

GE Aerospace Widebody Engine Composites

						
		GE90-94B	GE80-115B	GEnx-1B	GEnx-2B	GE9X
Airframe		B777-200ER	B777-200LR/300ER	B787-8/9/10	B747-8	B777X
Year (EIS)		1995	2004	2011	2011	
Fan Blade	Key feature	1 st composite	Swept aero, wider chord	Improved efficiency	Optimized for B747-8	Wider, thinner, new materials
	Number of blades	22	22	18	18	16
Fan Case				✓	✓	✓
Outer Guide Vane						✓
Engine	Rated Thrust (k-lbf)	93.7	115.3	70-76	66.5	110

CMCs: Product Differentiation Enabled by a Breakthrough Material

Ceramic temperature capability with metal-like toughness

Novel Properties

CMC constituents

- **Fiber:** silicon carbide
- **Matrix:** silicon carbide & silicon
- **Coatings:** boron nitride

Ceramic temperatures

Metal-like durability

1.4MM fibers per in²

Engine Hardware

CFM LEAP

Stage 1 shroud (18)

- >74MM flight hours
- >225,000 shrouds since 2016

GE9X

- 5 components, 107 parts
- Stage 1 shroud, stages 1 & 2 nozzles, inner & outer liners
- FAA certified since 2020

Vertically Integrated Supply Chain

High-volume raw material

Huntsville, AL

- 250,000 sq ft
- 2018

High-volume component fab

Asheville, NC

- 140,000 sq ft
- 2014