

TRANSMISSION SYSTEMS

COMPOSITE TRANSMISSION SHAFTS AND COUPLINGS

High performance and lightweight

Collins composite transmission shafts are custom designed at our Composite Centre of Excellence in Banbury, UK. We design, develop, qualify and manufacture composite transmission shafts for secondary flight controls for military and commercial aircraft applications.

Our designs deliver considerable weight reduction over traditional metallic shafts. Shafts can be designed with numerous end fittings, allowing a huge variety of aircraft configurations to be accommodated. Current applications include transmission for Airbus, Boeing, Bombardier and military platforms. Performance benefits can be achieved on many other applications where torque and weight optimisation is necessary.

Meeting strict static and dynamic loading, weight, connectivity and environmental requirements, our wing-mounted composite transmission shafts deliver significant performance benefits for our customers.

Characteristic	Typical Performance Range
Length	0.28m – 2.5m
Torque rating	Up to 4,000Nm
Diameter	20mm – 50mm
Temp operating range	-55° C – 90° C

KEY FEATURES AND BENEFITS

- Up to 75% weight-saving vs metallic equivalents
- High specific strength
- Span long distances without the need for support bearings
- Low rotational inertia energy, reducing operational cost
- Tuneable torsional stiffness and strength
- Tuneable lateral stiffness
- Compliant shafts with demanding strength to stiffness ratio
- Scalable load carrying capability up to 80,000Nm
- Axial/bending loads carrying capability
- Corrosion resistant
- Maintenance free

Capabilities



FLANGED END FITTING

This end fitting is the standard type offered – these offer a mounting point which can be fixed to any joint type. Our flanged end fittings are tailored precisely to the load application; large or small end fitting types can hence be designed and manufactured to suit.



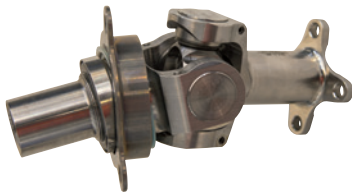
YOKE END

Collins offers an integrated universal joint solution, which allows added weight-saving compared to a standalone universal joint fixed to a flange end, eliminating the extra connection flange and fittings. Universal joints are used in applications which require increased articulation within a transmission system.



FIXED AND FREE SPLINED

An integrated spline is offered where a transmissions shaft needs a quick and easy installation into a transmission system. These are offered as fixed, which prohibit axial movement, or free, where this constraint is not required. The friction coefficient can be tuned to control axial loads.



STEADY BEARING

These act as mounting points for transmission systems, offering low rolling resistance.



TORQDISC™ TRIPOD

This innovative composite disc design was developed in house at Collins. The most lightweight joint solution, TORQdisc allows higher articulation angles than a crowned spline joint with a significant weight-saving.



METALLIC SHAFT

Whilst Collins focuses on composite shafts, metallic shafts are also manufactured in house. Usually machined as a singular piece, these are useful for small length shaft designs or in areas frequently exposed to extremely high temperatures.

Other available fittings

PLUNGING JOINT

These are fitted into a transmission system to allow larger levels of axial displacement.

CROWNED SPLINE JOINT

Similar to the integrated universal joint, an integrated crown spline is offered for applications where lower angle offsets are required. This solution is more lightweight than a universal joint, however maximum articulation angles are reduced.

Specifications subject to change without notice.