

# ***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 <sup>6</sup> PSI [GPa]		ULTIMATE STRENGTH TUBULAR FORM 10 <sup>3</sup> PSI [MPa]		DENSITY lb/in <sup>3</sup> [g/cm <sup>3</sup> ]	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 <sup>6</sup> FIBER FILAMENT MODULUS)	17	[117]	250	[1723]	0.06 [1.66]	EXCELLENT	283
CARBON FIBER COMPOSITE (56 X 10 <sup>6</sup> FIBER FILAMENT MODULUS)	30	[206]	263	[1813]	0.06 [1.66]	EXCELLENT	500
CARBON FIBER COMPOSITE (78 X 10 <sup>6</sup> 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)*

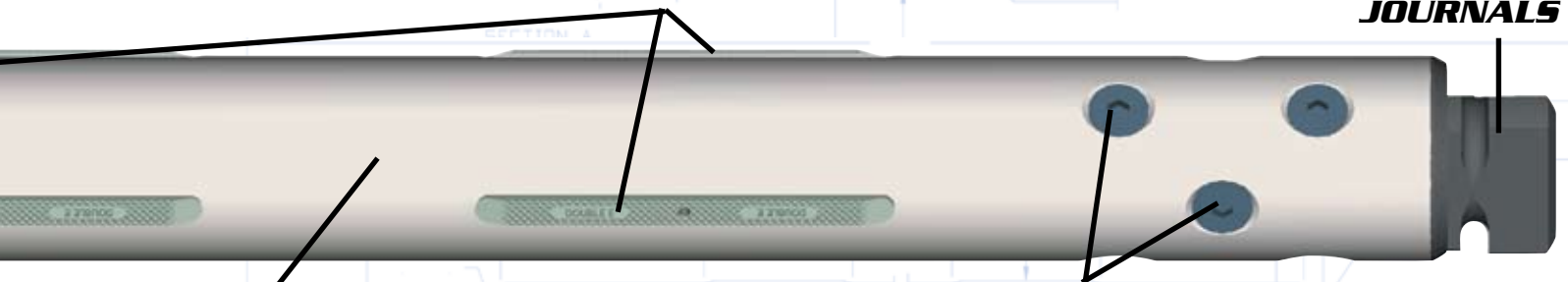
FEATURE	ADVANTAGE	BENEFIT
<b>Carbon Fiber Housing</b> Moduli: Medium (33 million) Ultra-High (56 million) Ultra-Ultra-High (78 million)	Low weight.	Fewer handling injuries lower worker's compensation expenses and non-productive time. Meet regulations for single person lifting.
	Less deflection.	Reduced vibration and less roll bounce. Heavier roll weights.
	High critical speed.	More throughput.
<b>Sleeving</b>	Protects carbon fiber from abrasion.	Long shaft life.
<b>Polyprene Bladder</b>	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.
<b>Springless Lugs</b>	No springs to break and puncture bladder.	Longer bladder life.
	Diamond plate gripping surface.	Better grip with less slipping.
	Large surface area.	
<b>Journal Fastening</b>	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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