



Shakespeare Composite Structures™



THE SHAKESPEARE STORY. . .

Our first innovation in the composite light pole business was to originate the fiberglass light pole. Building logically on composites technologies developed for fishing poles and other products, our engineers scaled the manufacturing processes upward to create a strong, durable light pole with properties that have literally revolutionized the industry.

Over the years, continued Shakespeare Composite Structures™ innovations have improved the product and design and extended the very concept. We've added proprietary and custom formulated resins, high performance coatings and Shakespeare-patented assembly techniques (for example, on Breakaway poles), to achieve unmatched quality and durability across our extensive line of innovative products.

Tuff-Poles® are the next generation in composites technologies, coupled with advanced, computer-driven process monitoring, computer aided design and modeling techniques and computer assisted quality assurance controls. These advances deliver a stronger, lighter, better looking pole that can be held to tight manufacturing tolerances.

FILAMENT WOUND, ROUND

Round Tapered poles start with the company's specially engineered filament winding process on equipment built and engineered by Shakespeare Composite Structures. Fiberglass strands impregnated with custom formulated resins are spiraled onto a rotating, heated mandrel. Under continuous, uniform tension, the helical winding is applied at low angles for axial strength. Additional, circular windings provide compression strength.



Linked to a sophisticated computer CAD system, the winding process is computer driven for precision and repeatability – a Shakespeare innovation.

From the beginning, colour pigments are formulated into the resin itself. The result is a one-piece, fiberglass composite pole with a naturally textured finish that shows off the shape of the strands of fiberglass which created it.


SQUARE POLES

Our 4x4 and 5x5 Straight Square poles are "pultruded" in one piece by pulling the shape through special dies. Their exceptional strength derives from the fiberglass strands which traverse the length of the poles. Straight Square Tuff-Poles® are yet another Shakespeare Composite Structures™ innovation.

DIRECT BURIAL POLES

Shakespeare's Direct Burial style poles are designed to mount directly into the ground. During their initial manufacturing stages, we apply an anti-rotation flare that is integral to the structure of the pole. The flare is constructed of the same composite which forms the rest of the pole. Direct burial poles can provide substantial installation cost savings.

FINISHING OPERATIONS

Whether round or square, after manufacturing Shakespeare fiberglass poles are cured and cooled, then finished with proprietary coatings. Our high-performance polyurethane coatings are pigmented throughout in the finished colour of the pole and provide extended UV protection. Strong ultraviolet rays will deteriorate unprotected resins over time, so our engineers have developed a system of UV inhibitors for both the resin and the coatings.

BREAKAWAY POLES

Designed to reduce injuries in the event of vehicular impact, Breakaway Tuff-Poles® are specially built to break away, in accordance with FHWA guidelines. The poles are required in certain applications near roadways. Shakespeare made the first direct burial Breakaway poles and holds patents on the joining techniques with which the poles are assembled.

STUB AND HINGE POLES

Lighting a subdivision is easier with Shakespeare's innovative Stub Poles. The poles are filament wound in two pieces, one of which is buried to just above ground level. After final grading and wiring are completed a construction crew can quickly



and easily install the finished poles, without concern for damage by grading and construction equipment.

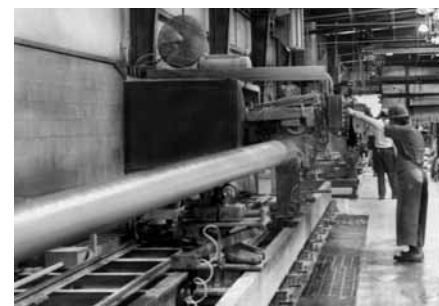
Our Tuff-Hinge poles address the servicing of luminaires in areas where heavy lift trucks are difficult or unwelcome. The poles simply hinge over, to permit ground-level service to the luminaire, and then snap back into place (lock if desired), when done. You don't even need a ladder.

ACCESSORIES

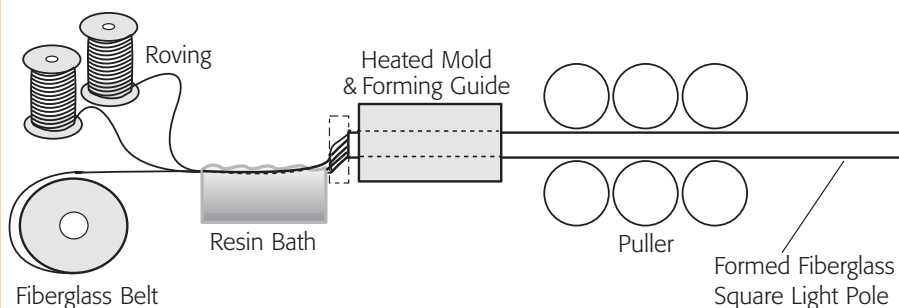
In addition to Tuff-Poles®, Shakespeare makes an extensive line of accessories such as arms, mast arms, brackets, shrouds and a great protector that shields against string

trimmers. You can also select from a variety of decorative luminaires. All of our poles can be custom fitted to your specifications for a manufacturer's luminaires or other attachments. Factory drilling can save you time and money in the field. Simply specify the options and provide the appropriate templates, dimensions, and instructions.

After more than three decades, hundreds of thousands of Shakespeare composite poles stand tall from coast to coast, weathering every storm, every season. Impervious to the elements, to woodpeckers, and to insects, they won't rust or rot and their lustrous beauty will be there to light the way for future generations, standing against the strongest winds.



PULTRUSION PROCESS FOR FIBERGLASS REINFORCED COMPOSITE POLES



COMPOSITE TUFF-POLES®: THE PRIMARY ADVANTAGES

LIGHT IN WEIGHT



Feather weight Shakespeare composite Tuff-Poles® save time, labor and equipment during installation. Many new construction projects or renovations can be entirely erected by a two-or three-person crew—without expensive cranes or lifting equipment. In addition, our Direct Burial style Tuff-Poles® can be set with substantially reduced site preparation, such as minimal construction equipment, less traffic disturbance resulting in fewer cost expenditures.



LOW MAINTENANCE



Rust is a foreign concept to composite Tuff-Poles®. They'll look their best without scraping, priming, or painting, being virtually maintenance free over the entire life of the pole. They won't weaken from rust or rot, so they won't have to be periodically replaced.

Shakespeare composite poles will outlast wood, aluminum, steel and concrete under the same climatic conditions. The result: superior versatility, beauty and owner satisfaction—coupled with a much lower cost over the life of the pole.



COLOUR FAST THROUGHOUT

Shakespeare Composite Structures™ pigments the resins during manufacture of composite poles. In addition, the poles are coated with a custom formulated, proprietary, polyurethane containing UV inhibitors to help prevent fading.

PRICE AND AVAILABILITY



A composite pole costs less to own than one made of metal or concrete. Fiberglass composite usually costs less to buy, in the first place. Shipping costs are

substantially lower than for concrete and metal poles. Maintenance costs are virtually zero; conventional poles which have to be stripped and repainted over and over end up costing many times their original price. Specifying poles in our Quick Ship program assures you of timely delivery to your site.



NONCONDUCTIVE



Fiberglass reinforced composites are not electrically conductive, so Shakespeare poles can greatly reduce the hazard of accidental electrocution and resulting liability.

PERFORMANCE!



High winds and large loads are no problem. Tuff-Poles® are engineered to withstand the sustained winds specified. Wind loading for all Shakespeare poles is calculated in accordance with the AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Test Data and engineering specifications are available on request.

Composite poles actually get stronger at extreme low temperatures, so low temperature performance is exceptional.

NONCORRODING



Air is one thing, but soil is another. Direct Burial poles exist partly in air, partly embedded in soil or concrete. Our noncorroding composites won't deteriorate in acid soil, acid rain, or salt air. Insects won't eat it and birds won't peck it.

A complete Shakespeare Composite Structures™ Composite Tuff-Pole® catalogue number includes all of the information detailed below, in order from left to right, including the dash. The letters and numbers to the left of the dash are the basic catalogue number found in the listings of the poles. Poles with mast arms include two digits to the right of the dash. The remainder of the catalogue number details the options which you can specify in the order listed to define accessories, handholes, colours, etc. Please use the standard

specification for these options whenever possible.

You can assemble your own catalogue numbers, or call for assistance. Most of the available options are listed in the template. Call for information on all other options.

HOW TO USE THIS MANUAL

To decide which Tuff-Pole® you need, first consider your application: Anchor Base or Direct Burial. Shakespeare Composite Structures™ recommends Direct Burial style poles for cost efficiency and ease of

installation, if your application permits. Next choose round or square, standard or Breakaway, hinge or stub styles and the method of luminaire attachment and wiring access. Then, using your required mounting height, wind speed and the total EPA and weight of all intended attachments, select a pole with loading ratings that meet your needs.

If you need help choosing or specifying our experienced staff will be glad to help. Just call.

BASE CATALOGUE NUMBER

A	S	W	30
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BASE TYPE*

A – Anchor Base
B – Direct Burial

NOTE:
For Anchor Bolts see page 808 at bottom.

ADD "W"

to Series for Breakaway Poles

SERIES

(from Spec. Charts)

S	O	H	X
A	B	C	D
G	Q	R	T

CATALOGUE LENGTH (FT.)

Not Mounting Height

OPTIONS

01	N2	BB	01
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LUMINAIRE MOUNTING

00 – Capped Only (Not predrilled)
01 – 3" Tenon (1-9/16" min. ID x 3-3/4" long)
02 – 2-3/8" Tenon (1-3/16" min. ID x 3-3/4" long)
03 – 4" Tenon (3-1/4" ID x 6" long) · not available on AS10 through AS25 or BS10 through BS25
04 – 3" Tenon (2-5/8" ID x 2" long) · AO and BO series only - suitable for most in-line ballast fixtures
08 – Capped and predrilled for our single 8" to 30" arm
09 – Capped and predrilled for our twin 8" to 30" arms
10 – Capped and predrilled for our single 4' to 12' mast arm
20 – Capped and predrilled for our twin 4' to 12' mast arms
15 – Capped and predrilled for our single 15' truss arm
25 – Capped and predrilled for our twin 15' truss arms
99 – Other (specify)

HANDHOLE (WITH REMOVABLE COVERS)

Distance from base of Pole	(Some models)		
	2-1/2"x5" Oval	4"x6" Oval	4"x12" Oval
NONE	AA	AA	AA
18" (Anchor Base only)	BB	CB	DB
54"	BC	CC	DC
66"	BE	CE	DE
78"	BG	CG	DG
90"	BI	CI	DI
102"	BK	CK	DK
Other (specify)	BZ	CZ	DZ

FINISH & COLOUR

N=Natural · S=Smooth

Colour	Natural	Smooth
Black	N1	S1
Gray	N2	S2
Brown	N3	S3
Light Green	N4	S4
Dark Bronze	N5	S5
Silver	N6	S6
White	N7	S7
Dark Green	N8	S8
Premium	N9	S9
(specify by colour name)		
Custom	N9	S9
(contact factory)		

CONDUCTOR ENTRANCE, SIZE AND LOCATION

Distance from base of Pole	1 ea.		2 ea.	
	2-1/4" dia. Grommeted	2-1/4" dia. No Grommet	2-1/2"x6"	2-1/2"x6"
NONE	01	01	01	01
12"	38	39	42	43
24"	08	09	12	13
36"	20	21	24	25
48"	32	33	36	37
60"	44	45	48	49
Other (specify)	99	99	99	99

Sample Catalogue No: AR25-99-S9-BB-01-D2 @ 180° - SBX4
 25' high, 5" square pole, smooth finish - medium bronze - drilled 2 sides at 180° for Day-Brite SBX400

NOTE: To match Gardco and Day-Brite bronze colour specify "9" - medium bronze
 NOTE: All boxes must be filled out

*Order logic and specifications for Tuff-Stub base poles are detailed in Shakespeare Composite Structures™ publication LSP-1. Order logic and specifications for Tuff-Hinge hinged base poles are detailed in Shakespeare publication LHP-1.

THOMAS
LIGHTING CANADA

www.thomaslightingcanada.com

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Your finished specification should also state the EPA ratings you require, and include maximum deflection and minimum pole weight. To help you prepare your specifications documents, this sample specification is available in a variety of electronic formats on floppy disk for easy import into your wordprocessor.

LIGHTING POLES SPECIFICATION

1. Lighting poles shall be fiberglass reinforced composite, Shakespeare Composite Structures design.
2. Wind loading shall be calculated for appropriate wind velocity plus a 30% gust factor, per AASHTO Standard Specification for Structural Support for Highway Signs, Luminaires and Traffic Signals.
3. Effective projected area (EPA) is the actual area adjusted with the appropriate drag coefficient (shape factor) to result in an equivalent area having a drag coefficient equal to one (1).

MATERIALS

1. **(A)** The (round) pole shall be constructed by the filament winding process from thermosetting polyester resin and contain a minimum of 65 percent "E" type fiberglass by weight. The filament windings shall be continuously applied with uniform tension and shall be placed on the pole helically at low angles to provide axial strength. Additional windings shall be placed on the pole in a circular manner to provide compressive strength.
1. **(B)** The (square) pole shall be constructed by the pultrusion process from thermosetting polyester resin and contain a minimum of 65 percent "E" type fiberglass by weight.
1. **(C)** The (tapered square) pole shall be constructed by the filament winding process from thermosetting polyester resin and contain a minimum of 65 percent "E" type fiberglass by weight. The filament windings shall be continuously applied with uniform tension.

