THE AVIATION POINT · THEAVIATIONPOINT.COM · THE AVIATION POINT · THEAVIATIONPOINT.COM

Guide to Aircraft Composite Materials

Composite materials are chosen as a set: a fiber, a resin and often a core.

Reinforcing fibers

Fiber	Density	Tensile strength	Tensile modulus	Role and warning	Page
E-glass	not stated	fabric 80–750 lbf/in	not stated	Low cost, non-conductive; secondary structure	E-glass
S-glass / S2	not stated	+15% over conventional glass (AGY, strand)	+25% (AGY)	Structural fiberglass	S-glass
Carbon, standard (T700S)	1.80 g/cm³	711 ksi (4,900 MPa)	33.4 Msi (230 GPa)	Stiff; lightning, galvanic	Standard modulus
Carbon, intermediate (T800S)	1.80 g/cm³	853 ksi (5,880 MPa)	42.7 Msi (294 GPa)	Stiffer, stronger	Intermediate modulus
Kevlar 49 (aramid)	1.44 g/cm³	435 ksi yarn (3,000 MPa)	16.3 Msi yarn (112,400 MPa)	Impact tough; weak in compression; absorbs water	Kevlar

Core materials

Core	Key point	Data in this site	Page
Nomex honeycomb	Most common aircraft core	HRH-10 1.8–9.0 lb/ft³	Nomex honeycomb
Aluminum honeycomb	Best strength-to-weight	CR III 5052, 3.1–8.1 lb/ft³	Aluminum honeycomb
Foam	Heavier and weaker than honeycomb	Rohacell 31-110 IG-F	Foam core

Resins, prepreg and consumables

Item	Key point	Page
Epoxy	High strength, brittle, moisture-sensitive; 250–350 °F most common cures	Epoxy
Polyester	Cheap, fast; low-smoke grades for interiors	Polyester
Vinyl ester	Polyester handling, better corrosion and mechanical properties	Vinyl ester
Phenolic	Low smoke and flammability; interiors	Phenolic
Prepreg	Frozen, limited out life, hot cure	Prepreg
Peel ply	Cured on, torn off before bonding	Peel ply
Bagging consumables	Breather weight follows pressure	Core and consumables
Glass cloth styles	7781, 120, 1581, 1080 and more	Glass fabric styles
Carbon fabric and tape	3K fabrics; UD tape	3K fabrics, UD

Key points

- **Not a selection tool.**
- **Values come from different manufacturers' sheets** and test methods.
- **Quartz fabric not covered:** no publishable data sheet could be verified.

SOURCES · FAA-H-8083-31B, AMT Handbook — Airframe, Volume 1, Chapter 7 · AC 43.13-1B, Change 1, Chapter 3, Fiberglass and Plastics · Toray Composite Materials America, TORAYCA T700S Standard Modulus Carbon Fiber Data Sheet · Toray Composite Materials America, TORAYCA T800S Intermediate Modulus Carbon Fiber Data Sheet · DuPont, Kevlar Aramid Fiber Technical Guide, Section II, Table II-1 and thermal properties · AGY, S-2 Glass fiber product page · Hexcel HexWeb CR III Corrosion Resistant Specification Grade Aluminum Honeycomb, Product Data Sheet · Evonik, ROHACELL IG and IG-F mechanical properties · Hexcel HexPly 8552 Product Data Sheet

SCAN · OPEN THIS GUIDE
theaviationpoint.com/materials/composites/aircraft-composite-materials/

Educational reference only, not approved data. Always consult the applicable SRM, AMM, or AC 43.13-1B and your certifying authority.