



# Carbon Fiber Composite Drive Shafts & Couplings



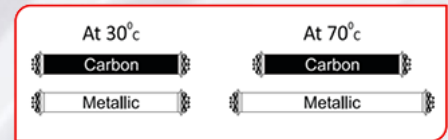




## Key features and advantages

### Dimensional stability

The lower coefficient of thermal expansion of superior composites that are used results in higher dimensional stability of the drive shaft resulting in reduced stresses, vibrations and increase in service life.



### Independent of direction of rotation

The drive shafts are designed to rotate in both directions and so are well suited for reverse operation as well.



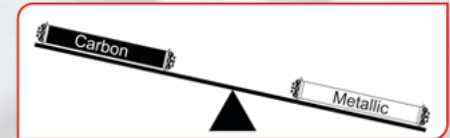
### Long spans

Higher stiffness of the composite shafts provides for longer spans without the need of any intermediate bearings.



### Light weight

Carbon Fiber Composites drive Shafts weight less than 1/3rd of an equivalent metallic drive shaft. This is possible because of very high specific stiffness of the material.



### Higher misalignment capabilities

The drive shafts are capable of withstanding higher angular misalignments, more than 10 for each flexi disc.



### Smoother operation

Composites have a higher dampening capacity and hence offer lesser vibrations and noise. This helps increase the operational life of other connected mechanical equipment's.



### Inherent corrosion resistance

The shafts, flanges and flexible couplings are made from composites while the hubs and hardware are made from SS-316, giving the drive shafts very high corrosion resistance. Specific additives further offer UV resistance to the equipment.



## Cooling Tower Drive Shafts

With the increase in demand for higher torque capabilities for long span drive shafts, we have developed our composite drive shafts to serve challenging industrial needs. These are highly engineered, non-lubricated, single span, advanced composite drive shafts for superior load applications and rugged environments. This has only been possible through our rich experience in the cooling tower industry.

Carbon light Drive Shafts are excellent for industrial cooling tower applications providing the following features:

- Inherent corrosion resistance
- High misalignment capability
- Superior fatigue life
- Smoother operation
- Easy installation

### Product design:

**Central Carbon composite shafts** is made from high modulus carbon fiber for additional longitudinal stiffness making long span drive shafts possible. This eliminates need of having any intermediate bearing housing, thereby increasing the effectiveness of power transmission.

**Carbon composite flanges** make use of continuous fiber placement technique where the fibers are placed at angles best suited for torque transmission. This further increases the stiffness required at the areas that come in direct with the driving bolts. Since Flanges are made from composites as well; they form an integral part of the central member making the assembly nearly indestructible.

**Flexi discs** make use of thin discs made from advanced composite materials for extremely high fatigue life. When unitized together, they offer low axial and angular restoring forces. They are further encapsulated with a micro cellular urethane elastomeric for its vibration dampening properties and protection from harsh cooling tower environments.

**Hubs/Hardware** are made from stainless steel 316 for superior corrosion resistance in acidic and saline water applications.

\*Hubs can be made available in K-500 Model if requested for at the time of order.

