

DURA-LIGHT® ***CARBON FIBER*** ***SHAFTS***

Lug, leaf, and
through shaft designs

Air-inflated,
mechanical, or
pneumatic/mechanical
operation

High Strength
Light Weight

*From the pioneer and leader in
composite shaft technology:*



DOUBLE E COMPANY, LLC

Excellence in Engineering



“Our shaft weight went from 90 to 50 pounds...my operators love Double E’s lightweight carbon fiber shafts.”

THE DURA-LIGHT® LINE

The Double E Company...

- Introduced carbon fiber shafts to the paper, film, and foil converting industries in 1986.
- Has manufactured more lightweight composite shafts, for more applications, than all other shaft producers combined.
- Double E offers the **longest, most comprehensive warranty** on all of its carbon fiber products.

How Dura-Light® Shafts Are Made

- Strands of carbon filament are impregnated with a thermo-set epoxy resin, wound at a precise helix angle in overlapping layers on a mandrel, and then cured.
- Resulting tubes are **a fraction of the weight of the equivalent volume of steel**, but equally as strong or even stronger.
- Double E winds and cures its own tubes in a state-of-the-art facility for **strict quality control and fast lead times**.

COMPARISON OF SHAFT HOUSING MATERIALS

MATERIAL	TUBE MODULUS OF ELASTICITY (E) 10 ⁶ PSI [GPa]		ULTIMATE STRENGTH TUBULAR FORM 10 ³ PSI [MPa]		DENSITY lb/in ³ [g/cm ³]	ENDURANCE RATING	STIFFNESS TO DENSITY RATIO
FIBERGLASS	2	[13.7]	50	[344]	0.09 [2.5]	GOOD	23
ALUMINUM (6061-T4)	10	[68.95]	35	[241]	0.1 [2.76]	POOR	100
ALUMINUM (7075-T6)	10	[68.95]	83	[572]	0.1 [2.76]	POOR	100
TITANIUM (6 AL-4V)	16	[110.30]	140	[965]	0.16 [4.43]	GOOD	100
STEEL - 4130 (COLD WORKED)	30	[207]	110	[758]	0.28 [7.75]	GOOD	107
STEEL - 4340 (HARDENED & TEMPERED)	30	[207]	160	[1103]	0.28 [7.75]	VERY GOOD	107
CARBON FIBER COMPOSITE (33 X 10 ⁶ FIBER FILAMENT MODULUS)	17	[117]	250	[1723]	0.06 [1.66]	EXCELLENT	283
CARBON FIBER COMPOSITE (56 X 10 ⁶ FIBER FILAMENT MODULUS)	30	[206]	263	[1813]	0.06 [1.66]	EXCELLENT	500
CARBON FIBER COMPOSITE (78 X 10 ⁶ FIBER FILAMENT MODULUS)	34	[234]	205	[1413]	0.06 [1.66]	EXCELLENT	567

COMPONENTS OF THE DURA-LIGHT

**RUST-PROOF
STAINLESS
STEEL
AIR VALVE**

**CARBON FIBER HOUSING PROVIDES
EXCEPTIONAL STRENGTH AT A
FRACTION OF THE WEIGHT OF STEEL;
AVAILABLE IN VARIOUS MODULI**

**SPECIALLY FORMULATED
BLADDER MATERIAL ENSURES
LUG COLLAPSE AND CONSIDERABLE
REMOVAL OF SHAFT FROM**



**UNIQUE BLADDER
ASSEMBLY ALLOWS
QUICK & EASY BLADDER
REPLACEMENT**

**ULTRA-DURABLE POLYPRENE BLADDER
RESISTS ABRASION AND PUNCTURE,
LEADING TO INCREASED BLADDER
LIFE AND REDUCED MAINTENANCE**

Dura-Light® Carbon Fiber vs. Metal

- Carbon fiber offers astounding “strength to weight” and “stiffness to weight” ratios as well as exceptional fatigue life.
- With few exceptions, any shaft currently made of steel, aluminum, or even titanium, can be replaced with a much lighter carbon fiber alternative with enhanced performance.
- Weight reduction reduces handling injuries and allows companies to comply with safety regulations.

BLADDER SHAFTS

- Available in lug or leaf designs.

THROUGH SHAFTS

- Used with core chucks to provide a lightweight shaft assembly (Double E manufactures a complete line of lightweight and durable core chucks).

MECHANICAL SHAFTS

- For high speed and/or heavy-weight applications requiring maximum torque capacity and minimum vibration.

- Mechanical design provides the most powerful gripping force possible.
- Activated by turning a crank (or impact wrench) that is inserted into the end of a journal.
- Requires just five cranks for full expansion – lugs rise concentrically to center the shaft in the core, minimizing the roll bounce common with other types of expanding shafts. Each lug set rises independently so every lug makes solid contact with the core.