2. The resin used to make the pole shall be ultraviolet resistant and pigmented approximately the same colour as the final coating to be applied. The colour shall be uniform throughout the entire wall thickness of the pole. A highly weather resistant, pigmented, polyurethane coating shall be applied to the pole. The coating shall have a minimum dry film thickness of 1.5 mils.
3. The surface of the pole shall have a (smooth or natural) finish that shall be uniform along the entire length of the pole.
4. The pole shall be flame resistant in accordance with ASTM D635. Specimens must cease to burn before the gauge mark of 100mm (3.9 inches) is reached.
5. (If applicable) The pole shall be delivered predrilled and capped (if applicable) to accommodate the lighting fixture(s) or mast arm(s) specified.
6. (If applicable) Tenons shall be permanently bonded to the fiberglass shaft and shall be hot-dipped galvanized steel to ASTM A153, or shall be 6061-T6 or A356-T6 aluminum.
7. The (standard) handhole shall be 2.5"x5" and provided with a vandal-resistant, stainless steel "M" socket head screw. (Substitute other handhole requirements as appropriate)
8. (If applicable) Anchor Base poles shall be delivered with a heavy-duty, A356-T6 aluminum base casting, which shall be permanently bonded to the outside of the fiberglass shaft.
9. (If applicable) Anchor bolts shall be supplied with the (Anchor Base) pole, and shall conform to ASTM F-1554 with threaded end, hex nuts (2 per bolt) and flat washers (2 per bolt) each galvanized to ASTM-A153. A bolt hole template shall be furnished with the anchor bolts.

BREAKAWAY POLES

1. (If applicable) Breakaway Poles shall comply with the current AASHTO LTS-2 Street Lighting Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, and shall be constructed using Shakespeare-patented joining techniques.

IDENTIFICATION

Each pole shall bear an identification tag which shall list the model and Shakespeare Composite Structures Catalogue Number of the pole, plus the month and year of manufacture.

PACKAGING

Each pole shall be individually packaged for protection during shipping and storage.

TESTING

The surface shall have been tested for a minimum of 2500 hours of accelerated testing in accordance with ASTM G53-84 (UV-B Lamp 313 NM wavelength 130° F, cycle lamp 4 hours on, 4 hours off) with the following minimum performance results:

Fiber exposure: None

Crazing: None

Chalking: None

Colour: Slight dulling may occur.



A Shakespeare Innovation

SMOOTH FINISH

Shakespeare Composite Structures™ smooth finish round tapered composite Tuff-Poles® undergo additional finishing steps after manufacture. The result is great looking superior poles that are ideally suited for the harshest outdoor environments. The poles' strength and structural integrity characteristics are identical to the natural finish poles.

The finishing process starts with a natural pole, fresh from initial manufacturing. A non-woven fabric is wrapped onto the uncured fiberglass while the pole is rotated. This fabric is saturated with the same pigmented resin used to manufacture the pole.

After the pole cools, the next step is a machine buffing operation along the length of the pole. It then receives a protective coat of our proprietary pigmented polyurethane (minimum dry film thickness 1.5 mils) to further enhance the smooth appearance. As with Shakespeare Composite Structures™ natural finish poles, this high-performance coating bears UV inhibitors for protection from sunlight.



NATURAL FINISH

Round tapered natural finish poles retain some of the texture of the strands of resin-impregnated fiberglass used to manufacture them. The poles look almost "woven." A finish coat of Shakespeare's proprietary high-performance pigmented polyurethane provides additional protection from ultraviolet light.

COLOUR

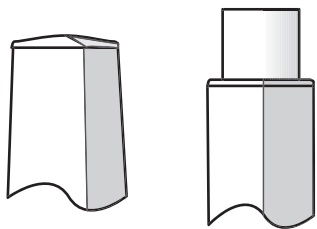
Round and square Shakespeare Composite Structures™ Tuff-Poles® are made in an array of eight Standard Colours, plus twenty-five Premium Colours. You can also get them in any colour you want to match. See our "Colours" brochure for colour chips of the Standard and Premium colours. For custom colour matching, just call.



SHAKESPEARE

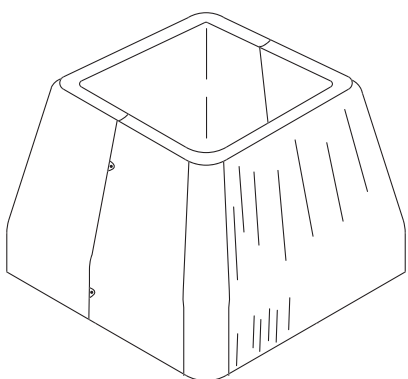
Straight Square Composite Tuff-Poles®

Straight Square Poles offer the contemporary look favored by today's architects, engineers and planners. Virtually maintenance free, square Tuff-Poles® have the same ease of installation as the traditional round tapered poles.



TENONS:

2-3/8" or 3" OD. Tenons are A356-T6 aluminum; for other optional tenons contact Shakespeare. Post top fixtures, flood lights, or brackets mount with ease.



SQUARE SHROUDS:

OPSH-AQ for all AQ Series poles
OPSH-AR for all SSA Series and AR Series poles

ANCHOR BASE:

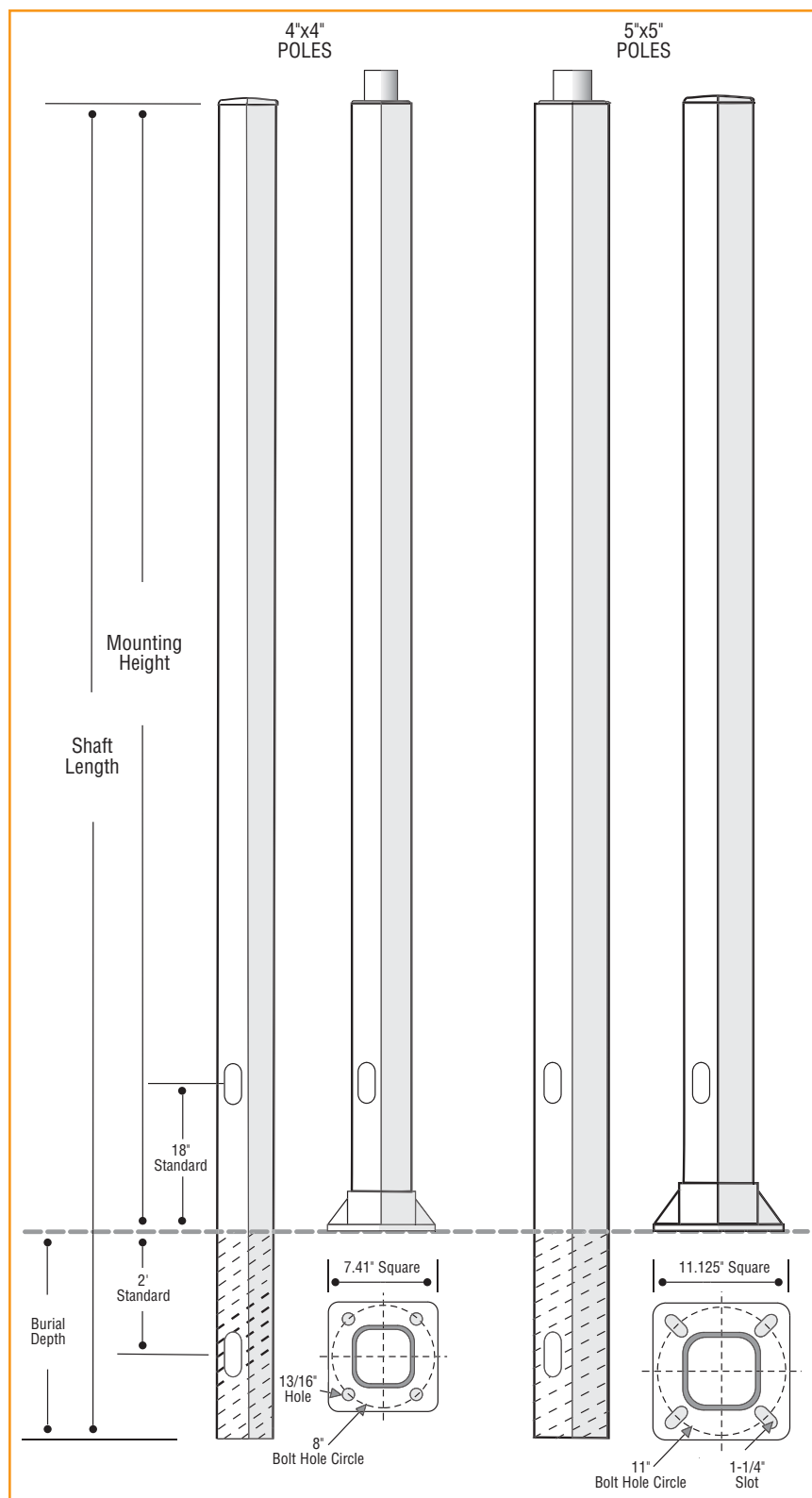
Cast A356-T6 aluminum, polyurethane coated to match pole colour.

Hot dipped galvanized steel anchor bolts complete with nuts (2) and washers (2) are supplied standard :

5/8" x 21" x 3" for 4"x4" poles
1" x 30" x 4" for 5"x5" poles

Square Poles Anchor Base Dimensions

Series	Bolt Hole		Mounting Heights
	Circle	Hole/Slot	
4x4 Poles (AQ, BQ)	8"	13/16"	6' to 25'
5x5 Poles (AR, BR, SSA, SSB)	11"	1-1/4"x2"	6' to 30'



SHAKESPEARE Straight Square Composite Tuff-Poles®

Nominal Mounting Height (ft.)	Shaft Length (ft.)	Pole Weight (lbs.)	POLE DIAMETER		Standard Handhole Location from Base (in.)	SUGGESTED MAXIMUM TOTAL LOADING					Bolt Hole Circle (in.)	BASIC CATALOGUE NUMBER	Comment
			Shaft Top (in.)	Shaft Base (in.)		Total Weight (lbs.)	80 MPH EPA* (sq. ft.)	90 MPH EPA* (sq. ft.)	100 MPH EPA* (sq. ft.)	120 MPH EPA* (sq. ft.)			

Straight Square 4" x 4" Anchor Base, Series AQ - STANDARD DUTY

6	6	18	4	4	18	150	20.0	20.0	20.0	18.7	8	AQ06	Smooth, bronze
8	8	23	4	4	18	150	20.0	20.0	20.0	13.8	8	AQ08	Smooth, bronze
10	10	27	4	4	18	150	20.0	20.0	16.1	10.5	8	AQ10	Smooth, bronze
12	12	31	4	4	18	150	20.0	16.4	12.8	8.1	8	AQ12	Smooth, bronze
14	14	35	4	4	18	150	14.2	10.7	8.2	4.9	8	AQ14	Smooth, bronze
15	15	37	4	4	18	150	13.0	9.7	7.3	4.3	8	AQ15	Smooth, bronze
16	16	39	4	4	18	150	11.9	8.8	6.5	3.7	8	AQ16	Smooth, bronze
18	18	43	4	4	18	150	9.9	7.2	5.2	2.6	8	AQ18	Smooth, bronze
20	20	47	4	4	18	150	8.3	5.8	4.0	1.6	8	AQ20	Smooth, bronze
25	25	57	4	4	18	150	5.0	3.0	1.5	--	8	AQ25	Smooth, bronze

Straight Square 5" x 5" Anchor Base, Series SSA - MEDIUM DUTY

10	10	56	5	5	18	300	41.0	32.0	25.6	17.2	11	SSA5-10	Smooth, bronze
15	15	79	5	5	18	300	21.3	16.3	12.8	8.2	11	SSA5-15	Smooth, bronze
20	20	102	5	5	18	300	14.9	11.1	8.4	4.9	11	SSA5-20	Smooth, bronze
25	25	125	5	5	18	300	10.6	7.6	5.4	2.6	11	SSA5-25	Smooth, bronze
30	30	148	5	5	18	300	5.7	3.4	1.7	--	11	SSA5-30	Smooth, bronze

Straight Square 5" x 5" Anchor Base, Series AR - HEAVY DUTY

6	6	41	5	5	18	300	99.4	78.2	63.1	43.3	11	AR06	Smooth, bronze
8	8	51	5	5	18	300	76.4	59.9	48.1	33.7	11	AR08	Smooth, bronze
10	10	61	5	5	18	300	61.5	48.0	38.4	25.8	11	AR10	Smooth, bronze
12	12	71	5	5	18	300	58.0	39.6	31.4	20.8	11	AR12	Smooth, bronze
14	14	82	5	5	18	300	34.5	26.6	21.0	13.6	11	AR14	Smooth, bronze
15	15	87	5	5	18	300	31.9	24.5	19.2	12.3	11	AR15	Smooth, bronze
18	18	102	5	5	18	300	25.9	19.4	14.9	9.1	11	AR18	Smooth, bronze
20	20	113	5	5	18	300	22.3	16.7	12.6	7.4	11	AR20	Smooth, bronze
25	25	138	5	5	18	300	15.9	11.4	8.1	3.9	11	AR25	Smooth, bronze
30	30	164	5	5	18	300	8.6	5.1	2.6	--	11	AR30	Smooth, bronze

*High lighted items are stock items in Markham.

AQ Series – Standard Duty

- 4" x 4" Straight Square design
- Mounting heights to 25'
- Smooth finish
- Bronze colour standard, architectural colours available.
- Tenon Top or Capped for side drilling

Anchor bolts #OPAB-1025, 5/8" x 21" x 3" (4 per set) included.

