

In Flight

Performance Polymer Solutions for
the Aviation & Aerospace Markets



Evonik is one of the world's leading specialty chemical companies.

Our Performance Polymers Business Unit manufactures an ever-expanding range of advanced, long service life materials to meet the critical demands of the Aviation and Aerospace Industries. You'll find our high performance and flame resistant polymers on nearly every takeoff and landing, inside and out. Evonik materials provide key OEMs and supply chain partners with the design freedom needed to engineer high quality, unique products.

We're ranked high as an innovation partner because we understand changing technical requirements and strive to offer next generation aviation materials. Evonik supports ongoing product development efforts focused on weight reduction, impact resistance and fuel savings while lowering production costs and maintaining reliability and safety.

Evonik Products In Flight

ACRYLITE®

ACRYLITE® is an acrylic sheet based on methacrylate chemistry (PMMA) for military and commercial aircraft glazing/transparencies. It's weatherable, half the weight of glass and offers outstanding impact resistance. ACRYLITE® is manufactured using equipment reserved for aviation acrylic products and is subjected to the most rigorous optical inspection in the industry. Our aviation grade sheets are also the largest in the industry (2 m x 3 m) and deliver superior optical quality and thickness tolerance in monolithic production. ACRYLITE® is U.S. Navy QPL'd MIL PRF 8184, Mil PRF 5425, and LP-391. The material can be easily cut, sawed, machined, thermoformed and cemented.

EUROPLEX®

EUROPLEX® Polyphenylsulfone (PPSU) extruded sheets are utilized to create endless design and décor possibilities for aircraft cabin components. Both opaque and transparent sheets meet the strict FST (Flame/Smoke/Tox) requirement according to FAR 25.853 and ABD 0031, and OSU Heat Release Test [FAR 25.853 (d)]. Along with its flammability properties, it offers high chemical and impact resistance. PPSU can be processed with customary forming equipment for everything from window shades and seating to large scale components such as side wall dividers for galleys and lavatories.





POLYIMIDE P84®

P84® Polyimide (PI) is a high performance polymer combining excellent physical properties with high temperature and chemical resistance. As solution in polar aprotic solvents, it can be used to make anti-friction coatings or insulating layers for aerospace electronics due to its low dielectric constant or high dielectric strength. In fiber form, P84® is typically used for applications ranging from protective clothing for pilots to aerospace insulation and sealing materials.

P84 NT® Polyimide (PI) powder offers high temperature stability to 350°C, chemical resistance, high mechanical strength, low friction coefficient and minimal abrasion. Using sintering technology, it can be cost efficiently manufactured into near-net-shape components on the plane or the engine. Compounds with solid lubricants are used in tribologically demanding applications often found in aerospace environments.

ROHACELL®

ROHACELL® Polymethacrylimide (PMI) structural foam has been used in fiber-composite technology for more than 30 years. It increases stiffness of composite structures and provides extremely robust and durable composites compatible with all common thermoset and thermoplastic polymers. ROHACELL® delivers excellent mechanical properties over a wide temperature range, even at low densities and high

temperature resistance up to 220°C. It has unique compressive creep behavior and dynamic strength and cell sizes that can be tailored for each processing method. It will not add unnecessary weight since this 100 percent-closed-cell foam uptakes resin only in the exposed cut cells at the surface. Versatile, the foam can be CNC milled and or thermoformed into complex geometries. All foam combined with common resin systems is suitable for autoclave, press, vacuum infusion, RTM and VARTM.

SOLIMIDE®

SOLIMIDE® Polyimide (PI) foams are a family of high performance thermal and acoustic insulation products. They possess significant advantages over traditional insulating materials, making them ideal for solving tough aircraft and spacecraft challenges. They're extremely lightweight, self-supporting and dimensionally stable in widely fluctuating temperature environments. This translates into fuel savings and extra payload capacity, faster and more cost effective handling and installation, and long service life. SOLIMIDE® foams also have excellent chemical stability, are formaldehyde and fiber free, and are very low in smoke and toxicity when exposed to fire thereby meeting all FAA flammability requirements.



VESTAKEEP® PEEK Polymer

VESTAKEEP® Polyether ether ketone (PEEK) is a high-performance thermoplastic polymer ideal for manufacturing long-lasting components for use in the toughest conditions. Tight tolerance parts can be produced via traditional molding and extrusion to withstand high temperature, chemical and conductive environments. Thanks to higher ductility and molecular weight, mechanical advantages such as higher elongation to break, higher impact strength and lower notch sensitivity can be achieved across elevated temperature ranges. This is a clear advantage in both fabrication and longevity. Inherent flammability properties and robust performance make it an ideal choice for aerospace applications.