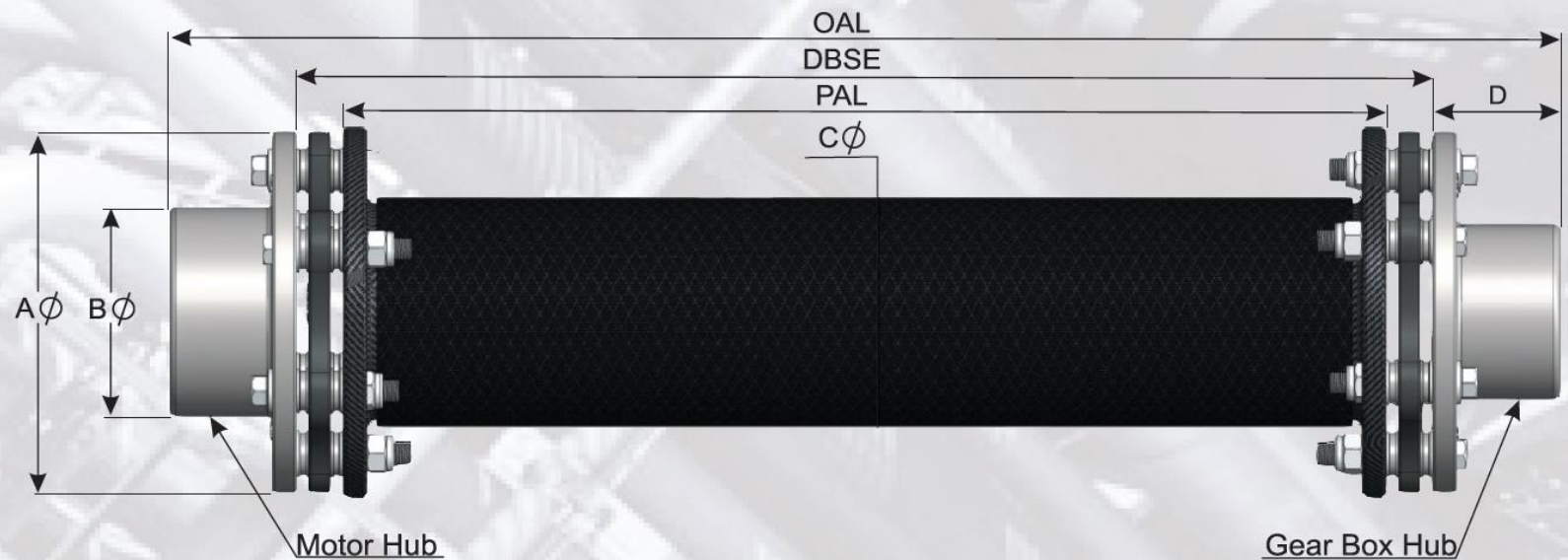




**Table 1, Engineering Data and Dimensions:**

Models	Tubes Size	Max. DBES @1500 rpm@ 1.2 SF	Max. DBES @1800 rpm@ 1.2 SF	Max. bore Size		Min. bore dia.	A	OC		OC	D	Mini DBSC
				Standard	Oversized			Standard	Oversized			
NSCF50	2	29755(117.13)	2730(107.48)	42(1.65)	65(2.55)	25(0.98)	138(5.43)	62(2.44)	87(3.43)	67(2.64)	60(2.36)	214(8.43)
NSCF75	3	3586(141.18)	3295(129.72)	60(2.36)	75(2.95)	35(1.37)	165(6.439)	84(3.30)	109(4.29)	96(3.78)	65(2.56)	244(9.61)
	4	3740(147.63)	3350(131.88)							108(4.25)		
NSCF100	4	3995(157.28)	3698(145.59)	80(3.14)	110(4.33)	45(1.77)	190(7.48)	94(3.70)	137(5.39)	122(4.80)	70(2.76)	288(10.94)
	5	4470(175.98)	4180(164.56)							145(5.71)		
	6	4675(184.06)	4290(168.89)							160(6.29)		
	7	5370(211.42)	4950(194.88)							200(7.87)		
	8	5700(224.41)	5265(207.28)							225(8.86)		
NSCF150	4	3995(157.28)	3698(145.59)	80(3.14)	110(4.33)	45(1.77)	190(7.48)	94(3.70)	137(5.39)	122(4.80)	70(2.76)	288(11.34)
	5	4470(175.98)	4180(164.56)							145(5.71)		
	6	4675(184.06)	4290(168.89)							160(6.29)		
	7	5370(211.42)	4950(194.88)							200(7.87)		
	8	5700(224.41)	5265(207.28)							225(8.86)		
NSCF200	6	4675(184.06)	4290(168.89)	85(3.34)	120(4.72)	45(1.77)	235(9.25)	120(4.72)	167(6.57)	160(6.29)	80(3.15)	362(14.25)
	7	5370(211.42)	4950(194.88)							200(7.87)		
	8	5700(224.41)	5265(207.28)							225(8.86)		
	10	7000(275.59)	6481(255.12)							260(10.24)		
Unit of Measure		mm(in)	mm(in)	mm(in)	mm(in)	mm(in)	mm(in)	mm(in)	mm(in)	mm(in)	mm(in)	mm(in)

- All dimension data is subjected to change without prior notice.
- Maximum DBSE is based on a minimum safety factor of 1.2 for critical speed as per common practices for composite Drive shafts.
- Bores and keyways are designed as per ANSI/AGMA 9112--A04
- Mass elastic properties and other characteristics are based– on ANSI/AGMA 9104-A06.



