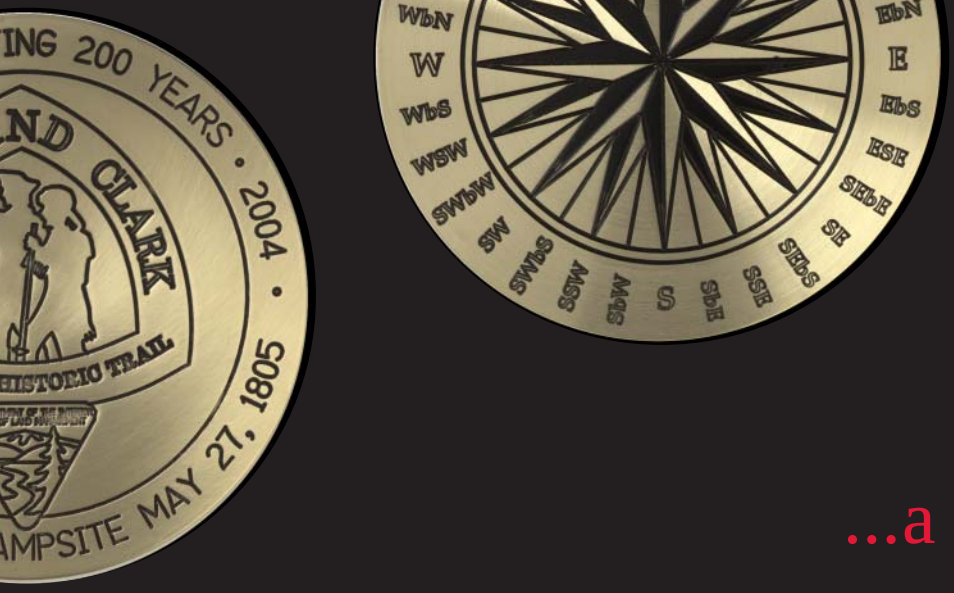
Berntsen

Survey Markers



...a marked difference.

Berntsen International, Inc.
P.O. Box 8670
Madison, WI 53708-8670 USA
Telephone: 800-356-7388
Fax: 800-249-9794
www.berntsen.com
Email: surveymark@berntsen.com

The Marked Difference...

Our Customers have defined the difference.*

- **99.4%** reported that Berntsen Customer Service **met or exceeded** their expectations.
- **97.5%** reported that Berntsen product quality **met or exceeded** their expectations.
- **93.3%** reported that Berntsen delivered their orders **on time or ahead** of schedule.
- **100%** reported that they **would purchase from Berntsen again.**

THANK YOU for the confidence you have placed in us. We look forward to giving you the best product and service available.

Rhonda L. Rushing
President

**Based on Customer Comment Cards received July 1 - Dec 31, 2003.*

TO CONTACT US:

Our office hours are:
MONDAY-FRIDAY 8:00 am - 4:30 pm Central Time (-6 hours GMT)

Telephone: NORTH AMERICA: 800-356-7388 (Toll-free)
Outside NORTH AMERICA: + 1 608-249-8549

Fax: NORTH AMERICA: 800-249-9794 (Toll-free)
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Mail: BERNTSEN INTERNATIONAL, INC.
PO BOX 8670
MADISON, WISCONSIN 53708-8670 USA

Email: surveymark@berntsen.com

Website: www.berntsen.com

Street Address: 3801 Hanson Road
Madison, Wisconsin 53704-2501 USA

Global Address: 43° 09' 12.8333340" N
89° 01' 15.5213676" W
Elevation: 237.442 m

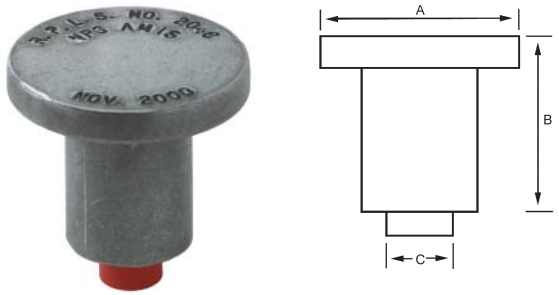
If you are ever in the Madison area we invite you to our facilities. We are located off US Highway 51 (north of the Madison airport) at 3801 Hanson Road.

We accept MASTERCARD®, VISA®, and AMERICAN EXPRESS®

Berntsen Survey Markers

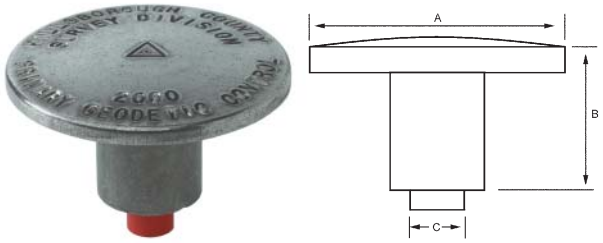
Survey Caps for Rebar & Pipe

FLAT REBAR CAP



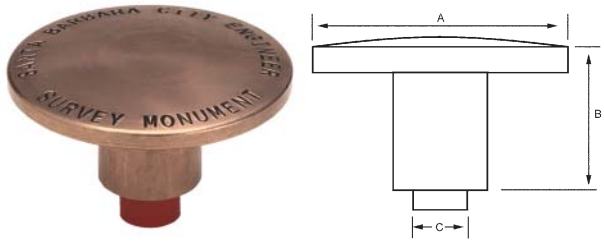
A = 1.5" (38 mm) and 2" (51 mm)
B = 1.75" (45 mm)
C = .375" (10 mm), .5" (13 mm), and .625" (16 mm)

