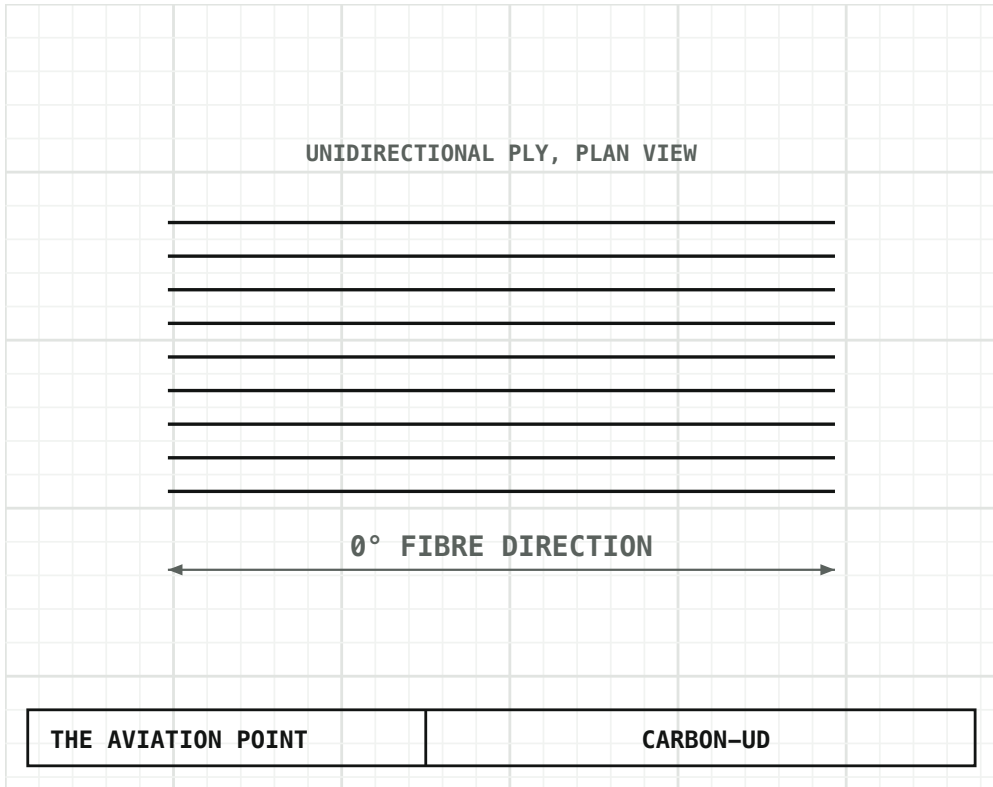
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The Aviation Point

Unidirectional carbon — carbon tape and unidirectional fabric

In a unidirectional (UD) ply every fiber runs the same way.



Schematic

Designation

Item	Value
Designation	Unidirectional carbon
Class	Composites
Type	carbon tape and unidirectional fabric

Strength along and across the fiber (Toray T700S/epoxy, 60% fiber volume)

Direction	Tensile strength	Tensile modulus	Ratio to 0° strength
0° (along fiber)	415 ksi (2,860 MPa)	19 Msi (134 GPa)	100%
90° (across fiber)	12 ksi (81 MPa)	—	about 3% (calculated)
In-plane shear	20 ksi (136 MPa)	—	about 5% (calculated)

Toray T700S data sheet, composite properties normalised to 60% fiber volume, cured with epoxy at 130 °C. T800S gives 477 ksi / 11 ksi (3,290 / 79 MPa). Ratios calculated by The Aviation Point.

Carbon tape prepreg (HexPly 8552)

Property	Carbon tapes
Resin content	33–38%
Flow	10–22%
Volatiles	1.0% max
Gel time at 350 °F	12–22 min

HexPly 8552 data sheet, US units, 2020.

Notes

- **Ratios are for one fiber and resin pair.**
- **Not a ply design.** The SRM gives plies, angles and cure.

SOURCES · Toray Composite Materials America, TORAYCA T700S Standard Modulus Carbon Fiber Data Sheet · Toray Composite Materials America, TORAYCA T800S Intermediate Modulus Carbon Fiber Data Sheet · Hexcel HexPly 8552 Product Data Sheet · FAA-H-8083-31B, AMT Handbook — Airframe, Volume 1, Chapter 7

SCAN · OPEN THIS DATA SHEET
theaviationpoint.com/parts/materials/carbon-ud/

Reference data. The aircraft manufacturer's documentation (SRM / IPC) takes precedence.