VESTAKEEP® is also used as a resin matrix for thermoplastic composite unidirectional fiber tapes and fabric preregs. Excellent fatigue, impact, and creep behavior are achievable for continuous use at elevated temperatures to 250C. Its lower weight combined with high mechanical strength make it a suitable replacement of traditional thermosets and metals.

Additionally, VESTAKEEP® is available as a specially formulated ultra fine powder for use in Additive Manufacturing (Selective Laser Sintering). Selective Laser Sintering is layer-based manufacturing that does not use molds or tools to create parts. Improved design freedom, part consolidation, metal replacement and cost reduction are possible. High temperature VESTAKEEP® is the solution for hot air ducting, clips and brackets in a wide variety of commercial and military applications.

VESTAMID®

VESTAMID® X7167 is heat stabilized Polyamide 12 (PA12) containing a non-migrating flame retardant, free of halogens and phosphorous. In compliance with the flammability requirements of FAR 25.853 and ABD0031, it is especially suited for aircraft interior parts. Airframe OEMs have achieved significant weight savings by replacing phenolic materials with X7167. It can be used for extrusion and injection molding.

VESTOSINT®

VESTOSINT® Polyamide 12 (PA 12) are ultra fine powders for Additive Manufacturing. VESTOSINT® provides dependable quality and repeatability of processing. It offers mechanical properties that enable complex geometry for optimum design freedom, part consolidation and simplified logistics. Ultra-flexible grades offer eight times the flexibility and five times the tensile strength versus competitive grades.

Aircraft Applications

ACRYLITE® Exterior Applications

- 1 Aircraft Canopy/View Windshield
- 2 Cockpit Instrument Panel
- 3 Wingtip Lens

ACRYLITE® Interior Application

- 4 Dust Covers

EUROPLEX® Interior Applications

- 5 Cockpit Instrument Panels
- 6 Window Shades and Dust Covers
- 7 Galleys, Partitions, Lavatories, Sidewalls, Seats & Tray Tables

POLYIMIDE P84® Interior Applications

- 8 Anti-friction/Insulating Coatings Electronics
- 9 Sealing Materials

POLYIMIDE P84® NT Powder Exterior Applications

- 10 Sealings, Bearings, Bushings & Guidances
- 11 Toughening Agent for Composites

ROHACELL® Exterior Applications

- 12 Belly Fairing
- 13 Engine Cowling Doors
- 14 Flaps
- 15 Landing Gear Doors
- 16 Radome

