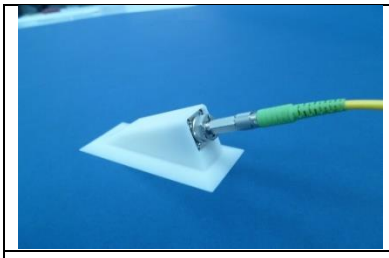
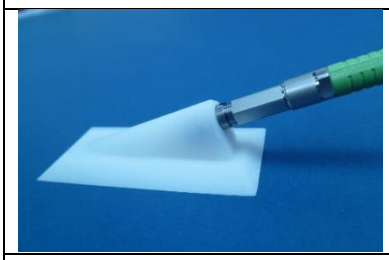
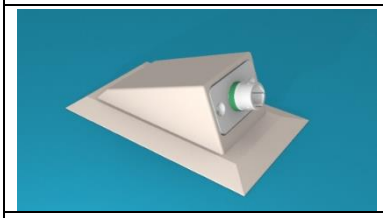
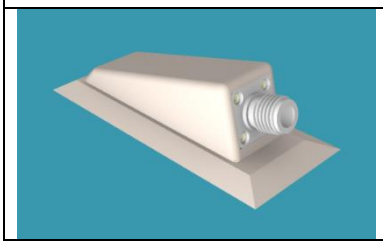
Embedding optical fibre sensors in composite structures just got easier…

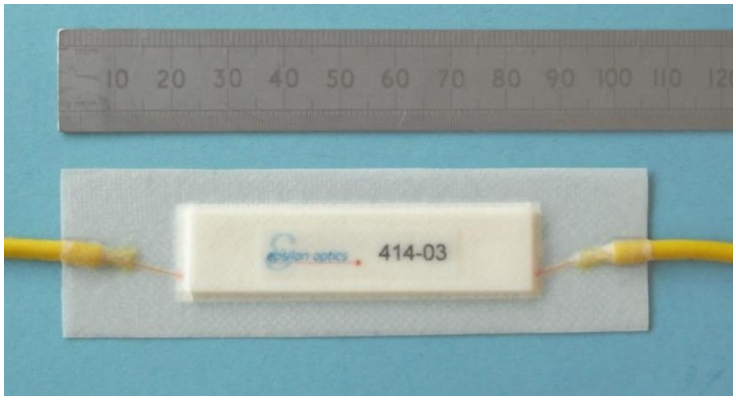
Successfully embedding optical fibre sensors into a composite structure requires careful thought and attention to detail. This task has just got a lot easier as Epsilon Optics have launched a range of components to help solve some of the most common problems. These problems include how to design the exit of the optical fibre from the laminate so that it will be able to survive lay-up, curing, and subsequent deployment in a potentially harsh operating environment. Epsilon Optics has developed a range of standard connector housings suitable for surface mounting and fully compatible with vacuum bagging and autoclave curing processes up to 200ºC. The connector housings are compatible with Aerospace and MIL spec harsh environment connectors from Diamond, Amphenol, Fischer, Radiall, Deutsch and others.

Surface mounted connector housings

	Connector type: Diamond AVIM Dimensions Housing Only: 83 X 39 X 20mm
	Connector type: Diamond mini-AVIM Dimensions Housing Only: 61 X 30 X 16mm
	Connector type: FC-APC Dimensions Housing Only: 81 X 35 X 16mm
	Connector type: Fischer R13 Dimensions Housing Only: 73 X 43 X 24mm
	Connector Type : Amphenol MFM and Deutsch RSC Dimensions Housing Only: 95 X 41 X 25mm

The connector housings are manufactured from a ceramic filled resin with very high dimensional tolerance and good surface finish. Normal surface preparation (keying and degreasing) is sufficient to ensure an excellent bond is formed with the composite laminates during cure. The connector housings will withstand a cure temperature of 140 ºC. or optionally up to 200 ºC. Note: Maximum cure temperatures may be limited by the connector specification in some cases. Sealing caps are provided to protect the connector from resin ingress during the cure cycle.

Embedded temperature sensors



Dimensions of temperature sensor enclosure: 64 X 17 X 1.5mm

Patent application: 1611022.3

Fibre-optic strain sensors often require co-located temperature sensors to enable correction for temperature. These temperature sensors are typically additional fibre-optic sensors that are physically isolated from the strain in the structure. Epsilon Optics has developed a temperature sensor kit comprising a number of self-adhesive laminates which enable a temperature sensor to be quickly and reliably assembled within the laminate stack during lay-up.

Embedded fibre management

A similar system of self-adhesive laminates can be used to manage excess lengths of optical fibre within the lay-up and avoid the problems of optical fibres crossing one another (which can result in fibre breaks or high optical loss).

Patent No. GB2505736

For more information please contact:

Epsilon Optics Ltd.

Tel. +44(0) 1425 655027

Link: http://www.epsilonoptics.com