



FLUID TRANSFER SYSTEMS

COMPOSITE FUEL PIPES AND HIGHLY RESISTIVE FITTINGS

Collins Aerospace composite fuel pipes are developed with fully composite wing skin construction. They are constructed using non-conductive glass fiber and an epoxy resin tuned to a specific resistivity, enabling the fuel system to dissipate static electrical charge while controlling the path of electricity in the event of a lightning strike.

Our composite pipes facilitate weight reduction and offer design features not achievable with traditional metallic pipes at aircraft level. Pipes can be fully composite or can be designed with metallic interfaces, allowing for variations in aircraft configurations.

Our composite pipe technology enables precise tuning of electrical resistivity and fly on today's aircraft. This technology is scalable and can hold aggressive fluids at high pressure. Within an aircraft wing, the pipes are linked and "float" on O-rings, such that when the aircraft wings bend they can move without being damaged.

Designed at our Composite Center of Excellence in Banbury, UK, our fuel pipes meet strict static and dynamic loading, weight, conductivity and environmental requirements, wing and fuselage mounted composite fuel pipes, delivering significant performance benefits for our customers.

Collins investment in this facility ensures that we're capable of producing the products at the volume and quality our customers require. Process controls are built into the automated lines, ensuring consistent high quality products, time after time.

At the leading edge of product design and qualification, our engineering teams are able to convert customer specifications into a production ready product. The testing and qualification programs ensure that the designs meet the strictest customer, legal and regulatory requirements.

KEY FEATURES AND BENEFITS

- High pressure resistance
- Tuneable conductivity
- Electrically bonded to the connectors
- High vibration resistance allows for longer pipes
- Double wall standardised designs for increased redundancy in key areas
- Compatible with fuel, hydraulic fluid and de-icing agents
- Parts designed for full aircraft life
- Four degrees of articulation to accommodate wing movements
- Axial load carrying capabilities

CAPABILITIES

Highly resistive fittings and isolators

These are fitted within the fuel and hydraulic systems of the aircraft to prevent flow of electric current from a lightning strike while still facilitating dissipation of a static charge.



Characteristic	Typical Performance Range
Length	0.2m - 2.0m
Resistance	100kΩ/m - 10MΩ/m
Diameter	10mm - 150mm
Working pressure	30bar
Burst pressure	70bar



Composite/Metal pipe

- Fitted within fuel tank
- Aluminium end fitting
- Allows customer specified interface with fuel system
- Resistance per unit length requirement to control flow of lightning strike



Hydraulic isolator

- Designed to withstand pressures of up to 2,000bar
- High pressure and low pressure variants designed
- Aluminium or titanium metallic parts
- Dielectric requirement to prevent flow of lightning strike



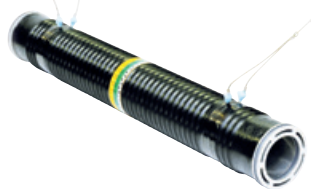
Single wall HRF

- Used in variety of systems
- Swaged or union couplings
- Dielectric requirement to prevent flow of lightning strike



Fully composite fuel pipe

- Significant weight saving
- No need for metal to composite interface
- Fitted within fuel tank



Double wall pipe

- Fitted in inerting system
- Dielectric requirement to prevent flow of lightning strike
- Exterior form designed to indicate barely visible impact damage
- Seal groove



Double wall HRF

- Bolted flange
- Located on pylon as part of the engine feed system
- Exterior form designed to indicate barely visible impact damage