DOMED REBAR CAP



A = 2.5" (64 mm) and 3.25" (83 mm)
B = 1.25" (38 mm)
C = .375" (10 mm), .5" (12.7 mm), .625" (16 mm), .75" (19 mm), .875" (22 mm), and 1" (25 mm)

DOMED REBAR CAP



A = 2.5" (64 mm) and 3.25" (83 mm)
B = 1.25" (38 mm)
C = .375" (10 mm), .5" (12.7 mm), .625" (16 mm), .75" (19 mm), .875" (22 mm), and 1" (25 mm)

PERMAMARK

Survey Caps for Rebar

- 6000 series aluminum or silicon bronze alloy won't chip, crack, or break
- Unique plastic insulator that locks the cap tight on to the rebar or pipe and helps prevent dissimilar metal corrosion
- Deep hex socket that won't "wobble" when tapped on to the rebar
- Virtually eliminates dissimilar metal corrosion
- Available with your name and number using our standard layout form
- Custom logo designs can also be made at additional cost
- Available in either flat or domed (convex) top diameters: Aluminum flat top sizes available include: 1-1/2" (38mm), 2" (51mm). Aluminum domed (convex) top sizes available include: 2-1/2" (64mm), 3-1/4" (83mm). Bronze flat top size: 2" (51mm). Bronze domed (convex) top size 3-1/4" (83mm)
- Our survey markers for rebar fit the following standard rebar sizes: 3/8" (10mm), 1/2" (13mm), 5/8" (16mm), 3/4" (19mm), 7/8" (22mm), and 1" (25mm)
- Best installed using a LIXIE deadblow hammer - *page 27*

QuickShip™ Survey Caps

- Same great cap as above - see top image
- Ship within two business days of your order
- 2" (51mm) diameter aluminum survey cap with one row of lettering around the perimeter of the cap (maximum of 35 characters)
- Available for all sizes of rebar shown above
- Minimum order of 100 caps

"The cap is unexpectedly easy to drive onto rebar & virtually impossible to remove." - PVG, New Mexico

PERMAMARK® Plastic Caps For Rebar and Pipe

- Easy to tap on
- No charge for personalization (minimum order: 200; same imprint, same size)
- Two parallel lines of information available.
- All lettering is RECESSED
- Colors available include yellow, orange, and red
- Four sizes fit inside water pipe or over rebar:
  - 3/8" (10mm) rebar or 1/2" (13mm) pipe
  - 1/2" (13mm) rebar or 3/4" (19mm) pipe
  - 5/8" (16mm) rebar or 1" (25mm) pipe
  - 3/4" (19mm) rebar

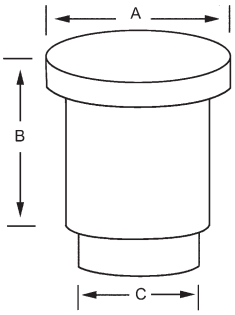
MORASSE - CLOSED CENTER

MORASSE - OPEN CENTER

BERNTSEN INTERNATIONAL, INC
PO BOX 8670
MADISON, WI 53708-8670

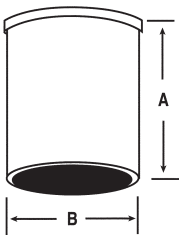
TEL: 800-356-7388
FAX: 800-249-9794
www.berntsen.com

PIPE CAP



A = 2" (51 mm)
B = 1.5" (38 mm) or 1.45" (37 mm)
C = 1.16" (30 mm) or 1.4" (36 mm)

THE MAGNETIZER



A = 1.7" (43 mm)
B = 1" (25 mm)

MORASSE® Plastic Caps For Rebar

Exclusively from Berntsen

- Unique design and larger diameter provide enough room to stamp additional field data using a steel stamp set
- No charge for personalization (minimum order: 200)
- Easy to read RAISED letters
- High quality UV stabilized polyethylene protects against fading (color is throughout for longer life)
- Colors available include orange, red/orange, blue, yellow, green, and pink
- More durable than other plastic caps
- Available with the center "capped" closed or with the unique "open" center (allows the rebar to "mushroom" during driving to a larger diameter than the cap socket and the cap is virtually locked on)
- Four cap diameters available:
  G series: 1-3/4" (45 mm) diameter fits 3/8" (10mm), 1/2" (13mm) or 5/8" (16mm) rebar,
  P series: 2-3/8" (60 mm) diameter fits 3/8" (10mm), 1/2" (13mm) or 5/8" (16mm) rebar,
  M series: 2-3/4" (70 mm) diameter fits 3/8" (10mm), 1/2" (13mm), 5/8" (16mm), or 3/4" (19mm) rebar,
  C series2-3/4" (70 mm) square fits 3/8" (10mm), 1/2" 13mm), 5/8" (16mm) or 3/4" rebar