Standard fixture attachment: Capped.

Standard colour: Dark Bronze.

Optional Base Cover: OPSH-AQ-5 (Dark Bronze colour). For other colours, contact factory.

• Standard handhole: 2-1/2" x 5" oval. All handhole covers are polyurethane coated to match pole colour.

• EPA ratings are the same for capped or tenon top poles.

• Poles can be predrilled for bolt-on side mount fixture(s), arms, brackets, etc.

*All EPA recommendations are based on poles with handholes, and in accordance with the AASHTO standard, include a 30% gust factor.

SSA Series – Medium Duty

- 5" x 5" Straight Square design
- Mounting heights to 30'
- Smooth finish
- Bronze colour standard, architectural colours available
- Tenon Top or Capped for side drilling

Anchor bolts #OPAB-2035, 1" x 30" x 4" (4 per set) included.

Standard fixture attachment: Capped.

Standard colour: Dark Bronze.

Optional Base Cover (2-piece), order OPSH-AR-5 (Dark Bronze colour).

For other colours, contact factory.

AR Series – Heavy Duty

- 5" x 5" Straight Square design
- Mounting heights to 30'
- Smooth finish
- Bronze colour standard, architectural colours available
- Tenon Top or Capped for side drilling

Anchor bolts #OPAB-2035, 1" x 30" x 4" (4 per set) included.

Standard fixture attachment: Capped.

Standard colour: Dark Bronze.

Optional Base Cover (2-piece), order OPSH-AR-5 (Dark Bronze colour). For other colours, contact factory.

"A" stock poles in Markham shown shaded.

SHAKESPEARE

Straight Square & Tapered Square Composite Tuff-Poles®

Nominal Mounting Height (ft.)	Shaft Length (ft.)	Pole Weight (lbs.)	POLE DIAMETER		Standard Handhole Location from Base (in.)	SUGGESTED MAXIMUM TOTAL LOADING					Bolt Hole Circle (in.)	BASIC CATALOGUE NUMBER	Comment
			Shaft Top (in.)	Shaft Base (in.)		Total Weight (lbs.)	80 MPH EPA* (sq. ft.)	90 MPH EPA* (sq. ft.)	100 MPH EPA* (sq. ft.)	120 MPH EPA* (sq. ft.)			

Straight Square 4" x 4" Direct Burial Base, Series BQ - STANDARD DUTY

6	8	17	4	4	42	150	20.0	20.0	20.0	18.7	2	BQ08	Smooth, bronze
8	10	22	4	4	42	150	20.0	20.0	20.0	13.8	2	BQ10	Smooth, bronze
10	13	28	4	4	54	150	20.0	20.0	16.1	10.5	3	BQ13	Smooth, bronze
12	15	32	4	4	54	150	20.0	16.4	12.8	8.1	3	BQ15	Smooth, bronze
14	18	37	4	4	66	150	14.2	10.7	8.2	4.9	4	BQ18	Smooth, bronze
15	19	40	4	4	66	150	13.0	9.7	7.3	4.3	4	BQ19	Smooth, bronze
16	20	43	4	4	66	150	11.9	8.8	6.5	3.7	4	BQ20	Smooth, bronze
18	22	49	4	4	66	150	9.9	7.2	5.2	2.6	4	BQ22	Smooth, bronze
20	25	55	4	4	78	150	8.3	5.8	4.0	1.6	5	BQ25	Smooth, bronze
25	30	70	4	4	78	150	5.0	3.0	1.5	--	5	BQ30	Smooth, bronze

Straight Square 5" x 5" Direct Burial Base, Series SSB - MEDIUM DUTY

10	13	61	5	5	54	300	41.0	32.0	25.6	17.2	3	SSB5-13	Smooth, bronze
15	19	88	5	5	66	300	21.3	16.3	12.8	8.2	4	SSB5-19	Smooth, bronze
20	25	112	5	5	78	300	14.9	11.1	8.4	4.9	5	SSB5-25	Smooth, bronze
25	30	140	5	5	78	300	10.6	7.6	5.4	2.6	5	SSB5-30	Smooth, bronze
30	35	164	5	5	78	300	5.7	3.4	1.7	--	5	SSB5-35	Smooth, bronze

Straight Square 5" x 5" Direct Burial Base, Series BR - HEAVY DUTY

10	13	67	5	5	54	300	61.5	48.0	38.4	25.8	3	BR13	Smooth, bronze
15	19	97	5	5	66	300	31.0	21.0	18.0	11.1	4	BR19	Smooth, bronze
20	25	123	5	5	78	300	22.3	16.7	12.6	7.4	5	BR25	Smooth, bronze
25	30	154	5	5	78	300	15.9	11.4	8.1	3.9	5	BR30	Smooth, bronze
30	35	180	5	5	78	300	8.6	5.1	2.6	--	5	BR35	Smooth, bronze

Tapered Square Direct Burial Base, Series BT and BTH

10	13	32	4.4	5.7	54	200	23.2	16.9	13.1	8.1	3	BT13	Smooth, bronze
12	15	37	4.4	5.9	54	200	17.2	12.7	9.5	5.4	3	BT15	Smooth, bronze
14	18	44	4.4	6.1	66	200	13.1	9.4	6.7	3.2	4	BT18	Smooth, bronze
16	20	49	4.4	6.3	66	200	8.0	5.4	3.5	1.1	4	BT20	Smooth, bronze
18	22	54	4.4	6.5	66	200	5.9	3.6	1.9	--	4	BT22	Smooth, bronze
20	24	58	4.4	6.8	66	200	4.1	2.1	0.6	--	4	BT24	Smooth, bronze
20	24	88	4.6	7.0	66	200	12.9	9.0	6.2	2.5	4	BTH24	Smooth, bronze

*High lighted items are stock items in Markham.

BQ Series – Standard Duty

- 4" x 4" Straight Square design
- Mounting heights to 25'
- Smooth finish
- Bronze colour standard, architectural colours available.
- Tenon Top or Capped for side drilling

SSB Series - Medium Duty

- 5" x 5" Straight Square design
- Mounting heights to 30'
- Smooth finish
- Bronze colour standard, architectural colours available
- Tenon Top or Capped for side drilling

BR Series - Heavy Duty

- 5" x 5" Straight Square design
- Mounting heights to 30'
- Smooth finish
- Bronze colour standard, architectural colours available
- Tenon Top or Capped for side drilling

• Standard handhole: 2-1/2" x 5" oval. All handhole covers are polyurethane coated to match pole colour.

• EPA ratings are the same for capped or tenon top poles.

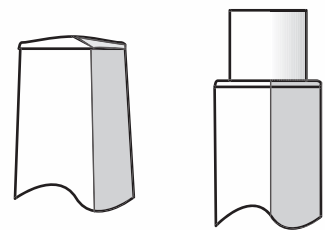
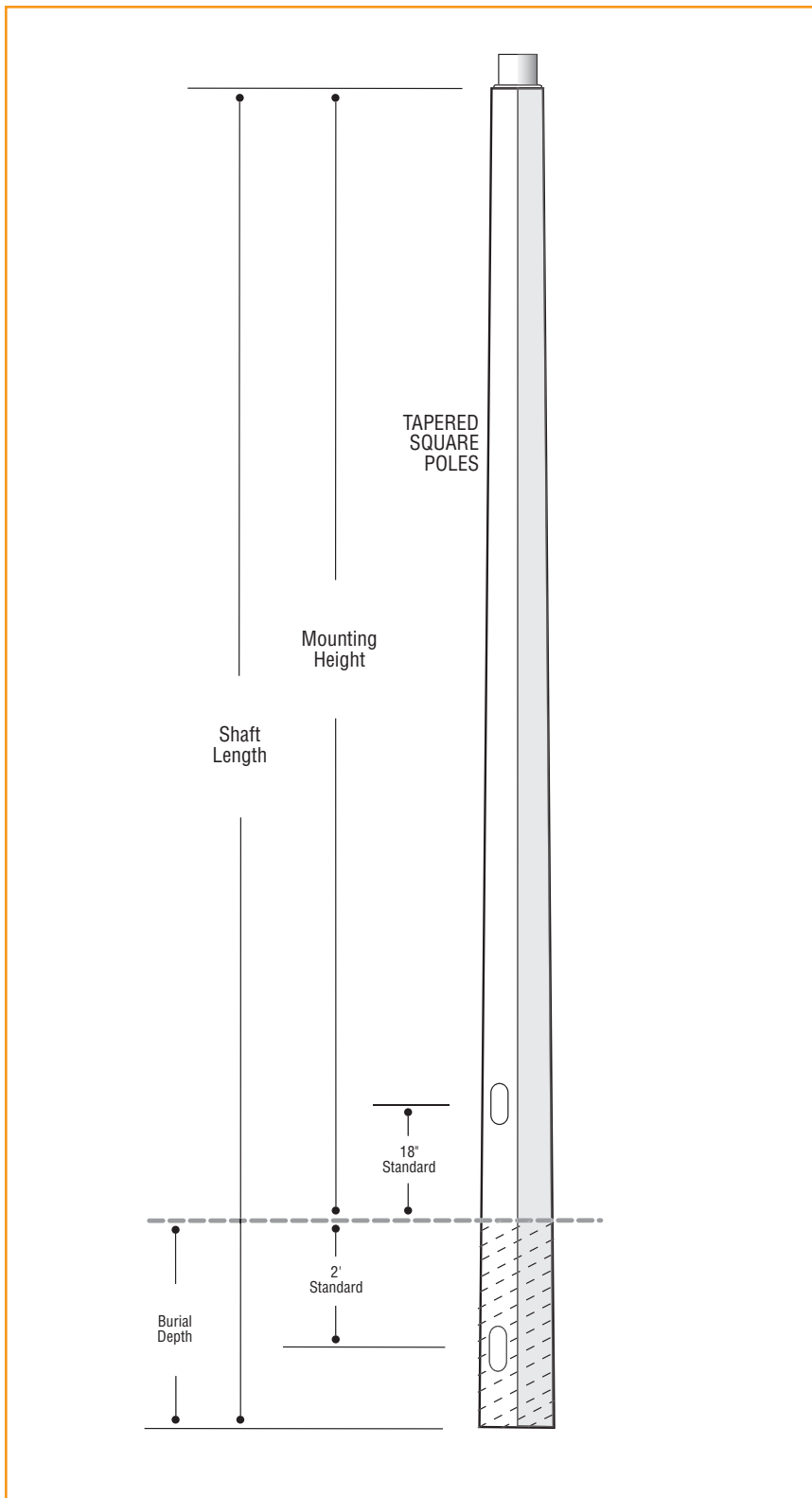
• Poles can be predrilled for bolt-on side mount fixture(s), arms, brackets, etc.

*All EPA recommendations are based on poles with handholes, and in accordance with the AASHTO standard, include a 30% gust factor.

"A" stock poles in Markham shown shaded.

**BT AND BTH SERIES:
DIRECT BURIAL BASE
TENON TOP OR SIDE MOUNT**

**SHAKESPEARE
Straight Square & Tapered
Square Composite Tuff-Poles®**



TENONS:

2-3/8" or 3" OD. Tenons are A356-T6 aluminum; for other optional tenons contact Shakespeare. Post top fixtures, flood lights, or brackets mount with ease.

**BT AND BTH SERIES
TAPERED SQUARE**

- Tapered Square design
- Mounting heights 10' to 20'
- Natural (textured) finish
- Bronze colour standard, eight standard colours available
- Tenon Top or Capped for side drilling
- Standard colour: Dark Bronze

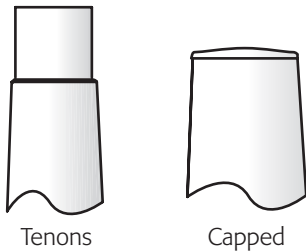
- Standard handhole: 2-1/2" x 5" oval. All handhole covers are polyurethane coated to match pole colour.

SHAKESPEARE Round Tapered Composite Tuff-Poles®

DIRECT BURIAL & ANCHOR BASE TENON TOP AND CAPPED

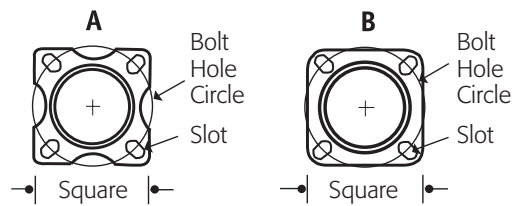
TENON TOP POLES

(AS Series below 25' and BS Series below 20' mounting heights.)



TENONS:

2-3/8", 3", 4" OD, if pole dimensions permit. Tenons are A356-T6 aluminum or hot-dipped galvanized steel, and are available in all standard sizes; for other optional tenons contact Shakespeare. Post top fixtures, flood lights, or brackets mount with ease.