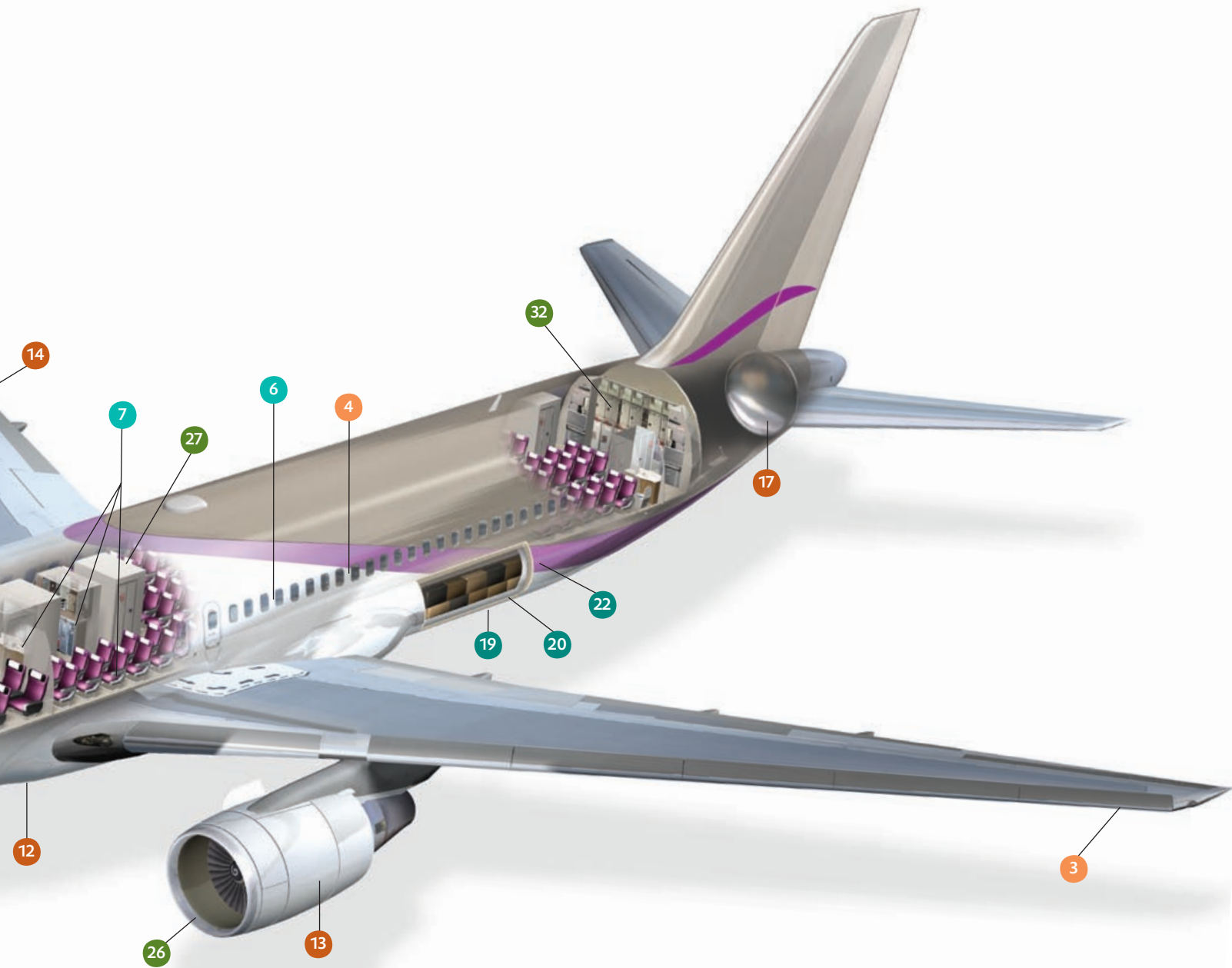
ROHACELL® Interior Applications

- 17 Aft Pressure Bulkhead

SOLIMIDE® Foams Interior Applications

- 18 Avionics Bays
- 19 Bilge Insulation
- 20 Cargo Liners
- 21 Duct Insulation
- 22 Fuselage Insulation





Suitable VESTAKEEP® Exterior Component Applications

- 23 Aileron
- 24 Fuselage
- 25 Leading Edge/J-Nose
- 26 Nacelle

Suitable VESTAKEEP® Interior Component Applications

- 27 Additive Manufacturing for High Temperature Applications
- 28 Ducting, Cable Ties & Sheathing
- 29 Hinges, Latches, Handles & Mechanical Parts
- 30 Secondary Floor Structures

VESTAMID® Interior Application

- 31 Interior Profiles/Rub Strips

Suitable VESTOSINT® Interior Application

- 32 Additive Manufacturing: Brackets, Clips & Ducts

Helicopter Applications

ACRYLITE® Exterior Applications

- 1 Cockpit Instrument Panels
- 2 Windshields/Windows

EUROPLEX® Interior Applications

- 3 Cockpit Instrument Panels
- 4 Doors, Walls & Ceilings

ROHACELL® Exterior Applications

- 5 Engine Inlet & Pylon Cowling
- 6 Main Rotor Blade
- 7 Radome/Forward Cowling
- 8 Tail Boom & Structural Stiffeners/Stringers
- 9 Tail Rotor Blade

ROHACELL® Interior Applications

- 10 Floor Panels

SOLIMIDE® Foams Interior Applications

- 11 Tubes, Ducts & Sidewalls

Suitable VESTAKEEP® Exterior Component Applications

- 12 Secondary Structures/Flooring

Suitable VESTAKEEP® Interior Component Applications

- 13 Latches, Handles, Hinges & Mechanical Parts

VESTAMID® Interior Application

- 14 Interior Profiles/Rub Strips

Suitable VESTOSINT® Interior Application

- 15 Additive Manufacturing: Brackets, Clips & Ducts





Evonik Products In Space

Evonik foam products continue to play a vital role in the global space launch vehicle construction market.

ROHACELL®

ROHACELL® foam cores offer unparalleled strength-to-weight ratio. It's the preferred core designed-in and specified for producing high performance sandwich composite structures in launch vehicles including payload and payload adapter fairings, interstages, nose cones and thermal protection shields.

SOLIMIDE®

SOLIMIDE® polyimide foams are lightweight yet durable, withstanding the extremes of rigorous multiple launches as payload fairing acoustic insulations on launch vehicles. Other space applications include thermal protection of communication satellite louvers, fire-resistant formaldehyde-free cushioning of delicate instruments and other components on the International Space Station, the Mars Exploration Rover and other NASA space vehicles.

Photo left: Courtesy U.S. Air Force.

For more information on these products please visit our web sites.

ACRYLITE®

www.acrylite.net

EUROPLEX®

www.performance-plastics.com

P84®

www.p84.com

ROHACELL®

www.rohacell.com

SOLIMIDE®

www.evonikfoams.com

VESTAKEEP®

www.vestakeep.com

VESTAMID®

www.vestamid.com

VESTOSINT®

www.vestosint.com

Evonik's Performance Polymers business unit occupies a leading global position in the international methacrylate chemistry markets with products made from methacrylates as well as specialty polyamides and high-performance polymers that meet the specific requirements of customers and applications.

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