Survey Caps for Pipe

- 6000 series aluminum alloy won't chip, crack, or break
- Unique plastic insulator that locks the cap tight on to the pipe and helps prevent dissimilar metal corrosion
- Deep hex socket that won't "wobble" when tapped onto the pipe
- Available with your name and number using our standard layout form
- Custom logo designs can also be made at additional cost
- Available in a flat top 2" (51mm) diameter for 3/4" (19mm) or 1" (25mm) ID (inside diameter) iron pipe
- Best installed using a LIXIE deadblow hammer - *page 27*

The Magnetizer

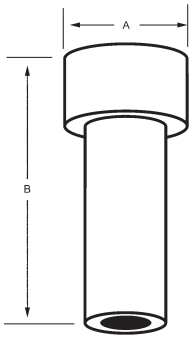
Do you have problems finding rebar, pipe, or survey nails?
Each time you drive in your rebar, pipe or nail (or anything magnetic) you are actually decreasing your chances of locating it later. When a magnetic object (i.e. rebar, etc.) is struck, you are altering the magnetic field. Simply put, you weaken the magnetic field of the marker you just installed.
To use The Magnetizer, follow these three simple steps:

1. Locate your position and drive in your marker (rebar, pipe, nail, etc.).
2. Take **The Magnetizer** and touch the *black end* to the top of your marker.
3. Tap cap onto the rebar or pipe.

Berntsen Survey Markers

Rebar Driver / Anvil / Capmag

REBAR DRIVER

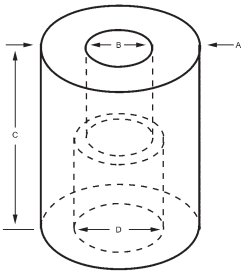


A = 6” (152 mm)
B = 2” (51 mm)

Rebar Driver

- Drive rebar easier with a large 2" striking surface
- Prevents mushrooming and splitting of the rebar end, making it easier to install insulated aluminum or plastic rebar caps
- Machined and hardened steel
- Available in the following sizes: Model RDRV4 for 3/8" (10mm) and 1/2" (13mm) rebar, model RDRV5 for 5/8" (16mm) rebar, model RDRV6 for 3/4" (19mm) rebar, model RDRV8 for 7/8" (22mm) and 1" (25mm) rebar

STAMPING ANVIL

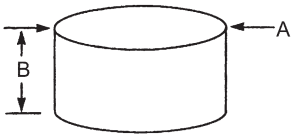


A = 2.97” (75 mm)
B = .82” (21 mm) or 1.13” (29 mm)
C = 3.2” (81 mm)
D = 1.265” (32 mm) or 1.54” (38 mm)

Stamping Anvil

- A sturdy tool that provides a good solid stamping base when backed up by another large, solid and stable object
- Holds Berntsen survey caps for rebar, while any hand stamping is being done with Rotary or Standard Steel Stamp Sets (before installation onto the rebar) - page 24
- ANVILCX available for stamping our larger rebar & rod monument survey caps, as well as the C and CD2 series of concrete markers

CAPMAG



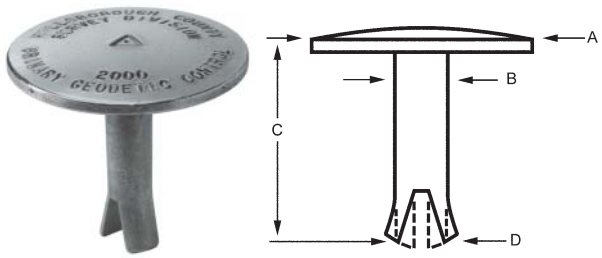
A = .5” (13 mm)
B = .25” (6 mm)

CAPMAG Permanent Ceramic Magnet

- Ceramic magnets are designed to be used with concrete survey markers to assure easy relocation with magnetic locators
- Dimensions: 1/2" (13mm) in diameter by 1/4" (6mm) long
- Can be located up to 4 feet (1220mm) deep with a magnetic locator

“I had a short schedule and you guys did great at meeting it.” - BF, Arizona

C SERIES CONCRETE MARKER

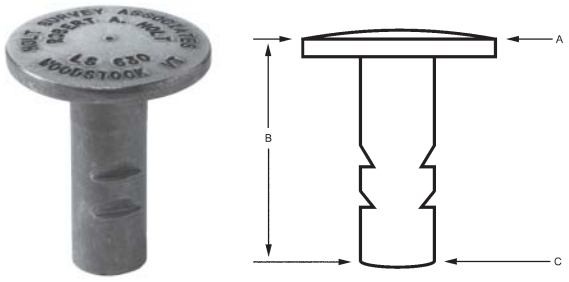


A = 2.5" (64 mm), 3.5" (89 mm), and 4" (102 mm)
B = .72" (18 mm)
C = 3.125" (79 mm), 3.3125 (84 mm), and 3" (76 mm)
D = .875" (22 mm)