Anchor Base Dimensions

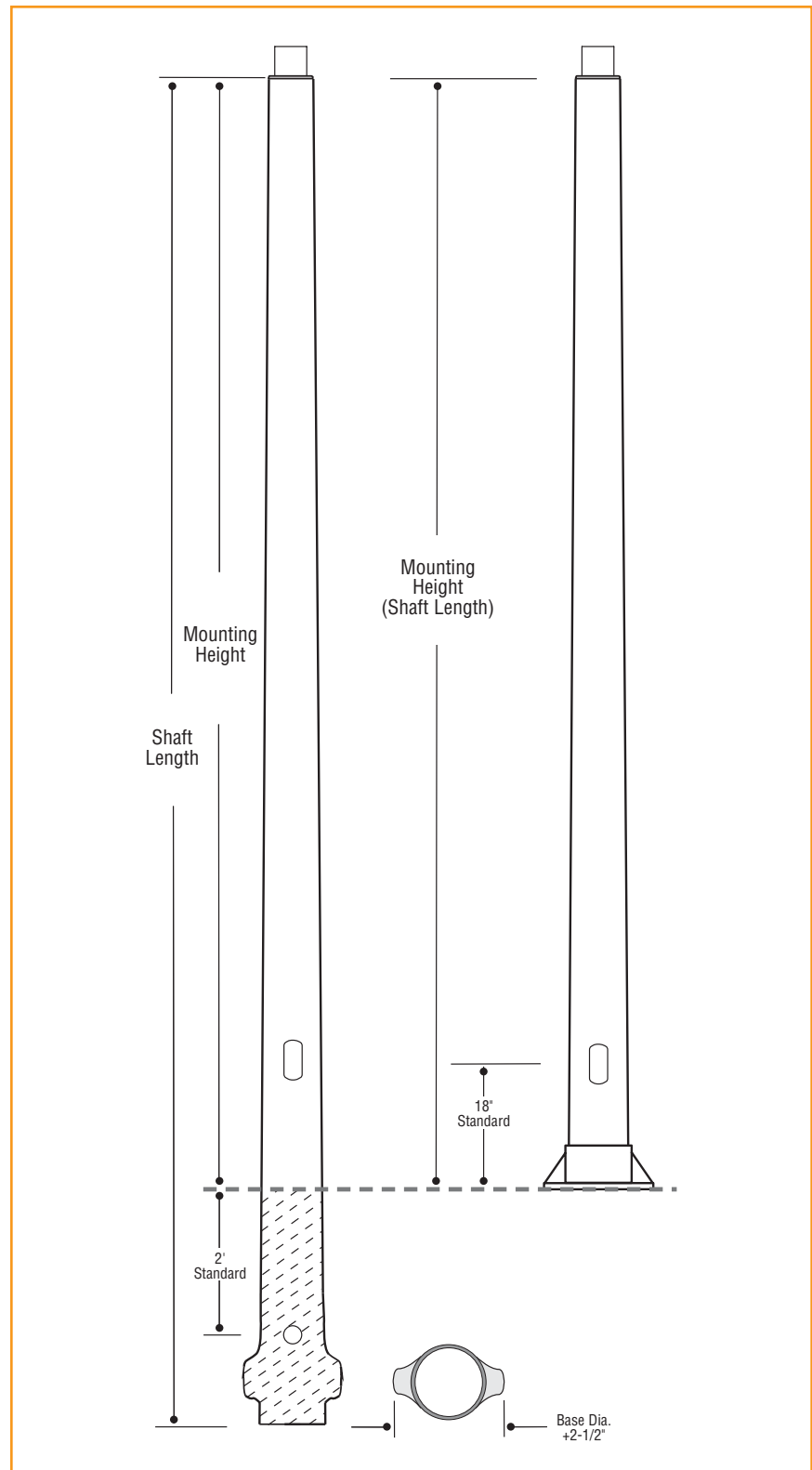
Bolt Hole Circle	Drawing	Square	Slot
8"	A	7.75"	13/16" x 1-5/16"
8-1/2"	A	8.125"	13/16" x 1-5/16"
9-1/2"	A	8.8"	13/16" x 1-5/16"
11-1/2"	B	11"	1-1/4" x 1-3/4"
14"	B	12.9"	1-1/2" x 2"
14-1/2"	B	13.3"	1-1/2" x 2"
15"	B	13.5"	1-1/2" x 2"
15-1/2"	B	14"	1-1/2" x 2"

For poles with one, two or more arms, see Mast Arm Poles.

ANCHOR BASE:

Cast A356-T6 aluminum, polyurethane coated to match pole colour.

Hot dipped galvanized steel anchor bolts complete with nuts (2) and washers (2) are supplied standard (5/8" x 21" x 3", 1" x 30" x 4", or 1-1/4" x 36" x 6" depending on the pole specified).



BS DIRECT BURIAL & AS ANCHOR BASE TENON TOP

SHAKESPEARE Round Tapered Composite Tuff-Poles®

Nominal Mounting Height (ft.)	Shaft Length (ft.)	Pole Weight (lbs.)	POLE DIAMETER		Standard Handhole Location from Base (in.)	SUGGESTED MAXIMUM TOTAL LOADING					Bolt Hole Circle (in.)	BASIC CATALOGUE NUMBER	Comment
			Shaft Top (in.)	Shaft Base (in.)		Total Weight (lbs.)	80 MPH EPA* (sq. ft.)	90 MPH EPA* (sq. ft.)	100 MPH EPA* (sq. ft.)	120 MPH EPA* (sq. ft.)			

Anchor Base, Series AS, Tenon Top

10**	10	22	2.9	4.6	18	150	16.3	12.5	9.9	6.7	8	AS10	Tenon Top only
12**	12	25	2.9	4.9	18	150	13.6	10.3	8.1	5.3	8	AS12	Tenon Top only
14**	14	28	2.9	5.3	18	150	9.8	7.2	5.6	3.6	8	AS14	Tenon Top only
16**	16	30	2.9	5.5	18	100	6.8	4.9	3.7	2.2	8.5	AS16	Tenon Top only
18**	18	34	2.9	5.8	18	100	6.7	4.9	3.8	2.4	8.5	AS18	Tenon Top only
20**	20	44	2.9	6.1	18	100	5.7	4.0	3.1	1.8	8.5	AS20	Tenon Top only
25**	25	52	2.9	6.8	18	100	4.0	2.9	2.1	0.9	9.5	AS25	Tenon Top only

**Not available capped - do not use AS Series below 25' mounting height for side mount applications, or with tenon mounted arms or for multiple fixture applications - Use AO Series, instead.

Direct Burial Base, Series BS, Tenon Top

10**	13	23	2.9	5.0	54	150	16.3	12.5	9.9	6.7	3	BS13	Not avail. Capped
12**	15	25	2.9	5.3	54	150	10.7	7.9	6.1	4.1	3	BS15	Not avail. Capped
13**	17	27	2.9	5.6	66	150	10.2	7.6	5.9	3.9	4	BS17	Not avail. Capped
14**	18	29	2.9	5.7	66	150	9.7	7.1	5.6	3.7	4	BS18	Not avail. Capped
16**	20	38	2.9	6.1	66	100	7.3	5.3	4.2	2.7	4	BS20	Not avail. Capped
20**	24	44	2.9	6.6	66	100	6.1	4.6	3.5	2.2	4	BS24	Not avail. Capped

**Not available Capped - do not use BS Series below 20' mounting height for side mount applications, or with tenon mounted arms or for multiple fixture applications - Use BO Series, instead.

For capped poles, and poles suitable for side mount or arm mounted fixtures, see Round Tapered Poles. For poles with arms, see Mast Arm Poles.

TENON TOP POLES

(AS Series below 25' and BS Series below 20' mounting heights.)

AA, AB, AC, AD, AG, AH, AO, and AS Series

ANCHOR BASE

- Mounting heights to 47'
- Natural or smooth finish
- Eight standard colours - pigments integrated into the resin
- High-performance UV- and weather resistant pigmented polyurethane coating
- Tenon Top (Post Top) or Capped (except AS Series below 25' mounting height)
- EPA ratings are the same for Capped or Tenon Top poles
- Poles can be predrilled for bolt-on side mount fixture(s), arms, etc. (except AS Series below 25' mounting height)
- Composite shrouds (1- or 2-piece) optional. Optional bolt covers available for some styles
- Poles are individually ID tagged
- Wrapped individually for shipment

BA, BB, BC, BD, BG, BH, BO, BS and BX Series

DIRECT BURIAL BASE

- Mounting heights to 40'
- Natural or smooth finish
- Eight standard colours - pigments integrated into the resin
- High-performance UV- and weather resistant pigmented polyurethane coating
- Tenon Top (Post Top) or Capped (except BS Series below 20' mounting height)
- EPA ratings are the same for Capped or Tenon Top poles
- Wiring access hole standard
- Poles can be predrilled for bolt-on side mount fixture(s), arms, etc. (except BS Series below 20' mounting height)
- Poles are individually ID tagged
- Wrapped individually for shipment
- Direct Burial style for fast, easy installation and improved ground line appearance
- Anti-rotation flare structurally integrated into pole base during manufacture
- Shakespeare fiberglass won't rust, rot, or corrode in the ground, and insects won't eat it.
- No concrete foundations or anchor bolts

• Standard handhole: 2-1/2" x 5" oval. Optional 4" x 6" or 4" x 12" handholes, depending on pole dimensions. For other handhole options, contact factory. All handhole covers are polyurethane coated to match pole colour.

Shakespeare calculates all EPA recommendations based on poles with handholes, and in accordance with the AASHTO standard, allowing for a 30% gust factor for all wind ratings, including 120mph.

For applications requiring extremely large loads and extra height, ask for information on Shakespeare Transmission and Distribution poles - up to 70' long and capable of large luminaires typical of sports stadiums and the like.

SHAKESPEARE Round Tapered Composite Tuff-Poles®

AA, AB, AC, AD, AG, AH, AO AND AS ANCHOR BASE TENON TOP OR CAPPED

Nominal Mounting Height (ft.)	Shaft Length (ft.)	Pole Weight (lbs.)	POLE DIAMETER		Standard Handhole Location from Base (in.)	SUGGESTED MAXIMUM TOTAL LOADING					Bolt Hole Circle (in.)	BASIC CATALOGUE NUMBER	Comment
			Shaft Top (in.)	Shaft Base (in.)		Total Weight (lbs.)	80 MPH EPA* (sq. ft.)	90 MPH EPA* (sq. ft.)	100 MPH EPA* (sq. ft.)	120 MPH EPA* (sq. ft.)			

Anchor Base, Series AA, AB, AC, AD, AG, AH, and AS, Tenon Top or Capped

8	8	20	4.1	5.2	18	150	23.4	18.1	14.4	9.5	8	AO8	
10	10	23	4.1	5.4	18	150	19.0	14.6	11.4	7.3	8	AO10	
10	10	30	4.4	5.8	18	200	26.1	20.1	15.7	10.1	11.5	AG10	
12	12	28	4.1	5.7	18	150	16.0	12.1	9.3	5.7	8.5	AO12	
12	12	34	4.4	6.1	18	200	22.0	16.7	12.8	7.9	11.5	AG12	
14	14	32	4.1	5.9	18	150	14.0	10.4	7.9	4.6	8.5	AO14	
14	14	38	4.4	6.4	18	200	19.3	14.3	10.9	6.3	11.5	AG14	
16	16	36	4.1	6.2	18	100	10.0	7.4	5.5	3.0	8.5	AO16	
16	16	42	4.4	6.6	18	150	13.8	10.2	7.6	4.1	11.5	AG16	
18	18	41	4.1	6.5	18	100	9.0	6.5	4.8	2.4	9.5	AO18	
18	18	46	4.4	6.9	18	150	12.4	9.0	6.6	3.3	11.5	AG18	
20	20	45	4.1	6.7	18	100	8.2	5.8	4.1	1.9	9.5	AO20	
20	20	49	4.4	7.1	18	150	11.3	8.0	5.6	2.6	11.5	AG20	
20	20	62	4.6	7.3	18	200	14.4	11.1	8.9	5.9	11.5	AH20	
25	25	55	4.1	6.8	18	100	5.4	3.4	2.0	--	9.5	AO25	
25	25	56	4.4	7.1	18	150	7.4	4.7	2.8	--	11.5	AG25	
25	25	75	4.6	7.3	18	200	9.6	7.3	5.7	3.4	11.5	AH25	
25	25	109	6.2	9.5	18	300	14.9	11.5	9.0	5.4	14	AA25	
25	25	142	6.4	9.6	18	300	23.2	18.2	14.3	9.0	14	AB25	
30	30	106	4.7	8.4	18	100	11.2	8.5	6.7	4.5	11.5	AS30	
30	30	140	4.9	8.5	18	200	15.6	12.0	9.5	6.0	11.5	AH30	
30	30	174	6.4	10.3	18	300	19.7	15.2	11.7	7.1	14.5	AB30	
30	30	202	6.6	10.4	18	300	28.7	22.4	17.4	11.0	14.5	AC30	
30	30	243	6.9	10.6	18	300	37.4	29.1	22.9	14.8	14.5	AD30	
35	35	125	4.7	8.4	18	100	5.5	3.8	2.7	1.3	11.5	AS35	
35	35	161	4.9	8.5	18	200	8.5	6.2	4.7	2.6	11.5	AH35	
35	35	201	6.4	11.0	18	300	14.3	10.8	7.8	4.0	15	AB35	
35	35	248	6.6	11.1	18	300	21.8	16.6	12.5	7.2	15	AC35	
35	35	282	6.9	11.3	18	300	29.0	22.1	17.0	10.3	15	AD35	
40	40	165	6.2	11.6	18	300	6.4	4.3	2.4	--	15.5	AA40	
40	40	227	6.4	11.7	18	300	12.2	8.8	6.0	2.5	15.5	AB40	
40	40	263	6.6	11.8	18	300	19.2	14.1	10.4	5.4	15.5	AC40	
40	40	317	6.9	11.9	18	300	25.8	19.3	14.3	8.3	15.5	AD40	
45	45	183	6.2	11.7	18	300	3.9	2.2	0.6	--	15.5	AA45	
45	45	254	6.4	11.8	18	300	9.1	6.2	3.8	0.6	15.5	AB45	
45	45	295	6.6	11.9	18	300	15.2	10.9	7.6	3.2	15.5	AC45	
45	45	375	6.9	12.0	18	300	21.2	15.4	11.2	5.7	15.5	AD45	

• Standard handhole: 2-1/2" x 5" oval. All handhole covers are polyurethane coated to match pole colour.