DURA-LIGHT® CARBON FIBER SHAFTS *(available in sizes from 70mm up)*

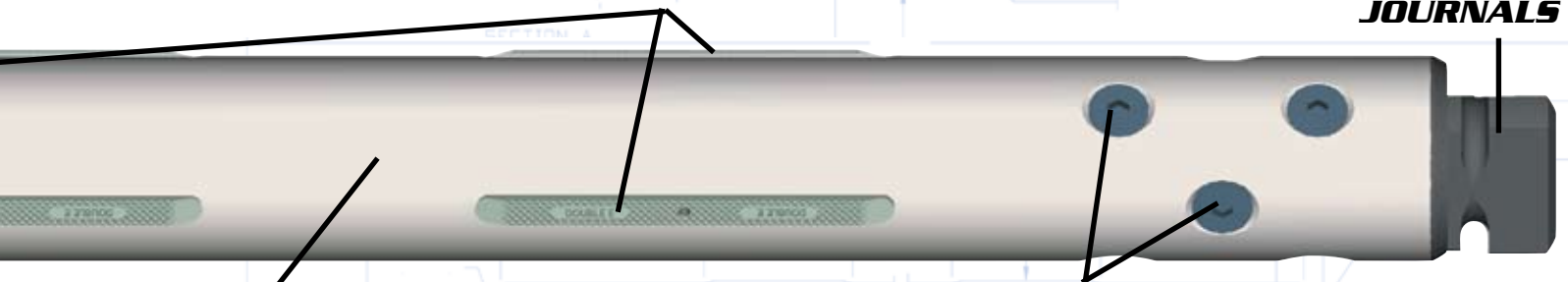
FEATURE	ADVANTAGE	BENEFIT
Carbon Fiber Housing Moduli: Medium (33 million) Ultra-High (56 million) Ultra-Ultra-High (78 million)	Low weight.	Fewer handling injuries lower worker's compensation expenses and non-productive time. Meet regulations for single person lifting.
	Less deflection.	Reduced vibration and less roll bounce. Heavier roll weights.
	High critical speed.	More throughput.
Sleeving	Protects carbon fiber from abrasion.	Long shaft life.
Polyprene Bladder	Stretches far less than traditional rubber.	Dependable lug collapse ensures consistent, easy removal of shaft from spent cores.
	More resistant to heat, puncture, and abrasion.	Far less bladder failure.
Springless Lugs	No springs to break and puncture bladder.	Longer bladder life.
	Diamond plate gripping surface.	Better grip with less slipping.
	Large surface area.	
Journal Fastening	No press fit facilitates journal removal.	Bladder replacement is quick and easy.

DURA-LIGHT® COMPOSITE BLADDER SHAFT

**POLYPRENE
LUGS DEPENDABLE
CONSISTENT, EASY
REMOVAL FROM CORES**

**DIE-CAST ALUMINUM LUGS,
MANUFACTURED WITH AN EXCLUSIVE
DIAMOND PLATE GRIPPING SURFACE
(STEEL LUGS OPTIONAL)**

**EASILY
REMOVED
HEAT TREATED,
ALLOY STEEL
JOURNALS**



**SLEEVING
PROTECTS CARBON
FIBER HOUSING
FROM ABRASION**

**PROPRIETARY FASTENING SYSTEM DOES NOT
REQUIRE A PRESS FIT - CLOSE TOLERANCE, DEEP
INSERTION OF JOURNALS, AND FLATHEAD SCREWS
ENSURE STRONG CONNECTION AND EASY MAINTENANCE**

COMPOSITE SHAFTS ~ CUSTOMER SPECIFICATIONS

Company Name: _____ Date: _____
Name: _____ Title: _____
Address: _____
City, State, Postal Code, Country: _____
Telephone: _____ Fax: _____

GENERAL SPECIFICATIONS

Actual Shaft Diameter: _____
Nominal Core I.D.: _____
Core Material: _____ Wall Thickness: _____
Core Manufacturer & Grade: _____
Steel-Capped Cores: All None Some
Shaft Overall Length: _____
Support Separation: _____
Bearing Material / Type: _____
Max. Roll Weight: _____
Max. Roll Width: _____ Diameter: _____
Other Roll Weight(s): _____
Other Roll Width(s): _____
Other Roll Diameter(s): _____
Min. Roll Weight: _____
Min. Roll Width: _____ Diameter: _____
Roll Position on Shaft: Left Right Center
Web Speed: _____ Tension (P.L.I.): _____

PRESENT APPLICATION

Equipment Manufacturer: _____
Machine Type: _____
Web Material: _____
Used On:
Unwind Rewind
Center Brake or Drive Surface Brake or Drive
Drum Supported Hoisted Slit Rewind
Max. # of Slit Rolls: _____ Min. Slit Width: _____
Min. Air Line Pressure Available: _____

PRESENT SHAFT

Manufacturer: _____
Material: _____ Wall Thickness: _____
Weight: _____ Quantity Required: _____

PROBLEMS W/ PRESENT SHAFTS:

Weight Deflection Maintenance
Other _____

Sketch shaft details (include all envelope dimensions). Please send shaft drawing if available.



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