C Series Concrete Survey Markers

- "C" style (US Army Corps of Engineers Type 1 Disc) has the classic split-style tapered stem
- One solid piece - no welding
- Available in 2-1/2" (64mm), 3-1/2" (89mm) or 4" (102mm) diameters with a flat or domed top
- 6000 series aluminum or silicon bronze alloy
- Inverted "Y" design stem is flared to approximately 3/4 inches (19mm) for anchoring in rock or concrete
- Optional capmag magnet available - *see page 6*

CD2 CONCRETE MARKER

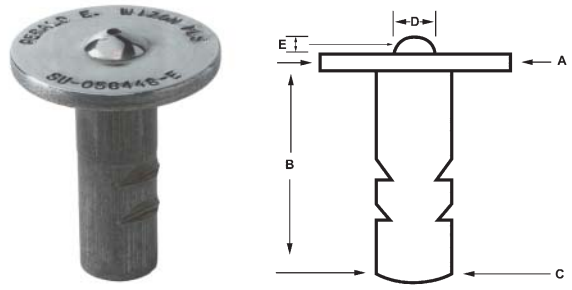


A = 2" (51 mm)
B = 2.25" (57 mm)
C = .75" (19 mm)

CD2 Concrete Survey Markers

- "CD" style has a 3/4" (19mm) diameter x 2" (50mm) long notched stem to hold firmly in concrete or rock
- 6000 series aluminum or silicon bronze alloy
- Optional capmag magnet available - *see page 6*

CD2L CONCRETE MARKER

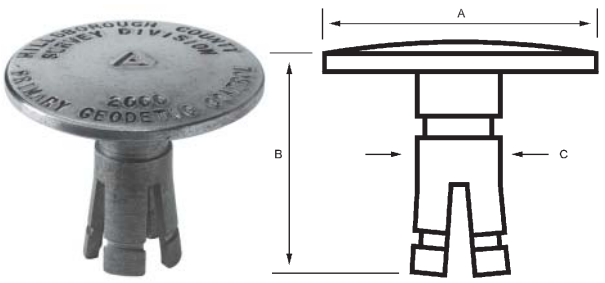


A = 2" (51 mm)
B = 2.25" (64 mm)
C = .75" (19 mm)
D = .6" (15 mm)
E = .16" (4 mm)

CD2L Concrete Survey Markers

- CD2L leveling mark with a raised datum point (and recessed center) for precise monitoring.
- 2" (50mm) diameter flat top marker with a 3/4" (19mm) diameter x 2" (50mm) long notched stem
- 6000 series aluminum or silicon bronze alloy
- Optional capmag magnet available - *see page 6*

RT CONCRETE MARKER

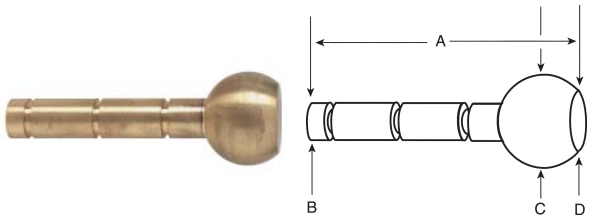


A = 3.5" (89 mm)
B = 2.8" (71 mm)
C = 1" (25 mm)

RT Series Concrete Survey Markers

- "RT" style is a variation on the concrete disc theme available in a 3-1/2" (89mm) diameter with a flat or domed top
- More resistance to twisting with four equidistant anchoring legs on the stem
- Stem is approximately 2-1/2" (64mm) long and flared approximately 1" (25mm) to provide an excellent anchor
- 6000 series aluminum or silicon bronze alloy
- Optional capmag magnet available - *see page 6*

SPHERICAL WALL MARKER

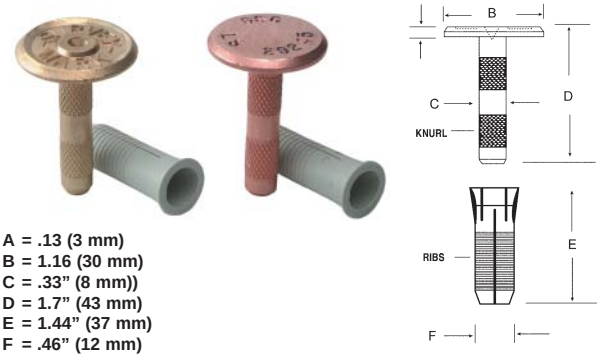


A = 2.625” (67 mm) and 3.95” (100 mm)
B = .4” (10 mm) and .6” (15 mm)
C = .8” (20 mm) and 1.35” (34 mm)
D = .55” (14 mm) and 1” (25 mm)

SPH Spherical Wall Marker

- Designed for precise leveling and offers a "high point" from any angle (even if the marker or its position is deflected up to 45 degrees)
- A flat area provided for stamping data
- SPH is a precision 35mm brass sphere featuring evenly spaced recessed ridges for anchoring
- SPH also available in stainless steel.
- SPHSMBR is a precision 20mm brass sphere useful for surveys that are in confined areas or to minimize its exposure