• EPA ratings are the same for capped or tenon top poles.

• Poles can be predrilled for bolt-on side mount fixture(s), arms, brackets, etc.

• All poles are individually wrapped for shipment.

*All EPA recommendations are based on poles with handholes, and in accordance with the AASHTO standard, include a 30% gust factor.

**BA, BB, BC, BD, BG, BH, BO BS
AND BX DIRECT BURIAL BASE
TENON TOP OR CAPPED**

**SHAKESPEARE
Round Tapered
Composite Tuff-Poles®**

Nominal Mounting Height (ft.)	Shaft Length (ft.)	Pole Weight (lbs.)	POLE DIAMETER		Standard Handhole Location from Base (in.)	SUGGESTED MAXIMUM TOTAL LOADING					Bolt Hole Circle (in.)	BASIC CATALOGUE NUMBER	Comment
			Shaft Top (in.)	Shaft Base (in.)		Total Weight (lbs.)	80 MPH EPA* (sq. ft.)	90 MPH EPA* (sq. ft.)	100 MPH EPA* (sq. ft.)	120 MPH EPA* (sq. ft.)			

Direct Burial Base, Series BA, BB, BC, BD, BG, BH, and BS, Tenon Top or Capped

8	11	21	4.1	5.5	54	150	23.4	18.1	14.4	9.5	3	BO11	
10	13	24	4.1	5.8	54	150	19.0	14.6	11.4	7.3	3	BO13	
10	13	27	4.4	6.2	54	200	26.1	20.1	15.7	10.1	3	BG13	
12	15	28	4.1	6.1	54	150	16.0	12.1	9.3	5.7	3	BO15	
12	15	31	4.4	6.6	54	200	22.0	16.7	12.8	7.9	3	BG15	
14	18	34	4.1	6.5	66	150	14.0	10.4	7.9	4.6	4	BO18	
14	18	38	4.4	6.9	66	200	19.3	14.3	10.9	6.3	4	BG18	
16	20	38	4.1	6.7	66	100	10.0	7.4	5.5	3.0	4	BO20	
16	20	42	4.4	7.1	66	150	13.8	10.2	7.6	4.1	4	BG20	
16	20	52	4.6	7.3	66	200	16.2	12.6	10.1	6.7	4	BH20	
18	22	42	4.1	6.7	66	100	9.0	6.5	4.8	2.4	4	BO22	
18	22	46	4.4	7.1	66	150	12.4	9.0	6.6	3.3	4	BG22	
20	24	46	4.1	6.7	66	100	8.2	5.8	4.1	1.9	4	BO24	
20	24	50	4.4	7.1	66	150	10.4	8.0	5.6	2.6	4	BG24	
20	24	62	4.6	7.3	66	200	11.2	8.6	6.8	4.5	4	BH24	
25	30	71	4.5	8.2	78	100	6.2	4.7	3.6	2.2	5	BS30	
25	30	98	4.7	8.4	78	200	14.5	11.2	8.9	5.9	5	BH30	
25	30	132	4.9	8.5	78	300	20.1	15.7	12.5	8.2	5	BX30	
25	30	159	6.4	10.3	78	300	23.2	18.2	12.5	9.0	5	BB30	
25	30	187	6.6	10.4	78	300	33.5	26.2	20.8	13.6	5	BC30	
30	35	82	4.5	8.3	78	100	3.7	2.6	1.9	0.8	5	BS35	
30	35	116	4.7	8.4	78	200	10.5	8.0	6.2	3.8	5	BH35	
30	35	153	4.9	8.5	78	300	14.8	11.4	9.0	5.6	5	BX35	
30	35	186	6.4	11.0	78	300	19.7	16.2	11.7	7.1	5	BB35	
30	35	218	6.6	11.1	78	300	28.7	22.4	17.4	11.0	5	BC35	
30	35	266	6.9	11.3	78	300	37.4	29.1	22.9	14.8	5	BD35	
35	41	154	6.2	11.7	90	300	8.1	6.0	3.9	1.3	6	BA41	
35	41	218	6.4	11.8	90	300	14.3	10.8	7.8	4.0	6	BB41	
35	41	156	6.6	11.9	90	300	21.8	16.6	12.5	7.2	6	BC41	
35	41	311	6.9	12.0	90	300	29.0	22.1	17.5	10.3	6	BD41	
40	47	176	6.2	11.7	102	300	6.4	4.3	2.4	--	7	BA47	
40	47	249	6.4	11.8	102	300	12.2	8.8	6.0	2.5	7	BB47	
40	47	292	6.6	11.9	102	300	19.2	14.1	10.4	5.4	7	BC47	
40	47	357	6.9	12.0	102	300	25.8	19.3	14.5	6.3	7	BD47	

• Standard handhole: 2-1/2" x 5" oval. All handhole covers are polyurethane coated to match pole colour.
 • EPA ratings are the same for capped or tenon top poles.
 • Poles can be predrilled for bolt-on side mount fixture(s), arms, brackets, etc.
 • All poles are individually wrapped for shipment.
 *All EPA recommendations are based on poles with handholes, and in accordance with the AASHTO standard, include a 30% gust factor.

SHAKESPEARE Options and Accessories

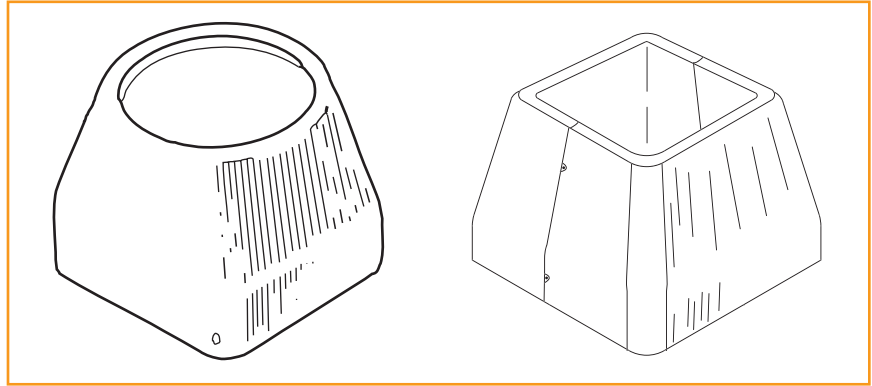
OPSH SHROUDS, OPAB ANCHOR BOLTS, OPNC BOLT COVERS

ANCHOR BASE SHROUDS

Material: Fiberglass reinforced composite or ABS.

Design: One-piece standard, except where noted (*). For two-piece shroud, add -S to part number.

Catalogue Numbers: part number plus colour number from the colour chart. Example: OPSH-1821-5 is a bronze, one-piece shroud for 8" to 9" Bolt Hole Circle, to fit 15' to 20' AS Series or 12' to 16' AO Series Round Tapered poles.



Anchor Base BHC	CATALOGUE NUMBER	COLOUR (from Chart)	For Pole Catalogue Numbers:
7.5" to 8.5"	OPSH-1017	Add COLOUR NUMBER from Chart at right	AS10-AS14, AO10
8" to 9"	OPSH-1821		AS15-AS20, AO12-16
9" to 10"	OPSH-2225		AS21-AS25, AO18-25
11" to 12"	OPSH-2735		All AS & AH 26'-35'
11" to 12"	OPSH-2025		AH20-AH25, AG20-AG25
13.5" to 14.5"	OPSH-2425		AA25-AB25
14" to 15"	OPSH-2930		AB30-AD30
14.5" to 15.5"	OPSH-3435		AB35-AD35
15" to 16"	OPSH-4047		AA40-AD47
*Square 8"	OPSH-AQ		All AQ square poles (4")
*Square 10-12"	OPSH-AR	All AR and SSA5 square (5")	

COLOUR CHART (Add to Catalogue Number)	
Black	-1
Gray	-2
Brown	-3
Light Green	-4
Bronze	-5
Silver	-6
White	-7
Dark Green	-8
(For other colours, just call)	

Examples: OPSH-2225-5 and OPSH-AR-5 are bronze-colour shrouds.

*2 piece standard stock in Markham

BOLT COVERS

(not available for all poles)

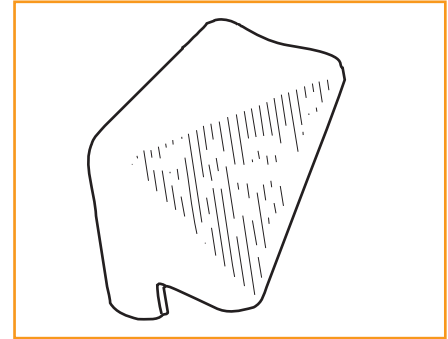
Material: cast aluminum

Sold in sets of four with one stainless steel screw per cover for attachment of cover to anchor base

Add colour number from colour chart.

CATALOGUE NUMBER	For Anchor Base Series
OPNC-2735	AS27-AS35, AH27-AH35
OPNC-2025	AH10-AH25, AG10-AG25
OPNC-3747	AA37-AD47

BOLT COVER

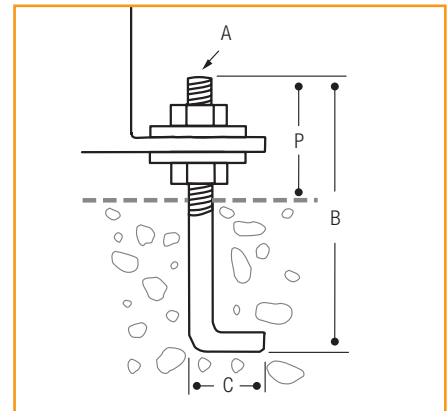


ANCHOR BOLT SETS (Stock in Markham)

Material: Low carbon steel per ASTM F1554 hot dipped galvanized per ASTM A153

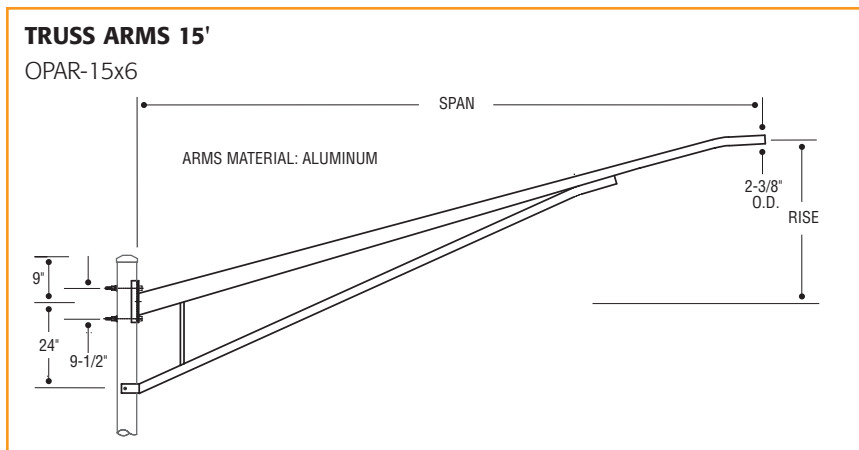
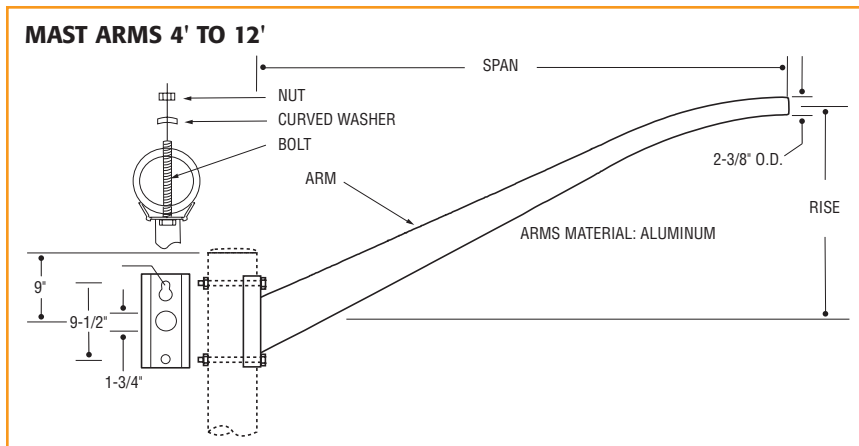
Sold in sets of four anchor bolts, each with two hex nuts and two flat washers

CATALOGUE NUMBER	Weight (lbs.)	A	B	C	P	For Use With:
OPAB-1025	9	5/8"-11 UNC	21"	3"	3"	AO, AS, AQ up to 25'
OPAB-2035	28	1"-8 UNC	30"	4"	4"	AH 20' to 35', AS 26' to 35', AR, SSA5, and All AG
OPAB-2545	57	1-1/4"-7 UNC	36"	6"	4"	AA, AB, AC and AD 25' to 35'
					5"	AA, AB, AC and AD 36' to 47'



OPAR MAST ARMS AND MOUNTING OPHW HARDWARE KITS FOR ARMS

SHAKESPEARE Options and Accessories



MAST ARMS

Material: Aluminum

Construction: Single tapered arm. One, two, three, or four can be mounted, depending on pole strength and other factors.

