved contact resin for composites. Our Sub-Lite-Wall® (-0.004" / 0.127 mm and below) heat shrinks offer seamless coverings for forming mandrels or bladders that expand with heat and pressure for composite creation.

Zeus heat shrinks replace labor intensive film and tape saving time and effort. Our heat shrinks can also be used as a compaction shrink on the outer surface of composites during the curing phase. The result is a solid composite with a smooth surface finish.



## Fiber Optics

**COATED OPTICAL FIBER:** We provide polymer coated optical fibers that are resilient in harsh operating environments. These coatings protect against abrasion, chemicals, solar radiation, and extreme temperatures up to 260 °C (500 °F). We offer an array of optical fiber coatings including, but not limited to PEEK, PFA, ETFE, and PVDF.

For composite structural health monitoring, Zeus coatings support optimal bonding between materials for non-destructive testing and validation. Zeus fiber optics coating also serve as protection for optical strain gauges.



## Fluid Management

**TUBING:** Zeus can customize the tolerances or wall thickness on all materials upon request to increase burst pressure. Our performance tubings are chemically inert to typical aerospace fluids such as JP fuels, Skydrol, de-icing and anti-icing fluids, and salt spray.

**FILLERS:** Carbon is a filler for PTFE and melt extruded resins that increases static dissipation. We can also introduce other unique fillers and customize percentages to suit your needs. Dual-layered or homogeneous extrusions are available upon request.

## MIL-SPEC Guide

ASTM D 3295	PTFE Tubing, Beading, Spiral Wrap & Monofilament
AMS 3653, 3654 & 3655	PTFE Wire Gauge Tubing
MIL-I-22129	PTFE Standard Wall Tubing
ASTM D 3296	FEP Tubing
AMS-DTL-23053/12	PTFE Heat Shrink
AMS-DTL-23053/11	FEP Heat Shrink
AS81914/1-6	PTFE, FEP & ETFE Convuluted

## Continuous Improvement

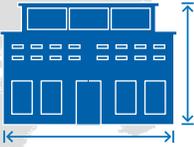
The use of performance polymers in aircraft design is expected to increase, and Zeus is prepared to support and accelerate future applications development by helping you determine your optimum material needs. Zeus continues to focus on producing the highest quality products that meet or exceed industry standards, and partnering with next generation aerospace programs.

We stay informed of industry changes, policies, and statutes to help you through the regulatory process.

# About Zeus.



**1,500**  
EMPLOYEES



**400,000+ ft<sup>2</sup>**  
MANUFACTURING SPACE



**23**  
CLEAN ROOMS



**3,876 ft<sup>2</sup>**  
DEVOTED TO  
CLEAN ROOMS



**50+**  
SCIENTISTS,  
ENGINEERS &  
R&D PERSONNEL



**5,000 ft<sup>2</sup>**  
BIOABSORBABLES  
RESEARCH & MFG.



**100+**  
CLASS VI APPROVED  
RESINS & PIGMENTS



**ZOS**  
OPERATIONAL  
EXCELLENCE



**ISO  
CERTIFIED**  
ISO 9001  
AS 9100  
ISO 13485  
IATF 16949

## - OVER 50 YEARS OF INDUSTRY SOLUTIONS -

Zeus delivers precision polymer solutions that transform businesses, markets, and lives. We have dedicated ourselves to building partnerships, products, and services for the benefit of our customers.

Headquartered in Orangeburg, South Carolina, Zeus employs approximately 1,500 people and operates multiple facilities around the world.



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