BP BRASS MARKER



A = .13 (3 mm)
B = 1.16 (30 mm)
C = .33” (8 mm))
D = 1.7” (43 mm)
E = 1.44” (37 mm)
F = .46” (12 mm)

BP Brass Markers

- Formed from copper
- Unique survey marker featuring a machine-knurled stem that holds tightly to and deforms a specially designed ribbed plastic expansion plug
- Top diameter of the marker is 1.17" (30mm)
- Ideal for use in sidewalks and curbs
- Installed, the marker is flush with the surface
- Available in three styles:

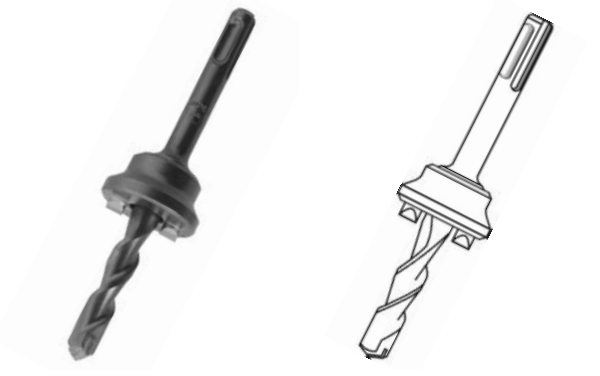
  BP1 - Brass coated copper, with "SURVEY MARK"imprint with a recessed, beveled center

  BP1P - Uncoated copper, with a plain top with the recessed, beveled center

  BP2 - Uncoated copper, with a plain flat top

BP1P and BP2 can be stamped with up to 15 characters (includes spaces)

BRASS MARKER DRILL BIT



BPMDRL Brass Marker Drill Bit

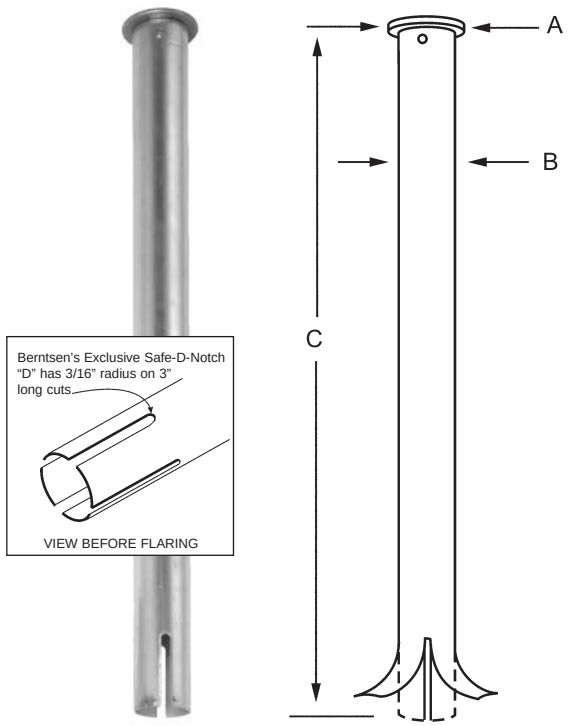
- Countersink drill bit (BPMDRL) to install the BP series marker
- Fits any standard SDS chuck and some 1/2” chucks

FASTPLUG

FASTPLUG® Anchoring Cement

- A hydraulic-type concrete expands while drying
- Great for setting all types of stem-type survey markers in existing concrete or rock
- Mix 3 parts FASTPLUG to 1 part "drinking quality" water
- Sets quickly

A1NB30, A1NBF30



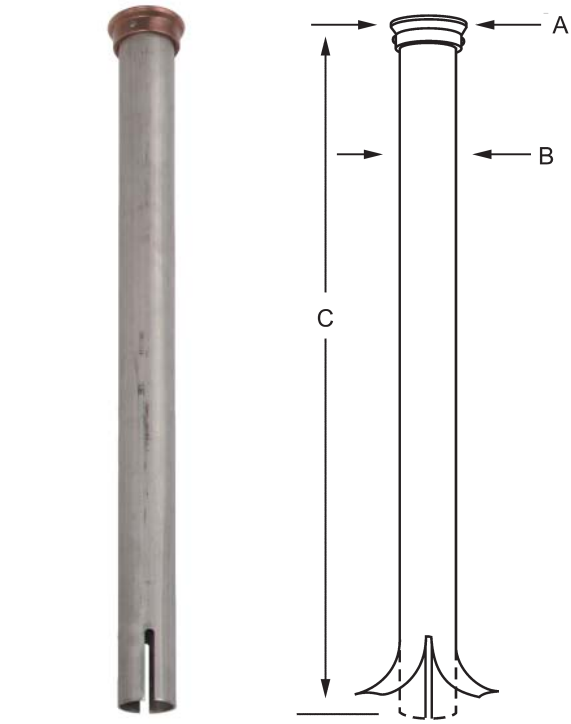
A = 3.25" (83 mm)
B = 2.375" (60 mm)
C = 30" (762 mm)
(Other lengths available)