Options: 1.66" Dia. slipfitter (specify).

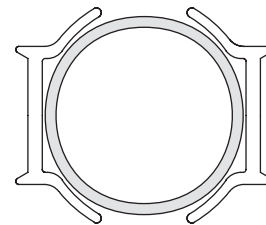
Mast Arms available in powder coated colours to match poles, at additional cost.

CATALOGUE NUMBER	SPAN	RISE	EPA (Sq. Ft.)	Weight (lbs.)	For Pole Series:
OPAR-4	45"	15"	0.9	6	G, H, S, X
OPAR-4x6	45"	15"	0.9	6	A, B, C, D
OPAR-4x4	45"	15"	0.9	6	All O series
OPAR-6	68"	24"	1.6	10	G, H, S, X
OPAR-6x6	68"	24"	1.6	10	A, B, C, D
OPAR-6x4	68"	24"	1.6	10	All O series
OPAR-8	90"	33"	2.4	14	G, H, S, X
OPAR-8x6	90"	33"	2.4	14	A, B, C, D
OPAR-8x4	90"	33"	2.4	14	All O Series
OPAR-10	120"	39"	3.3	17	H, S, X
OPAR-10x6	120"	39"	3.3	17	A, B, C, D
OPAR-12	138"	45"	4.0	22	H, S, X
OPAR-12x6	138"	45"	4.0	22	A, B, C, D
OPAR-15x6	174"	45"	7.4	40	A, B, C, D

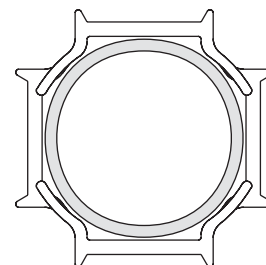
HARDWARE KITS FOR MAST ARMS

Material: Hot dipped Galvanized Steel

CATALOGUE NUMBER	Arms Configuration	For Pole Series:	5/8"-11 Bolts	Washers	Nuts
OPHW-1	Single arm	G, H, S, X	2 ea. 6"	2 ea. Curved	2 ea.
OPHW-1x4	Single arm	All O Series	2 ea. 5-1/2"	2 ea. Curved	2 ea.
OPHW-1x6	Single arm	A, B, C, D	2 ea. 8"	2 ea. Curved	2 ea.
OPHW-2	Two @180°	G, H, S, X	2 ea. 7"	2 ea. Flat	2 ea.
OPHW-2x4	Two @180°	All O Series	2 ea. 6"	2 ea. Flat	2 ea.
OPHW-2x6	Two @180°	A, B, C, D	2 ea. 9"	2 ea. Flat	2 ea.
OPHW-1x6-15	One Truss Arm	A, B, C, D	2 8", 1 9"	2 ea. Curved	3 ea.
OPHW-2x6-15	Two Truss @ 180°	A, B, C, D	3 ea. 9"	2 ea. Flat	3 ea.



Two-Arm
Installation
@ 180°



Four-Arm
Installation
@ 90°

SHAKESPEARE Options and Accessories

BOLT-ON SIDE MOUNT LONG-REACH BRACKETS

Material: Aluminum.

Colour: Mill finish aluminum.

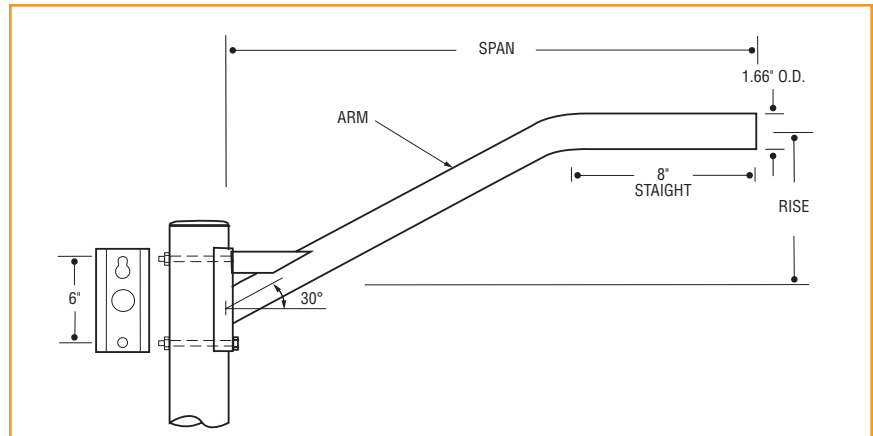
Options: 2.375" O.D.;
Colour to match pole (specify).

Mounting hardware not included.
Order separately according to pole series.

CATALOGUE NUMBER	SPAN	RISE	Arm EPA* (Sq. Ft.)	Weight (lbs.)	Max. Lum. EPA* 90-120 MPH
OPAR-3	30"	15"	0.5	3.5	>20.0

*Sq. Ft. per arm

OPAR SIDE MOUNT BRACKETS



BOLT-ON SIDE MOUNT BRACKETS

Material: Aluminum.

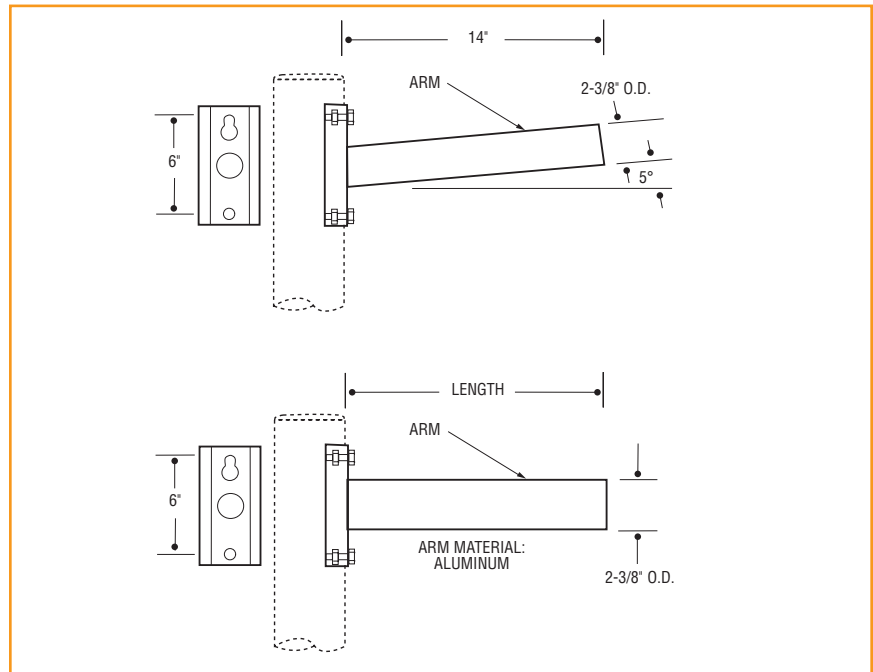
Colour: Mill finish aluminum.

Options: 1.66" Dia.; 1.9" Dia.; Custom lengths to 30"; Colour to match pole (specify).

Mounting hardware included.

CATALOGUE NUMBER	Length	Arm EPA* (Sq. Ft.)	Weight (lbs.)	Max. Lum. EPA* 90-120 MPH
TILTED Style (5° tilt)				
OPAR-1.2	14	0.25	2.0	>20.0
HORIZONTAL Style (no tilt)				
OPAR-0.4	4.5	0.08	1.0	>20.0
OPAR-0.7	8	0.15	1.4	>20.0
OPAR-1	12	0.22	1.8	>20.0
OPAR-1.25	15	0.27	2.1	>20.0
OPAR-1.5	18	0.33	2.4	>20.0
OPAR-2	24	0.44	3.0	>20.0
OPAR-2.5	30	0.54	3.7	>20.0

*Sq. Ft. per arm/bracket



BOLT-ON SIDE MOUNT 3" TENON STYLE BRACKETS

For luminaires designed to fit a vertical 3" Tenon – including in-line ballast types

Material: Aluminum.

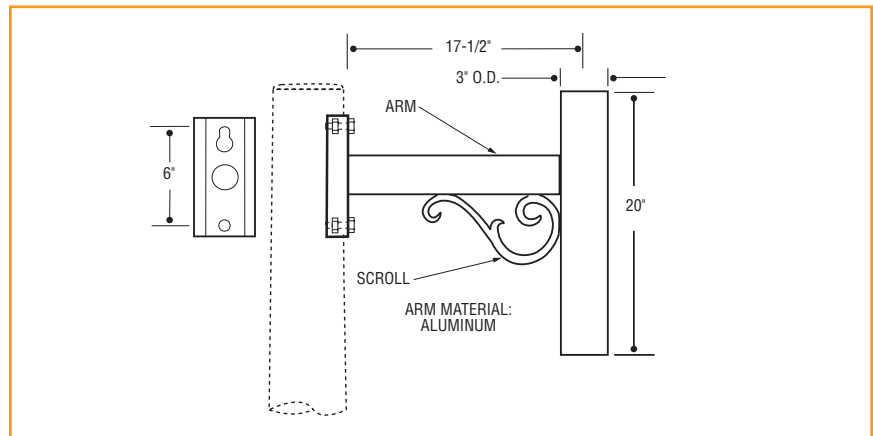
Colour: Mill finish aluminum.

Options: Colour to match pole (specify).

Mounting hardware included.

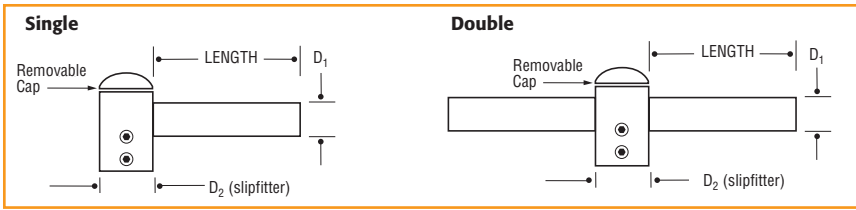
CATALOGUE NUMBER	Arm EPA* (Sq. Ft.)	Weight (lbs.)	Max. Lum. EPA* 90-120 MPH
OPAR-1.5-30 (without scroll)	1.2	6.4	>20.0
OPAR-1.5-30S (with scroll)	1.5	6.9	>20.0

*Sq. Ft. per arm



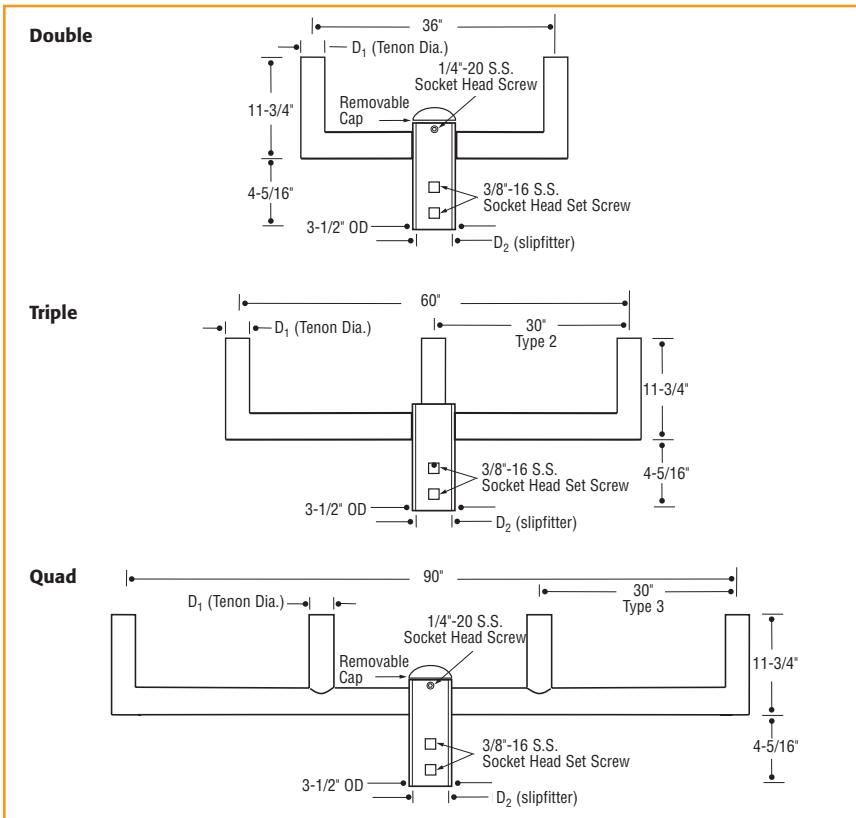
OPAR TENON MOUNT BRACKETS, OPBH BULLHORN BRACKETS

SHAKESPEARE Options and Accessories



CATALOGUE NUMBER	LENGTH	D ₁	D ₂ (slipfitter) fits tenon size	Arm EPA* (sq. ft.)	Weight (lbs.)	Max. Luminaire EPA* 90-120 MPH
SINGLE						
OPAR-2T-0.7	8"	2-3/8"	2-3/8"	0.4	4.6	>20.0
OPAR-3T-0.7	8"	2-3/8"	3"	0.4	2.7	>20.0
DOUBLE						
OPAR-2Tx2-0.7	8"	2-3/8"	2-3/8"	0.5	5.5	>20.0
OPAR-3Tx2-0.7	8"	2-3/8"	3"	0.5	3.6	>20.0

*Sq. Ft. per arm



CATALOGUE NUMBER	D ₁	D ₂ (slipfitter) fits tenon size	Arm EPA (Sq. Ft.)	Max. Luminaire EPA*				Weight (lbs.)
				80 MPH	90 MPH	100 MPH	120 MPH	
DOUBLE								
OPBH-2-02-36	2-3/8"	2-3/8"	1.3	14	11.2	9	6.3	9.6
OPBH-2-01-36	3"	3"	1.6	19.1	15.2	12.2	8.7	13.2
TRIPLE								
OPBH-3-02-60	2-3/8"	2-3/8"	1.9	8.4	6.7	5.4	3.8	13.0
OPBH-3-01-60	3"	3"	2.3	11.5	9.1	7.3	5.2	20.5
QUADRUPLE								
OPBH-4-02-90	2-3/8"	2-3/8"	2.6	4.2	3.3	2.7	1.9	15.3
OPBH-4-01-90	3"	3"	3.2	5.7	4.5	3.7	2.6	29.1

*Sq. Ft. per luminaire

TENON MOUNT BRACKETS

Material: Aluminum

Colour: Mill finish aluminum.