- (I) OAL: Over All Length  
(ii) DBSE: Distance between Shafts Ends  
(iii) PAL: Pipe Assembly Length



Table 2, Torque and Moment of inertia:

Models	Tubes Size	Continuous Torque @ 1.0 SF	Continuous Torque @ 2.0 SF	Peak Overload Torque	Weight @ min. DBSE	Moment of inertia(WR <sup>2</sup> ) @ min. DBSE	Weight change as per length	Moment of inertia(WR <sup>2</sup> ) Change per Length
NSCF50	2	700(6195)	350(3098)	1050(9293)	6.1(13.42)	0.0145(49)	1.24(0.0693)	0.0013(0.1125)
NSCF75	3	1140(10480)	592(5240)	1776(15720)	9.7(21.34)	0.0285(97)	1.79(0.1)	0.0034(0.2945)
	4				10.2(22.44)	0.0324(110)	1.9(0.1)	0.0045(0.3893)
NSCF100	4	1680(14870)	840(7435)	2520(22305)	14.8(32.56)	0.0550(188)	2.29(0.1279)	0.0071(0.6149)
	5				15.9(34.98)	0.0563(190.8)	3.05(0.1704)	0.0131(1.1346)
	6				16.5(36.3)	0.0649(221)	3.39(0.1894)	0.0178(1.5417)
	7				18.2(40.08)	0.0724(2.45)	3.68(0.206)	0.02114(1.8292)
	8				19.27(42.39)	0.0912(309)	4.12(0.2307)	0.02542(2.1995)
NSCF150	4	2850(25225)	1425(1262)	4275(37837)	15(33)	0.0573(195)	2.29(0.1279)	0.0071(0.6149)
	5				16.16(35.33)	0.062(211)	3.05(0.1704)	0.0131(1.1346)
	6				17.19(37.82)	0.0649(211)	3.39(0.1894)	0.0178(1.5417)
	7				19.93(43.84)	0.0692(234)	3.42(0.1915)	0.0198(1.7132)
	8				21.6(47.52)	0.0898(304)	3.512(0.1966)	0.0214(1.8517)
NSCF200	6	4235(37483)	2118(18746)	6352(56220)	24.4(53.68)	0.1419(484)	3.39(0.1894)	0.0178(1.5417)
	7				28.11(61.84)	0.1782(608)	4.26(0.2380)	0.0356(3.0834)
	8				29.9(65.8)	0.1853(633)	4.81(0.2688)	0.0512(4.4346)
	10				36.22(79.68)	0.2703(923)	5.57(0.3113)	0.0798(6.9117)
Unite of Measure		Nm(lb-in)	Nm(lb-in)	Nm(lb-in)	Kg(lb)	Kg-m <sup>2</sup> (lb-in <sup>2</sup> )	Kg/m(lb/in)	Kg-m <sup>2</sup> /m(lb-in <sup>2</sup> /in)

• All design data is subjected to change without prior notice.  
 • The standard weight and moment of inertia values are calculated at the minimum drive shaft DBSE with minimum bore sizes for a complete assembly.

### Continuous Drive Torque is calculated as follows:

$$T_{\text{cont.}} = \frac{P \times 9549}{N}$$

Where,

$T_{\text{cont.}}$  = Driving Torque (Nm)

P = Motor Power (KW)

N = Drive Shafts Speed (RPM)

$$T_{\text{cont.}} = \frac{P \times 63025}{N}$$

Where,

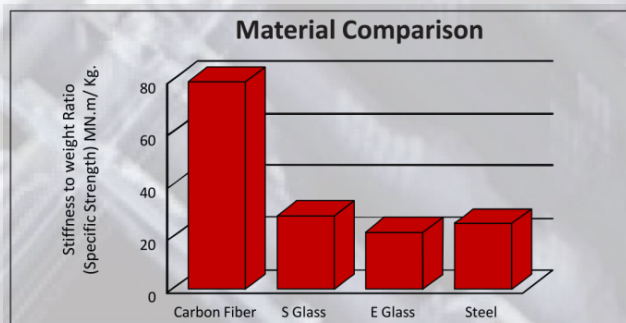
$T_{\text{cont.}}$  = Driving Torque (lb-in)

P = Motor Power (HP)

N = Drive Shafts Speed (RPM)

### Each Carbon Light Shafts is rigorously test for its performance before dispatch

- Dynamically balanced as per ISO 1940-1:2003, grade 6.3
- Tested at 3 times the continuous torque on our torque Testing Machine.
- Flexural tested for up-to 10,000 times at rated torque.
- Each drive shafts is checked for its critical speed on our specially designed speed testing rig.
- ATEX(CE) certified for use in the most critical and challenging environment.