WEIGHT:
2.7 lbs (1.2 kg)

A1NBF30 Aluminum Pipe Monument

- Designed to meet the requirements of federal, state, and county surveyors
- Similar in appearance to the old Regulation Iron Pipe Monument as found in Chapter IV-7 of the Manual of Instructions For The Survey of The Public Lands of The United States - 1973, Department of the Interior Technical Bulletin No 6
- Safe-D-Notch design has a 3/16" (5mm) radius on a 3" (76mm) long sheared cut
- 2" (50mm) Schedule 10 aluminum pipe
- 4 split legs flared to form a self-supporting base anchor
- 3-1/4" (83mm) diameter series 6000 aluminum cap has a domed (convex) surface attached to the pipe with an aluminum rivet
- A permanent ceramic magnet is affixed to the underside of the cap
- Pipe, cap, and rivet are metallurgically matched
- Also available:
  A1NB30 Aluminum Notch Base Monument (Not Flared)
  The A1NB30 is identical to the A1NBF30 except that the 4 notched split legs have not been flared. This gives you the option of driving the monument into the ground or flaring legs in the field, using a crescent wrench or vise grip wrench.

SSBNB30, SSBNBF30



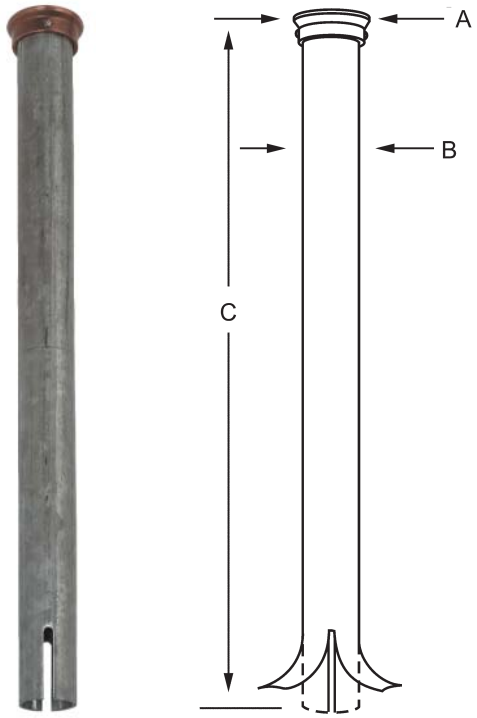
A = 3.25" (83 mm)
B = 2.375" (60 mm)
C = 30" (762 mm)
(Other lengths available)

WEIGHT:
7.6 lbs (3.4 kg)

SSBNBF30 Stainless Steel Pipe Monument

- Nearly identical in appearance to the Iron Pipe/Brass Cap Monument
- Significantly more corrosion resistant in even the most aggressive soil conditions
- One of the standard survey monuments used by the USDI Bureau of Land Management
- 2" (50mm) Schedule 10 stainless steel alloy 304 pipe
- Safe-D-Notch design
- 4 split legs flared to form a self-supporting base anchor
- 3-1/4" (83 cm) diameter silicon bronze survey cap has a domed (convex) surface and is attached to the pipe with a stainless steel rivet
- A permanent ceramic magnet is mechanically fixed to the underside of the cap
- Several other models of stainless steel pipe monuments are available:
  SSBNB30- same as the SSBNBF30, the notched split legs are not flared
  SS5NBF30- similar to the SSBNBF30 except that the pipe is schedule 5 stainless steel pipe
  SS5NB30- same as the SS5NBF30 except the 4 notched split legs are not flared

IPNB30, IPNBF30



A = 3.25" (83 mm)
B = 2.375" (60 mm)
C = 30" (762 mm)
(Other lengths available)

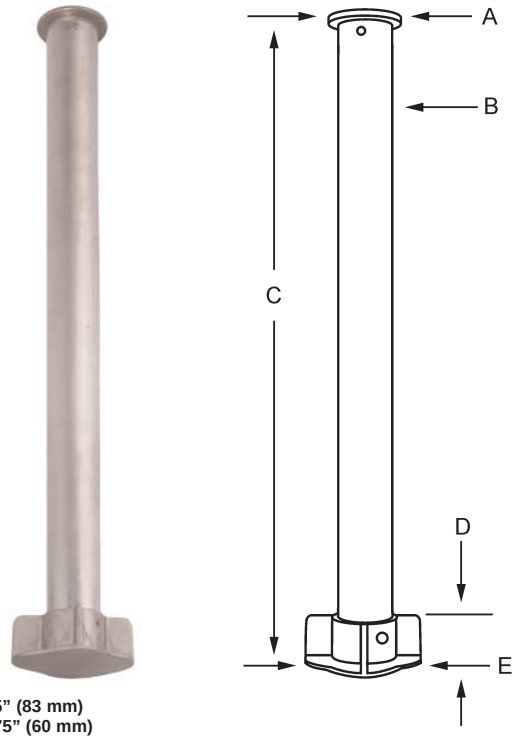
WEIGHT:
10 lbs (4.5 kg)