Options: D1=1.66" Dia.; D1=1.90" Dia.; Custom lengths to 24"; Colour to match pole (specify).

Set screws included.

TENON MOUNT BULLHORN BRACKETS

Material: Aluminum.

Colour: Mill finish aluminum.

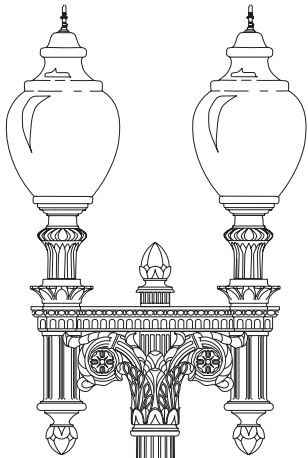
Options: Colour to match pole (specify); Mix tenon and slipfitter sizes (except Quad)

Set screws included.

Our distinctive decorative shrouds add classical beauty to your streetscape... Easily!

For the ultimate in streetscape appeal ask for information about our extensive Historical Series Decorative Poles. Or achieve the classic look with existing poles by using our composite decorative shrouds.

Shakespeare Composite Structures™ decorative Polymer Concrete series offers contemporary styling with an extra durable polymer concrete base that can resist damage from string trimmers.



- Fiberglass reinforced composite construction
- Seven standard or 23 premium colours, or any colour can be matched
- Superior environmental tolerances
- Nonconductive for safety
- Weather and UV-resistant polyurethane coating
- Molded-in colour
- Shrouds fit easily onto new or existing H, O, or S series poles, anchor base or direct burial styles, or onto fluted or straight-fluted decorative poles
- Extensive selection of base shapes and sizes

Shakespeare Composite Structures™ also offers an extensive line of composite decorative poles, luminaires, arms, brackets, and accessories.



Shakespeare Composite Structures™ Transmission & Distribution Products:

- Composite Tuff-Poles® Class 1 to 6 equivalent
- Lewtex® Tangent and Dead-End Crossarms
- Lewtex® H-Frame Crossarms
- Underarm, Sidearm, and X-Braces
- Composite Buss and Switch Supports
- Pole Extensions
- Mast Arms, brackets and accessories

NEW PRODUCT

THE WINNER for sports lighting



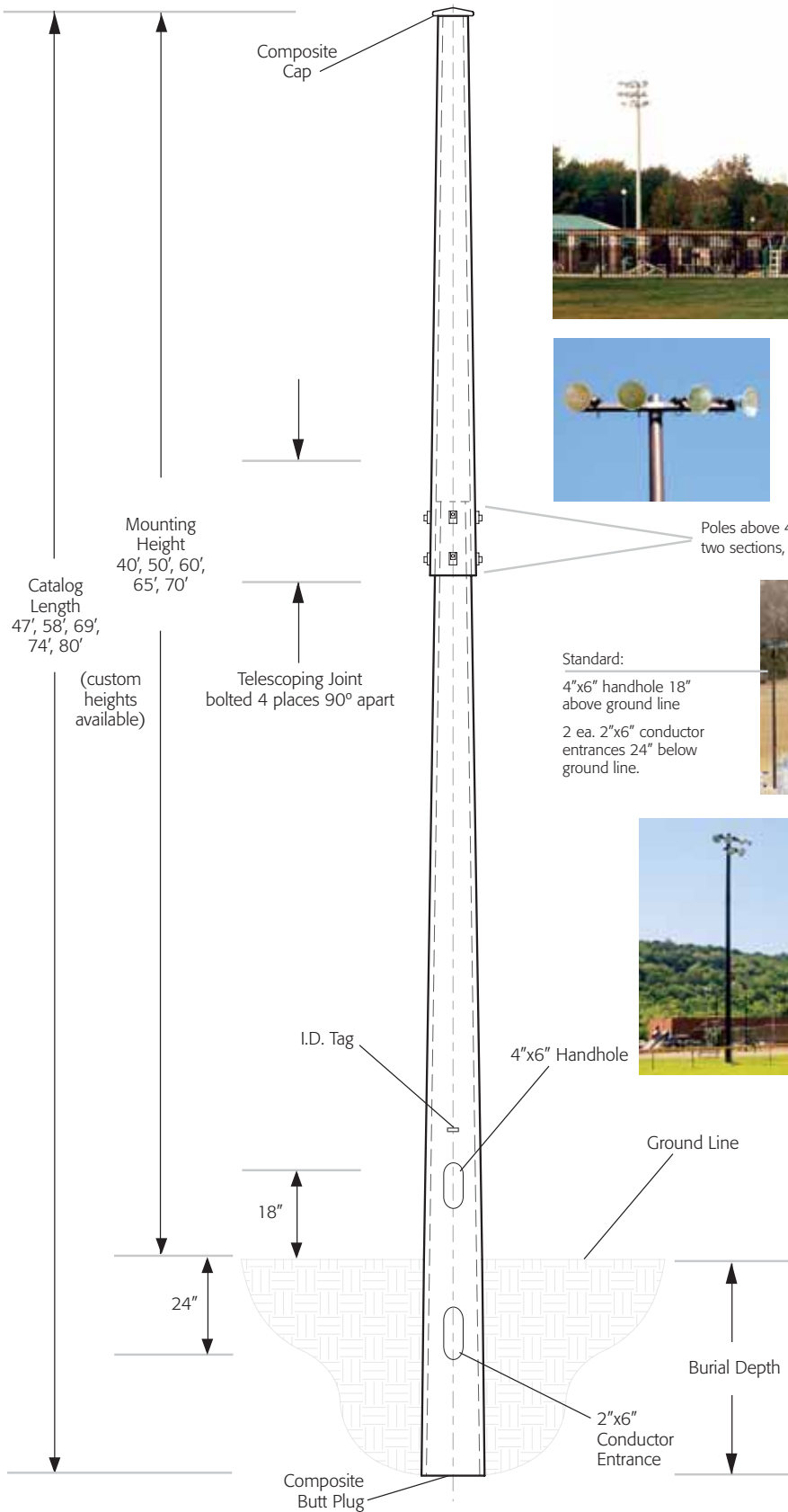
Tall and strong, composite SportsLighting Tuff-Poles® support the heaviest loads without even working up a sweat.

- Great looking poles in your choice of colors, built for sports lighting duty
- Easy, fast installation with minimal heavy equipment needed
- Environmentally safe fiberglass composite construction will never rot, rust or corrode
- Veil finish has UV inhibitors formulated in for extremely long life and strength retention over a very long useful life.
- Climbing steps available
- Mounting heights up to 70 feet
- Luminaire assemblies up to 1,000 pounds
- Poles will not twist, rotate, or warp over time - no re-aiming luminaires, no puddles of darkness
- Non-conductive - eliminates potential hazards
- Insect and woodpecker proof
- Heavy duty Composite Cross Arms available in 2 to 10' lengths to create the lighting arrays you need
- Tuff-Pole® reliability, durability and strength.

Shakespeare's composite SportsLighting Poles are easily installed, great looking and extra strong to support large luminaire assemblies.



SHAKESPEARE SportsLighting Direct Burial Poles



Poles above 40' Mounting Height are supplied in two sections, to be joined on site as shown.

Standard:
4"x6" handhole 18" above ground line
2 ea. 2"x6" conductor entrances 24" below ground line.



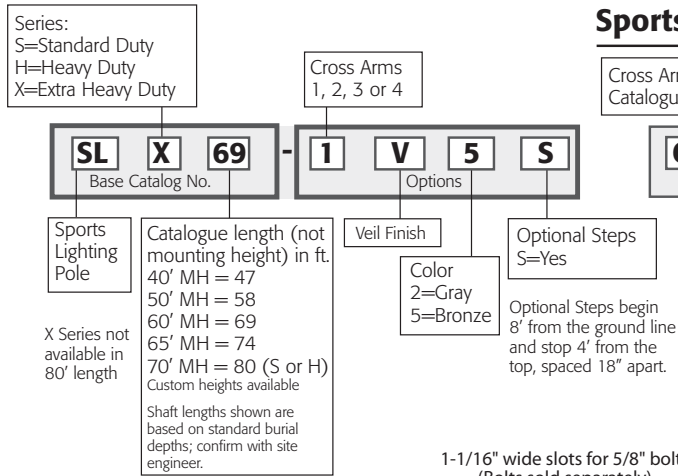
How to order

Shakespeare Composite Structures™ SportsLighting Tuff-Poles® are designed for big, tough jobs, and they can take it standing up. They look great and with Shakespeare's superior Tuff-Pole® process and engineering they keep on doing their job over the long haul.

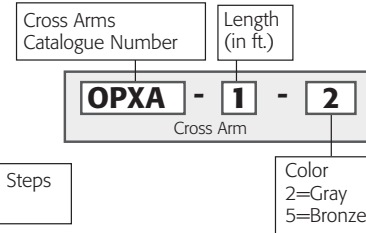
To order, specify series, catalog length, and options according to the order logic panel. The example is for SLX69-1X5S, a 69-foot X Series bronze Tuff-Pole® with one cross arm and optional steps. Specify SportsLighting Cross Arms according to their separate logic panel.



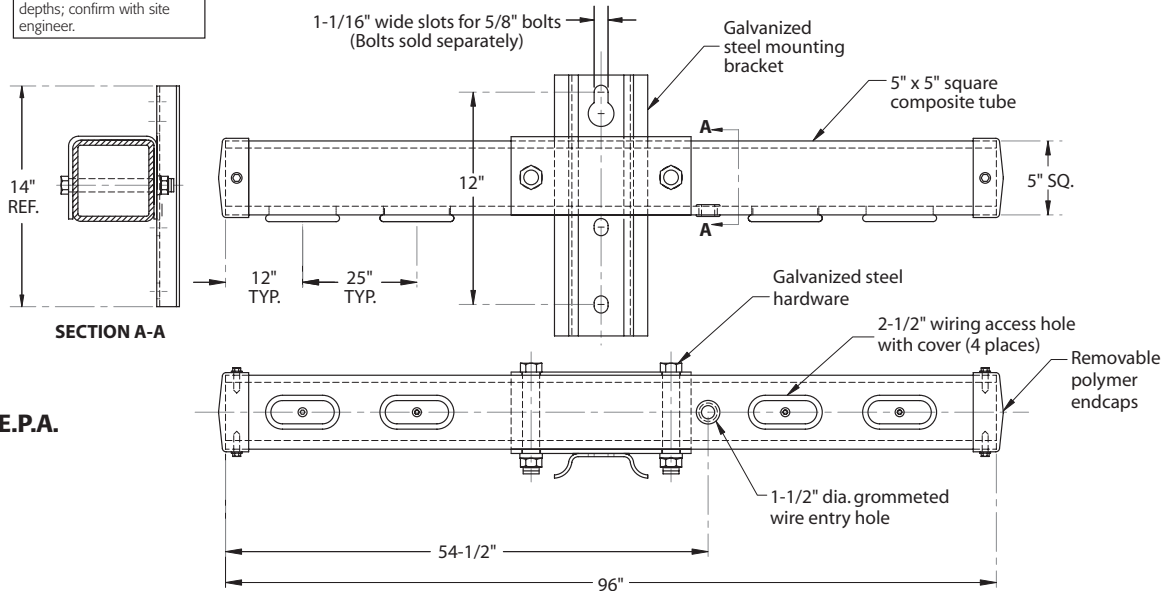
SportsLighting Poles



SportsLighting Cross Arms



SportsLighting Cross Arms come with wiring access holes to keep the wiring inside the arm.
Luminaires are field installed unless otherwise specified. Arm attachment hardware is included.



Cross Arm E.P.A.

Length	EPA
10'	6.0
8'	4.8
6'	3.6
4'	2.4
2'	1.2

SportsLighting Poles E.P.A. Ratings

In square feet, including a 30% Gust Factor, per A.A.S.H.T.O standards.

	80 MPH	90 MPH	100 MPH	120 MPH
STANDARD	23.4	18.5	15.0	10.4
HEAVY	39.1	30.9	25.0	17.4
EXTRA HEAVY	54.7	43.2	35.0	24.3

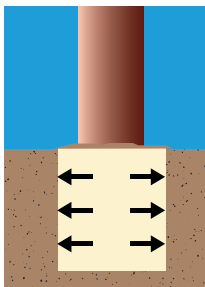


Tamping, Tipping and Concrete Mixing are History!

PoleCrete™ lets you set poles quickly, permanently and inexpensively in any soil without pouring concrete.

