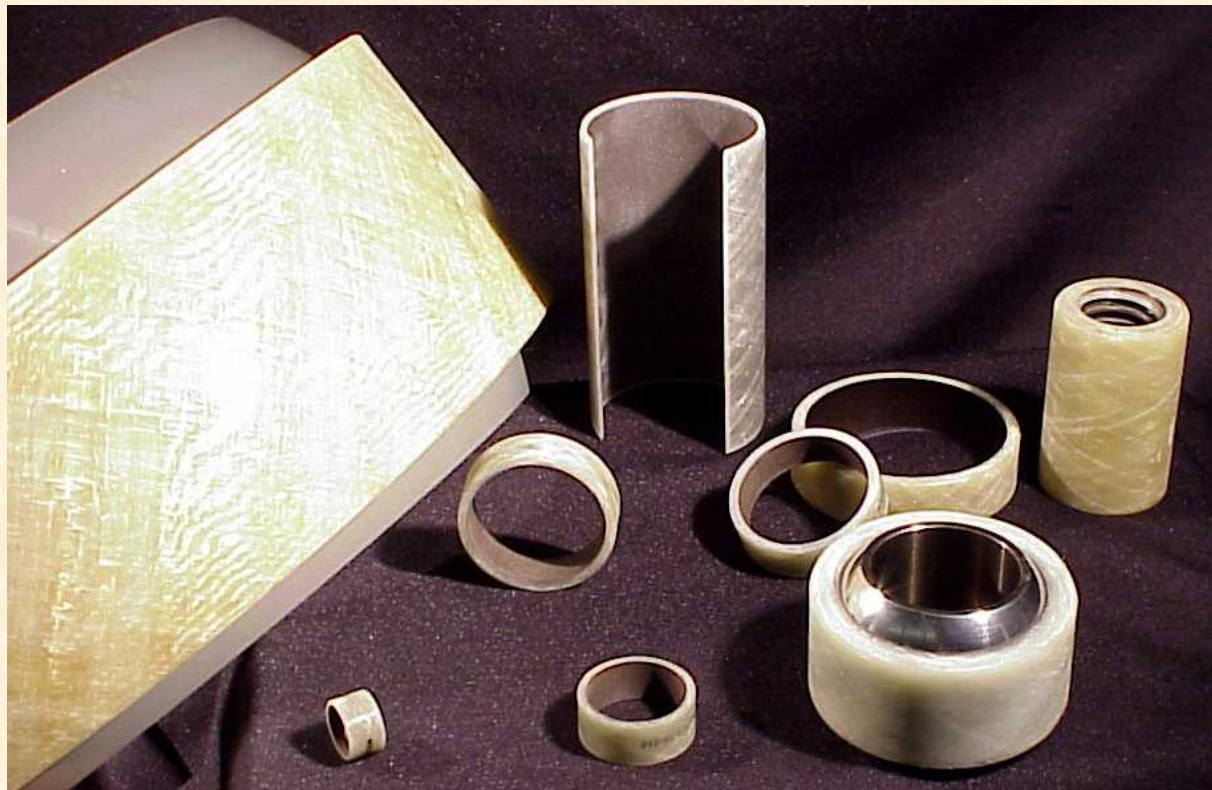

Fiberlon™ Bearings

Self-Lubricating Fiber Reinforced Composite Bearings



Kamatics Corporation

Rev. March 28, 2004

KAMAN

Features and Benefits

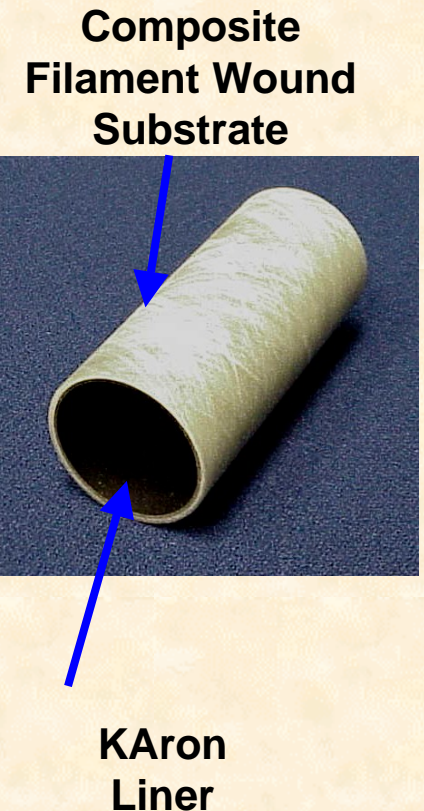
- The only bearing system which meets the requirements of MIL-B-85560 with a *fully machineable* liner that is also self-lubricating.
- Dynamic operation greater than 20,000 psi (138 MPa).
- Ultimate strength greater than 60,000 psi (414 Mpa).
- One quarter the weight of stainless steel bearings.
- Resists chemical degradation with no galvanic corrosion.
- Superior fluid/chemical resistance