IPNBF30 Iron Pipe Monument

- 2" (50mm) Schedule 40 galvanized iron pipe
- Safe-D-Notch design
- 4 split legs flared to form a self-supporting base anchor
- 3-1/4" (83 cm) diameter silicon bronze survey cap has a domed (convex) surface and is attached to the pipe with a stainless steel rivet
- A permanent ceramic magnet is affixed to the underside of the cap
- Also available:
  IPNB30- same as the IPNBF30 except the 4 notched split legs are not flared *(the IPNB30 CANNOT be flared in the field)*

"Very nice looking caps just like all the others purchased from you." - BU, Washington

A130



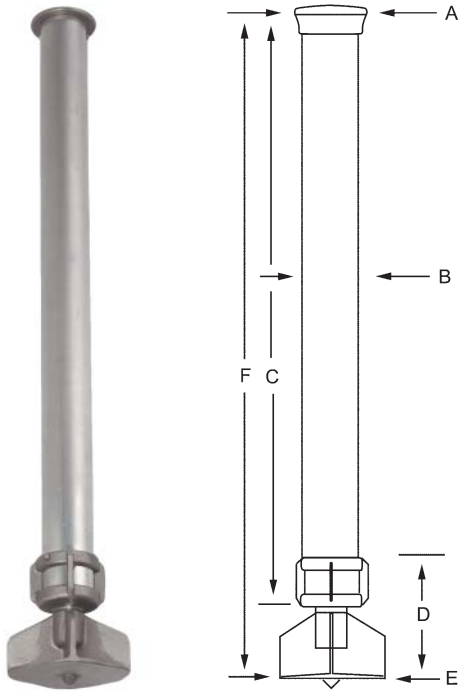
A = 3.25" (83 mm)
B = 2.375" (60 mm)
C = 30" (762 mm)
(Other lengths available)
D = 2.1875" (56 mm)
E = 5.5" (140 mm)

WEIGHT:
4.1 lbs (1.9 kg)

A130 Standard Pipe Monument

- A significant improvement over the federal "regulation" monument
- Specially designed cast aluminum base adds to the horizontal stability of the structure in the ground, and houses a strong permanent ceramic magnet
- Standard length of the pipe is 30' (762mm)
- 3-1/4" (83mm) diameter 6000 series aluminum survey cap with ceramic magnet
- 2" (50mm) inside diameter aluminum pipe
- Cast aluminum base
- Cap and base are held to the pipe with an aluminum rivet

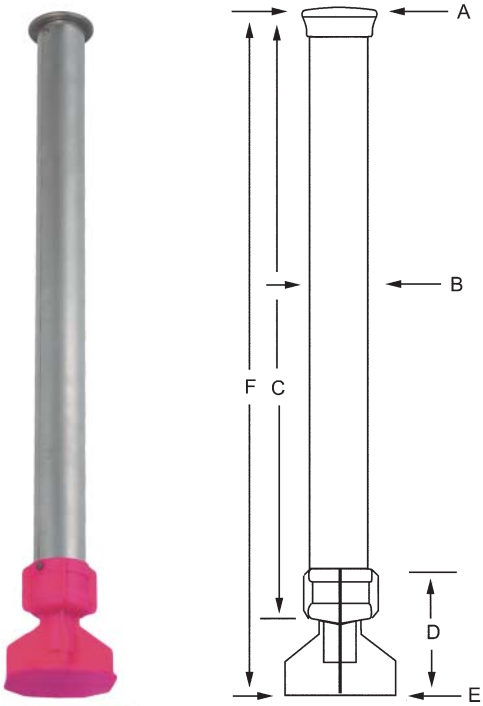
A1BR30



A = 3.25" (83 mm)
B = 2.375" (6 mm)
C = 30" (762 mm)
(Other lengths available)
D = 5.5" (140 mm)
E = 4.375" (111 mm)
F = 33.5 (851 mm)

WEIGHT:
3.7 lbs (1.7 kg)

A2BR30



A = 3.25" (83 mm)
B = 2.375" (60 mm)
C = 30" (762 mm)
(Other lengths available)
D = 5.5" (140 mm)
E = 4.375" (111 mm)
F = 33.5 (851 mm)

WEIGHT:
2.8 lbs (1.3 kg)

A1BR30 Break-off Monument

- The first magnetic break-off monument introduced by Berntsen
- Designed to be used in areas where surface disturbance is likely
- Elongated base is designed to break at a predetermined point
- Magnetic remnant is left at the original location after impact, even if the entire pipe and cap portion of the monument is pulled from the ground
- Prevents complete loss of the original survey point
- 3-1/4" (83mm) diameter 6000 series aluminum survey cap *
- 2" (50mm) diameter ID aluminum pipe
- Cast aluminum break-off base *
- Cap and base are held to the pipe with aluminum rivets

* Permanent ceramic magnets located in the cap and below the break-off point in the base