- Eliminates time, labor and material expense of forming, pouring, and curing reinforced concrete
- Requires no special equipment for use
- Can be used year round, even in extremely cold climates
- Environmentally safe - no ozone depleting chemicals
- Safe to use
- Packaging acts as storage, mixing and disposal container

- Long lasting, with long shelf life
- Install new poles, including fiberglass, wood, etc., or straighten and stabilize old ones



PoleCrete™ grips the pole from inside the hole and presses against the soil to hold the pole much better than tamped soil.

Available in convenient 1-gallon, 2-gallon, 3-gallon, and 5-gallon kits which include pre-assembled mixing blade for 1/4" drill, gloves and stirring paddle.

Done!

After only 15 minutes, remove supports, tidy the ground line, and move on to the next pole.



1
Mix the two parts together in the box they come in.



2
Pour the liquid into the hole around the pole.



Fast, easy pole installation without soil tamping or concrete

Advanced-formula PoleCrete™, puts the squeeze on the surrounding soil to set poles fast, easy, and inexpensively without time consuming soil tamping and without pouring concrete. The foam works in virtually any type of soil, even rock and sand. It works in any climate, even extremely cold ones.

Use PoleCrete™ for:

- Setting new poles
- Uprighting damaged poles
- Communication dishes
- Cable protection
- Pedestal fill
- Gate and fence posts
- Billboard poles
- Pole barn poles
- Highway sign poles
- H-Frame supports

Environmentally safe: The EPA does not classify PoleCrete™ as a hazardous material or hazardous waste and the product contains no ozone depleting chemicals, no CFC's.

Specifications

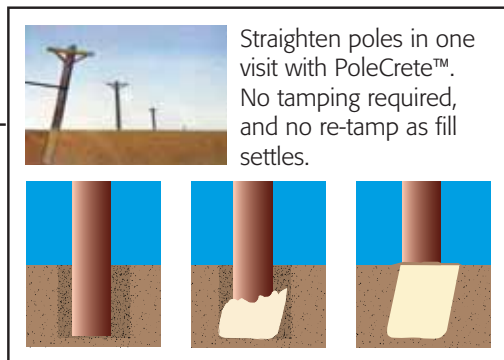
Definition: PoleCrete™ Stabilizer is a 3.5-4.0 pcf density NON-CFC blown, rigid urethane foam system.

Product Data (Typical Properties)

	A	B		
Viscosity @ 77° F, cps	200	1700-2100	Shelf life	At least 1 year
Specific Gravity	1.24	1.10	Recommended storage	35° F or higher
Mix ratio, by volume	1	1	Availability	Kits of 1, 2, 3, and 5 gallons
Cream Time, seconds		35-55	Approximate yield	2.5 cu. ft. per gallon
Gel Time, seconds		120-155	Recommended safety protection	Gloves and goggles
Tack Free Time		On Rise		
Demold Time	8-12 minutes @ 77° F			
Free Rise Core Density, pcf (ASTM D-1622)	3.5-4.0			
Compressive Strength (ASTM D-1621)	70-80 psi			
Flexural Strength (ASTM D-790)	85-95 psi			
Shear Strength (ASTM C-273)	45-55 psi			
Tensile Strength (ASTM D-1623)	90-110 psi			
Impact	1.2-1.6 lbs/sq. in.			

Benefits:

- Safe and economical to use
- Convenient kits, easy to use and dispose
- Expands up to 20 times its volume
- Compressive strength 3 to 4 times that of undisturbed soil
- Equal to crushed stone against uplift
- Superior to stone in resistance to overturning
- Helps reduce ground level decay in wood poles
- Reduces labor costs by 50%
- No tamping required



Q: Can I use PoleCrete™ on fiberglass poles?

A: Yes. The foam works equally well with fiberglass, wood, metal, or concrete poles.

Q: Is special clothing needed to safely use foam?

A: We recommend wearing gloves and protective glasses when mixing the chemicals. Gloves are provided with 1-gallon, 2-gallon, 3-gallon, and 5-gallon kits.

Q: Will cold temperatures affect the foam?

A: Yes. As with all chemical reactions, low temperatures will slow the reaction. We recommend raising the temperature of the chemicals above 50° F. prior to mixing by simply storing kits in the truck's cab before using.

Q: Is PoleCrete™ ruined if it freezes?

A: No. We formulate PoleCrete™ Stabilizer with ingredients that are not affected by freezing. If freezing occurs, we recommend bringing the chemicals to liquid state by raising the temperature. Then, simply tumble the containers prior to mixing.

Q: In northern climates there are times when we set new poles in the winter. Frequently, before we can put the soil back into the hole, it freezes. Then we cannot properly tamp it. It takes twice as long to tamp a pole under these conditions and we always have to return in the spring to re-tamp and finish the job. This is very costly. Will PoleCrete™ help us?

A: Yes. The bottom of the hole stays 55°-58° (F.) year round. PoleCrete™ Stabilizer is formulated to react at this temperature. We recommend drilling the hole just prior to setting the pole. If this isn't possible, cover the hole with a tarp to prevent wind, snow, or rain from blowing in until you are ready to set the pole. If the hole is left uncovered and freezes, you can still use the foam. Simply put a fire in the hole to warm it. Light a kerosene-soaked rag and throw it in the hole. When the fire goes out, set the pole in, plumb it, mix the PoleCrete™ Stabilizer, and pour the mixture in the hole. In ten minutes the foam is hard enough to hold the pole, so you can move to the next pole. Springtime revisits are not needed.

Q: Can I set a pole in standing water using PoleCrete™?

A: No. We recommend pumping water from the hole prior to foaming. A damp hole will not adversely affect foam.

Q: Will the foam cause the pole to rise from the hole during a flood?

A: No. The amount of buoyancy the foam gives to the pole is as negligible as the amount of flotation tires give to an automobile in a lake.

Q: You always include a pre-assembled mixing blade with PoleCrete™ kits. If a hand drill is not available on site, can we hand stir it to mix the chemicals?

A: No. We recommend always using a drill to insure thorough blending, proper expansion, and maximum strength.

Q: We have been using a competitor's foam out of 55-gallon drums. In order to keep the "B" side mixed we have to stir it at least once a day. Is this necessary with PoleCrete™ Stabilizer?

A: No. We do not add "extenders" to our product because they adversely affect results. Consequently, daily mixing of either of the components is not necessary. Also, because we use only top quality ingredients, we guarantee shelf life for 12 months.

Q: Is PoleCrete™ Stabilizer foam affected by acid soil conditions?

A: No. It's not only not affected by acids, it also keeps the preservatives in wood poles from leaving the poles. If you set new wood poles in foam, you can expect them to last longer. Utility companies have reported virtually no ground line decay on poles set with foam.

Q: Are poles originally set with foam difficult to remove?

A: Yes. This is why companies have used foam to counteract wind uplift on H-frame structures. Poles can be removed by drilling one or two holes next to them and rocking them back and forth. The foam will stay on the pole and can be removed with a shovel or saw. However, by leaving the foam on wood poles that are to be reset, and setting them in new holes with additional PoleCrete™ Stabilizer, the preservatives will remain in the pole, and a much longer pole life should result.

Q: The foam is hard enough in 10 minutes to support a newly set pole. Is it rigid enough in that time to stabilize a leaning pole?

A: Probably not. Since a leaning pole is under load from conductors, it is advisable to hold the pole straight for 15 minutes before releasing it. Unlike straightening a pole using conventional backfill materials (earth, rock riprap), which often requires several trips due to compression, you only have to perform the job once with PoleCrete™ Stabilizer. The foam provides continuous support from the butt of the pole to the ground line with a compressive strength of over 10,000 psf. That's three to four times that of undisturbed earth. This feature alone makes using foam very cost effective.

Q: If more rigid foam is needed in a hole, can more be added?

A: Yes. However, never pour more PoleCrete™ Stabilizer on foam while it is rising. It is recommended to wait five minutes between pours.



PoleCrete™ Stabilizer

How to calculate how much PoleCrete™ is needed

The chart at right lists the net volume of an installation by pole diameter (inches) or circumference (inches). Determine Pole Diameter or Circumference (PD) at butt of pole (inches). Determine Auger Size (AS) in inches. From Pole Diameter/ Circumference, read across to Auger Size column to determine Gallons of Material per Foot (GpF). Determine Burial Depth (BD) in feet. Multiply the GpF shown in the table by the Burial Depth.

Example:

PD=10.5; AS=18; BD=5; GpF=0.44

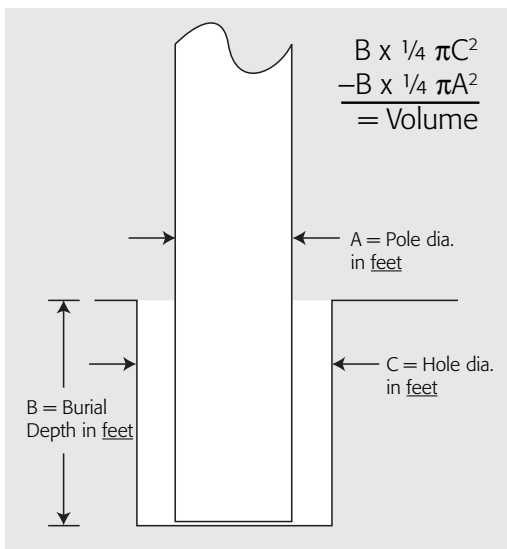
$$0.44 \times 5 = 2.2 \text{ gallons}$$

Order 3 gallons

Kit Size per Foot of Burial Depth

Pole Dia.	Pole Circumference	Auger Diameter (inches)										
		8	10	12	14	16	18	20	22	24	30	36
5	15.7	0.08	0.15	0.25	0.35	0.48	0.62	0.77	0.95	1.14	1.81	2.63
5.5	17.3	0.07	0.14	0.23	0.34	0.47	0.61	0.76	0.94	1.13	1.80	2.61
6	18.8	0.06	0.13	0.22	0.33	0.45	0.59	0.75	0.93	1.12	1.78	2.60
6.5	20.4	0.04	0.12	0.21	0.32	0.44	0.58	0.74	0.91	1.10	1.77	2.59
7	22	0.03	0.11	0.20	0.30	0.43	0.57	0.72	0.90	1.09	1.76	2.58
7.5	23.6	0.02	0.09	0.18	0.29	0.41	0.55	0.71	0.88	1.07	1.74	2.56
8	25.1		0.07	0.17	0.27	0.40	0.54	0.69	0.87	1.06	1.73	2.54
8.5	26.7		0.06	0.15	0.26	0.38	0.52	0.68	0.85	1.04	1.71	2.53
9	28.3		0.04	0.13	0.24	0.36	0.50	0.66	0.83	1.02	1.69	2.51
9.5	29.8			0.11	0.22	0.34	0.48	0.64	0.81	1.00	1.67	2.49
10	31.4			0.09	0.20	0.32	0.46	0.62	0.79	0.98	1.65	2.47
10.5	33			0.07	0.18	0.30	0.44	0.60	0.77	0.96	1.63	2.45
11	34.6			0.05	0.15	0.28	0.42	0.58	0.75	0.94	1.61	2.43
11.5	36.1			0.02	0.13	0.26	0.40	0.55	0.73	0.92	1.59	2.40
12	37.7				0.11	0.23	0.37	0.53	0.70	0.89	1.56	2.38
12.5	39.3				0.08	0.21	0.35	0.50	0.68	0.87	1.54	2.35
13	40.8				0.06	0.18	0.32	0.48	0.65	0.84	1.51	2.33
13.5	42.4				0.03	0.15	0.29	0.45	0.62	0.81	1.48	2.30
14	44					0.12	0.26	0.42	0.59	0.78	1.45	2.27
14.5	45.6					0.09	0.23	0.39	0.57	0.76	1.42	2.24
15	47.1					0.06	0.20	0.36	0.53	0.72	1.39	2.21
15.5	48.7					0.03	0.17	0.33	0.50	0.69	1.36	2.18
16	50.3						0.14	0.30	0.47	0.66	1.33	2.15
16.5	51.8						0.11	0.26	0.44	0.63	1.30	2.11
17	53.4						0.07	0.23	0.40	0.59	1.26	2.08
17.5	55						0.04	0.19	0.37	0.56	1.23	2.04
18	56.5							0.16	0.33	0.52	1.19	2.01
18.5	58.1							0.12	0.29	0.48	1.15	1.97
19	59.7							0.08	0.25	0.44	1.11	1.93
19.5	61.3							0.04	0.21	0.40	1.07	1.89

You can also use the formula below to calculate the amount you need. In the formula, all dimensions are in feet, not inches.



How To Order

Each gallon of PoleCrete™ Stabilizer makes approximately 2.5 cubic feet of rigid backfill. Since PoleCrete™ works well in confined spaces, you may wish to reduce the diameter of augered holes to further reduce costs. Use the formula at left to provide a guideline for how much foam is needed. Order PoleCrete™ in kits of 1 gallon, 2 gallons, 3 gallons, or 5 gallons.

PoleCrete™ Stabilizer:

	Catalogue Number
1 Gallon Kit	BMK-01-PS
2 Gallon Kit	BMK-02-PS
3 Gallon Kit	BMK-03-PS
5 Gallon Kit*	BMK-05-PS

*5-Gallon Kit is supplied in a 3-gallon (Part A) bucket and a 6-gallon (Part B) bucket. Contents of 3-gallon bucket are poured into 6-gallon bucket for mixing with supplied mixing blade for 1/4" drill.

Also available: PadCrete™ structural foam for pad transformer stabilization.

