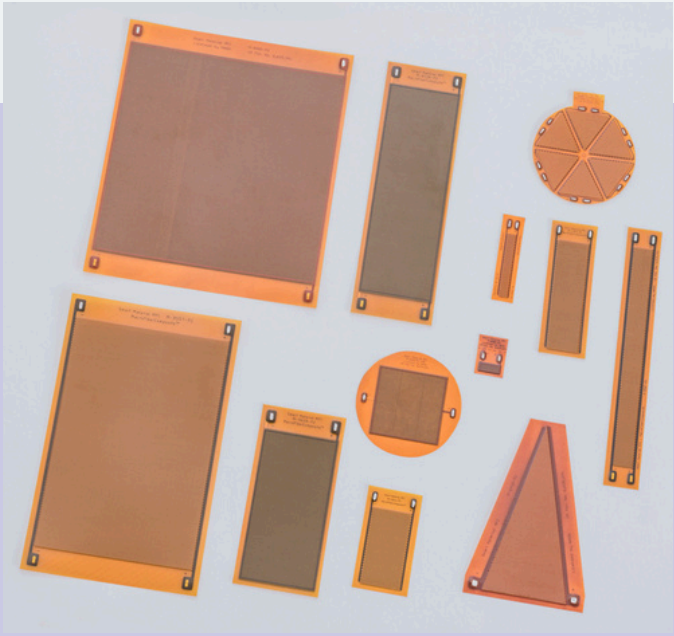
SMART MATERIAL

Macro Fiber Composite™ (MFC)

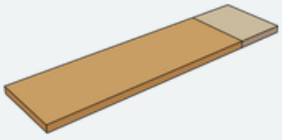
The leading low-profile actuator, sensor and generator device

Smart Material's Macro-Fiber Composite™ technology offers high performance, precision, and durability, delivering tailored solutions for aerospace, automotive, energy, and structural health monitoring applications.
Aerospace applications include active wing morphing, surface control and de-icing for fixed wing drones.

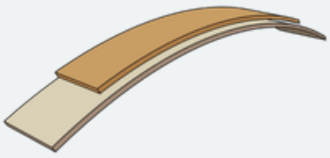
- Flexible, durable and reliable
- Increased strain actuator efficiency
- Directional actuation and sensing
- Damage tolerant
- Conforms to surfaces
- Various piezo ceramic materials available



How do MFC work?
The MFC consists of rectangular piezo ceramic rods sandwiched between layers of adhesive, electrodes, and polyimide film.



Expansion



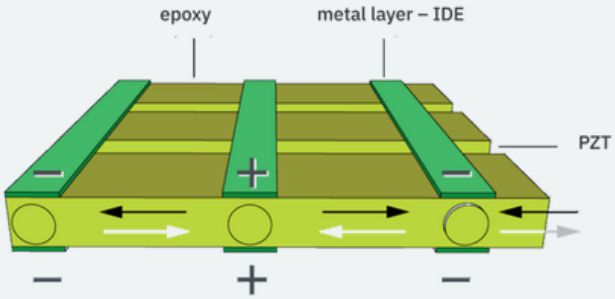
Bending



Torsion

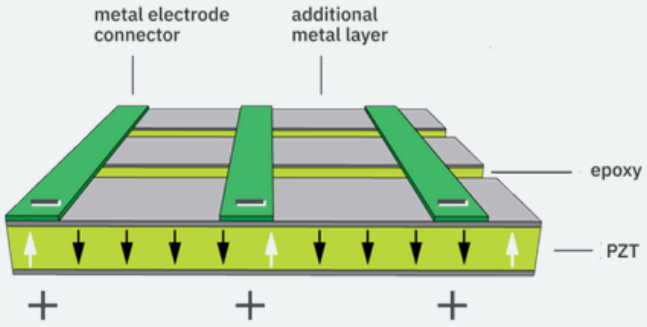
SMART MATERIAL

MFC P1 type

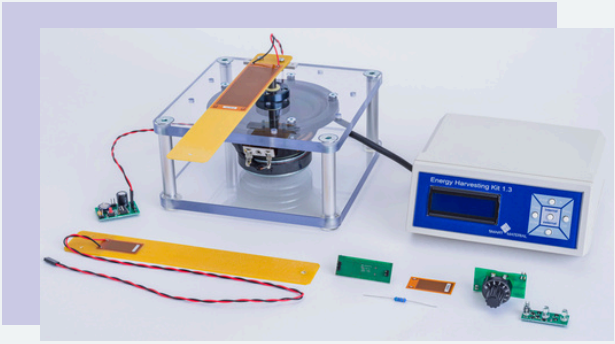


The electrodes are attached to the film in an interdigitated pattern which transfers the applied voltage of the MFC structure directly to and from the ribbon-shaped rods
This assembly enables in-plane poling, actuation, and sensing in a sealed and durable ready-to-use package.

MFC P2 type



Between the inderdigitated finger layer and the composite cernel additional aconductive layers are applied on both sides.
The applied or generated voltage generates an electrical field through the thickness of the piezoceramic rods. The interdigital electrodes of each level are connected to each other.
They act as a redundant collecting electrodes.





The MFC was invented by NASA in 1999. In 2002, Smart Material started commercializing this invention worldwide as NASA's licensed manufacturer and distributor.