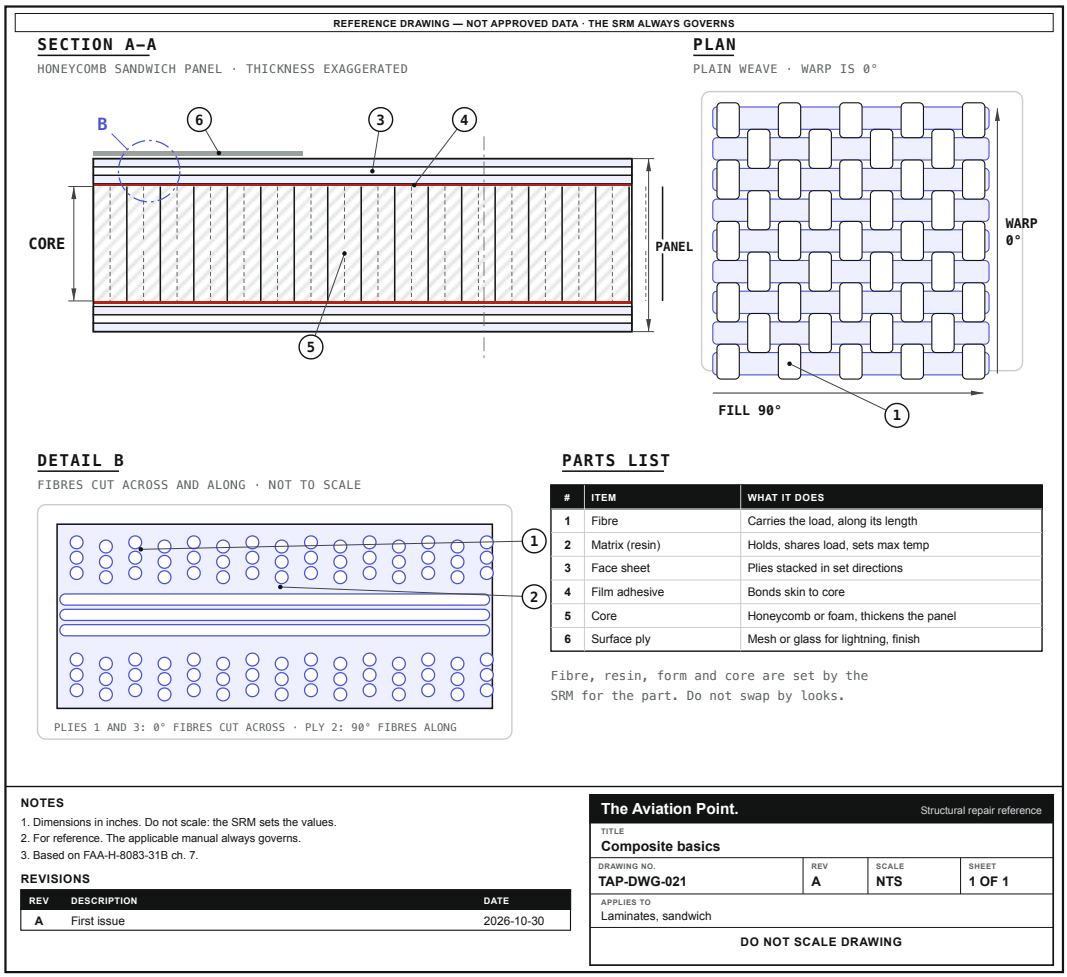
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Composite Basics: Fibre, Resin, Form and Core

Fibre · resin · form · core, and what to watch for each



Section, plan of a plain weave, detail of the fibres in resin and parts list, after FAA-H-8083-31B pp. 7-2, 7-3, 7-10 and 7-11.

The fibres: what each is for and what to watch

Fibre	Look	Typical use	Watch for
Fiberglass (E-glass; S-glass and S2-glass for higher strength)	White	Secondary structure: fairings, radomes, wing tips, rotor blades	Lowest cost; does not conduct electricity; resists chemical and galvanic corrosion
Aramid (Kevlar)	Yellow	Areas prone to impact damage	Weak in compression; absorbs water (service reports up to 8 % of its weight), so seal it; fuzzes when cut, needs special scissors
Carbon / graphite	Grey or black	Floor beams, stabilisers, flight controls, primary fuselage and wing	3 to 10 times stiffer than glass; galvanic corrosion with metal fasteners and structure; needs lightning-strike mesh or coating; costly
Boron	Prepreg tape only	Repair of cracked aluminium skins; mainly military	Stiff, thick, will not follow contours; costly and hazardous to handle

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The resins: what each is for

Resin	What the Handbook says	Where you meet it
Polyester	Cheap, fast processing, for low-cost applications	Wet layup, cabin and fairing parts
Vinyl ester	Handles like polyester; better corrosion resistance and mechanical properties	Where polyester is not enough
Phenolic	Low smoke and low flammability	Interior parts
Epoxy	High strength and modulus, low volatiles, good adhesion, low shrinkage; brittle, loses properties with moisture; slower to cure than polyester	Prepreg, structural adhesives, most repairs. Cure from room temperature to about 350 °F; most common 250 to 350 °F
Bismaleimide (BMI), polyimide	Higher temperature capability than epoxy; polyimide cures above 550 °F	Engines and hot structure
Thermoplastics	Soften again when heated; no chemical cure in processing	Some secondary and primary structure

Key points

- **Fibre direction is strength direction.** Same material, same direction.
- **Matrix** sets the maximum service temperature.
- **Carbon on aluminium:** galvanic corrosion; carbon facings never on aluminium core.
- **Aramid** absorbs water: seal it.
- **Prepreg:** freezer below 0 °F, thaw sealed, elevated cure.
- **Wet layup at room temperature** does not restore a 250 or 350 °F original.

SOURCES · FAA-H-8083-31B, AMT Handbook — Airframe, Volume 1, Chapter 7

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