#### WARRANTY

Carbon light warrants the end user that the product will be free from defects in material or workmanship, under normal use and service for a period of one year or otherwise longer in case the warranty period is extended at the time of sale. If a user discovers that product is unable to confirm to its requirements within the warranty period, then it must swiftly notify the seller in writing. Carbon light's obligation under this warrant shall be, at Carbon light's option and expense, to either (I) repair the defective part or product, or (ii) deliver the user an equivalent part or product to replace the defective products or (iii) if neither of the tow aforementioned options are reasonable, Carbon Light may, in its sole discretion, refund the user the purchase price paid for the defective product. All products replaced under this scheme will become property of Carbon Light.

#### NOT COVERED UNDER WARRANTY

The warranty shall be void in case the products is not installed, operated, maintained and serviced as per Carbon light requirements or subjected to operation loads higher than the published limits. The warranty does not cover damage resulting from (I) improper use, abuse or accident; (ii) modifications, tampering or alterations to the hardware; (iii) abnormal operation conditions or application beyond the product specifications; (iv) repair by the user or any third party with written consent from Carbon Light.

#### DISCLAIMER OF WARRANTY

Under no circumstances shall Carbon Light be liable for any incidental, special or consequential damages or loss, including without limitation, lost profits or the inability to use equipment, whether such damages are based upon a breach of express or implied warranties, breach of contract, negligence, strict tort, or any other legal theory.

The information provided in this catalogue contains technical specifications for performance which in case of actual use may not always apply as published or which may change as a result of further development of the products. An obligation to provide the respective information shall only abide if expressly in the terms of contract. Carbon light reserves the right to change technical specifications without prior notice.



# Cooling Tower Drive Shafts Application From

Company:	Date:
Name:	Location:
Telephone:	E-mail:

## Motor Specifications:

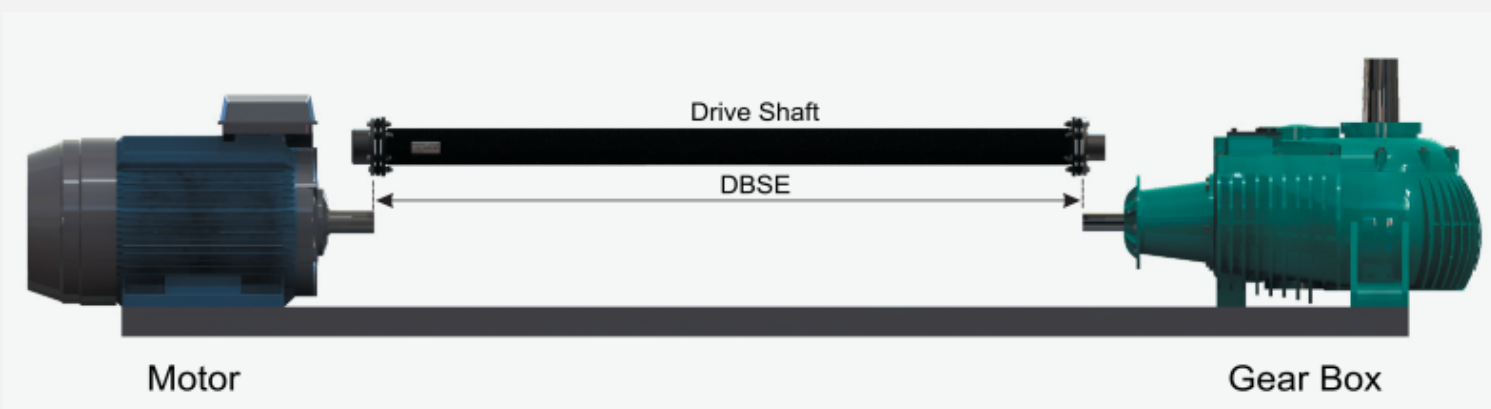
DBSE (Distance Between Shafts End):
Motor Power:
Motor Speed:
Motor Frame Size:
Motor Shaft Diameter:
Keyway Size:

## Gear Box Specifications:

Reduction Ratio:
Input Shafts Diameter:
Keyway Size:

## Fan Specifications:

Diameter:
Fan RPM:
Number of Fan Blades:



## Carbon Light

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