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Materials and Construction

- Substrate: Fiberglass/Epoxy
 - Fibers are filament wound using a precision computer controlled geometry to maximize strength and consistency.
 - Advanced thermoset polymer chemistry is used to insure corrosion resistance and maximum temperature capabilities.
- Liner: KAron® V
 - Proprietary self-lubricating polymer consisting of PTFE and other fillers in a thermoset resin matrix.
 - Over 25 years of proven self-lubricating performance in the most demanding aviation and marine applications.
 - Could also use KAron VS



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Fiberlon Bearing Uses

- Light weight KAron lined composite backed bearing
- Can be co-cured into composite structures
- Eliminates need for heavy metallic housing
 - Higher strength and lighter weight
 - no cutting of composite matrix to insert metallic housing and fasteners
- Bearing can be replaced if required by reaming out old bearing and bonding in new bearing

**KAron Lined
Composite Backed
Bushing**



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Fiberlon Also Applied to Spherical Bearing

- Composite outer race reduces weight over all steel bearings
- Can be integrated into composite structures



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Fiberlon™ Bearings

Computer Controlled Filament Winding Machine



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What is MIL-B-85560?

MIL-B-85560 is a military specification for plain and flanged sleeve bearings with a composite substrate and a self-lubricating liner.

Qualification Requirements:

- 40,000 psi (276 MPa) static load
- 20,000 psi (138 MPa) dynamic load
- -65°F (-54°C) to 250°F (121°C) service temperature
- Compatibility with aerospace grade fluids

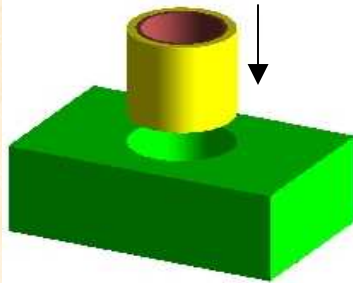
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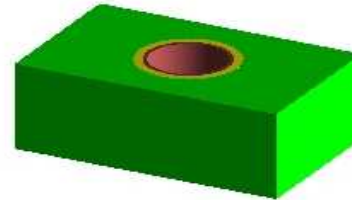
Bonded-In Bearing Surfaces

Use Fiberlon™ bearings integrated directly into composite structures.

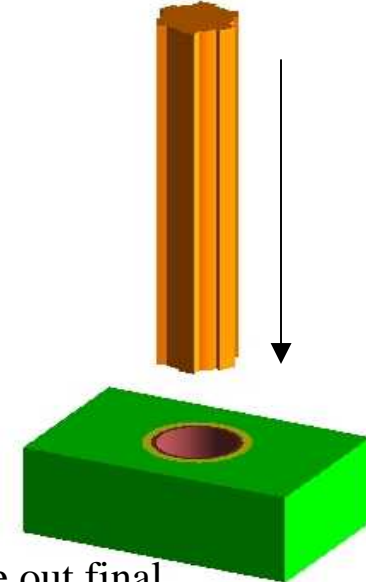
1. Install Fiberlon™ bushing into composite structure preform.



2. Co-cure bushing with composite structure (autoclave or vacuum bag).



3. Ream to take out final assembly tolerances.

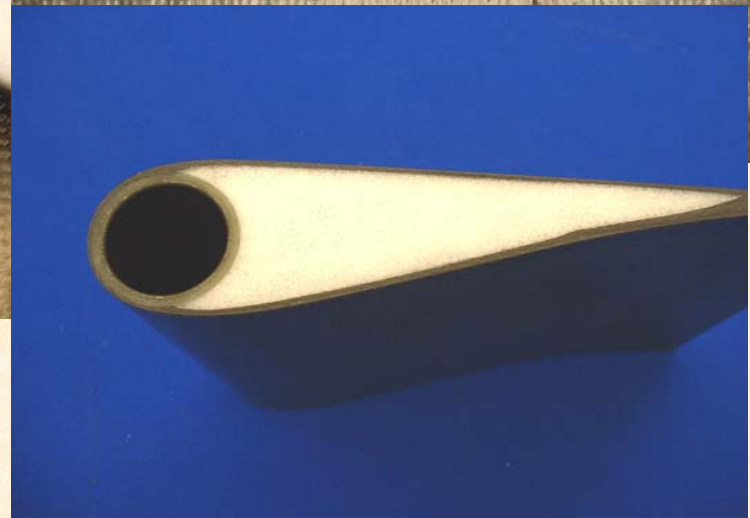
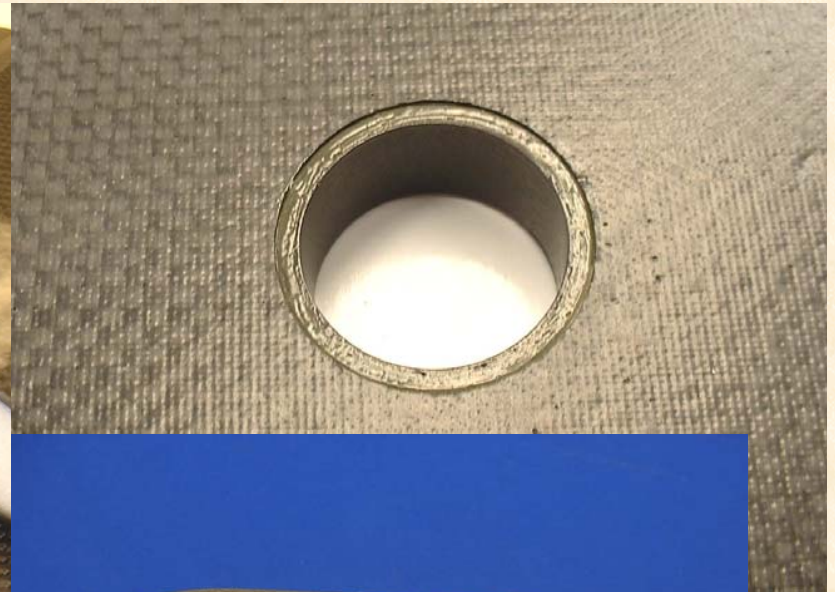
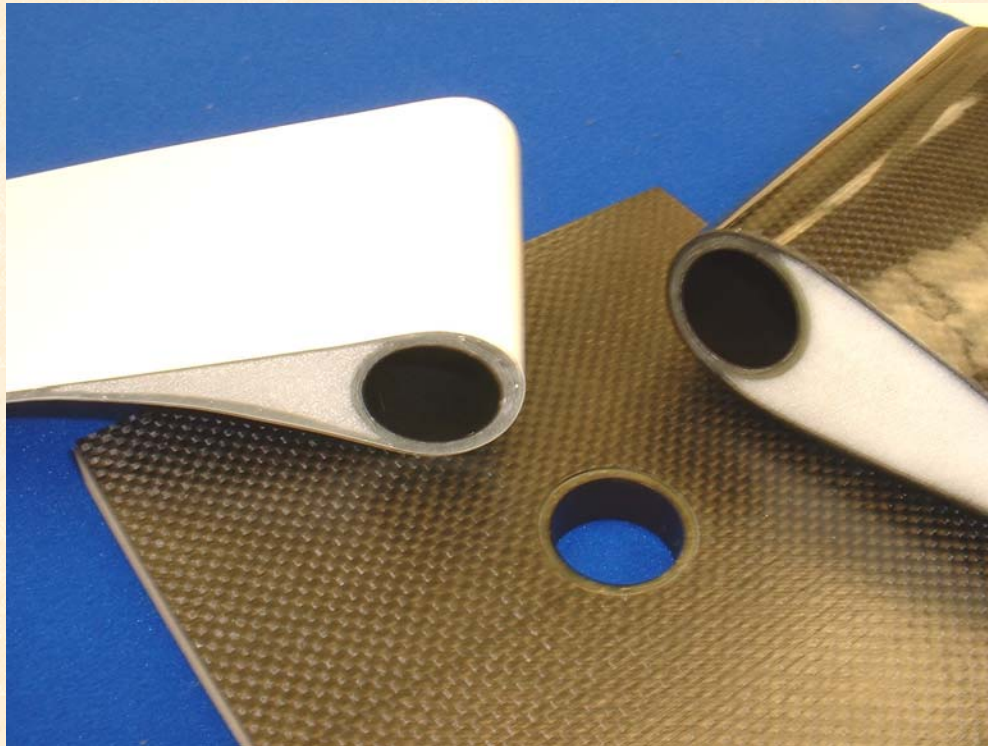


Eliminates costly, heavy metallic mounting housings in composite structure
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Aerospace Applications

- Pivoting linkages
- Anti-fretting static joints
- Hinge lines (access doors, flight control hinges)
- Bushings in floor panels
- Rotary wing main and tail rotor assemblies
- In water or fluid contaminated areas

Fiberlon Bearing Uses



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Non-Aerospace Applications

- Surface ships and submarines - corrosion resistant light weight bearing systems
- Ground support equipment
- Transportation
- Tracked vehicles
- Industrial applications

Available Bearing Designs

Plain or Flanged Bearings

- Interference fit: .0005” (0.0127 mm) - .002” (0.0508 mm) interference suggested.
- Bonded assembly: will not affect ID dimensions.
- Flanged bearings available with or without liner on flange.

Self-Aligning Bearings

- Spherical metallic (aluminum or stainless steel) inner race
- Composite outer race

Special Bores

- Square, hexagonal, and other bore configurations available.

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