A2BR30 Break-off Monument

- Base is made from bright pink high impact polystyrene.
- Weights and costs less than the A1BR30
- 3-1/4" (83mm) diameter 6000 series aluminum survey cap *
- 2"(50mm) diameter ID aluminum pipe,
- Bright pink high impact polystyrene base *

* Permanent ceramic magnets located in the cap and below the break-off point in the base

A3BR30 Break-off Monument

- 3-1/4" (83mm) diameter 6000 series aluminum survey cap *Silicon bronze cap substituted at additional cost* *
- 2" (50mm) diameter ID schedule 80 PVC pipe
- Bright pink high impact polystyrene base *
- Cap and base are held to the pipe with aluminum rivets

* Permanent ceramic magnets located in the cap and below the break-off point in the base

A5BR30 Break-off Monument

- 3-1/4" (83mm) diameter silicon bronze survey cap *
- 2" (50mm) diameter ID schedule 5 stainless steel 304 alloy pipe
- Bright pink high impact polystyrene base *
- Cap is held to the pipe with stainless steel rivets - base shipped separately from the cap/pipe assembly to protect against breakage - Install in the field

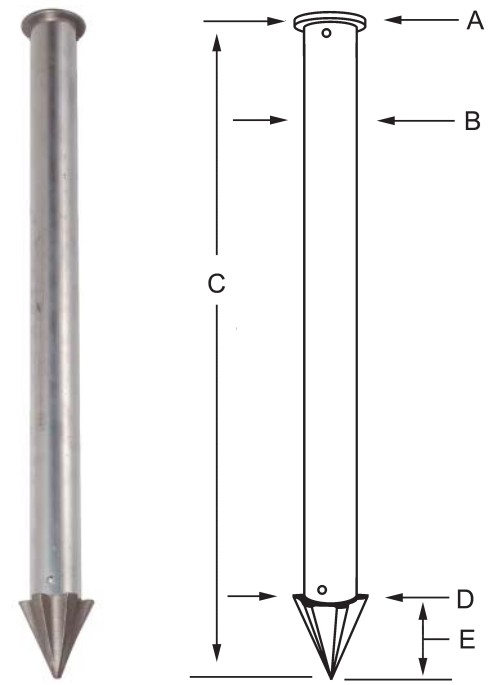
* Permanent ceramic magnets located in the cap and below the break-off point in the base

A6BR30 Break-off Monument

- 2-3/8" (60mm) diameter plastic survey cap
- 2" (50mm) diameter ID schedule 80 PVC pipe
- Bright pink high impact polystyrene base
- Cap and base are held to the pipe with aluminum rivets

* Permanent ceramic magnets located below the break-off point in the base

F130



A = 3.25" (83 mm)
B = 2.375" (60 mm)
C = 30" (762 mm)
(Other lengths available)
D = 3.5" (89 mm)
E = 4" (102 mm)

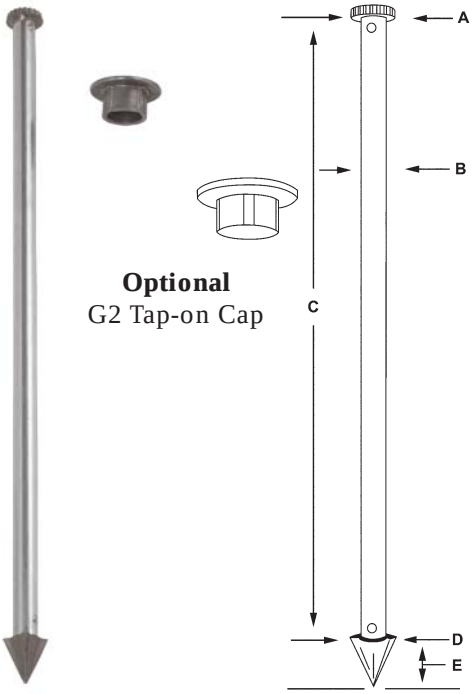
WEIGHT:
3.4 lbs (1.5 kg)

F130 Drive-in Cone Monument

- Designed primarily for use in wetlands - swamps, riverbanks, lake shores, streams - anywhere a substantial monument is needed and digging a hole is impossible due to constant water cover
- 3-1/4" (83mm) diameter series 6000 aluminum survey cap *
- 2" (50mm) diameter aluminum pipe
- Cast aluminum base point
- Cone-shaped point is fluted for easy installation
- Tapers out to a diameter larger than the diameter of the pipe to deter removal
- Cap and base are held to the pipe with aluminum rivets
- Not recommended for "normal" firm, hard, or stony soil conditions
- Best installed using a LIXIE deadblow hammer - *page 27*

* Permanent ceramic magnet located on the survey cap

G130



Optional
G2 Tap-on Cap

A = 1.625" (41 mm)
B = 1" (25.4 mm)
C = 30" (762 mm)
(Other lengths available)
D = 2" (51 mm)
E = 2.125" (54 mm)

WEIGHT:
1.3 lbs (.59 kg)
G2 cap: .37 lbs (.17kg)

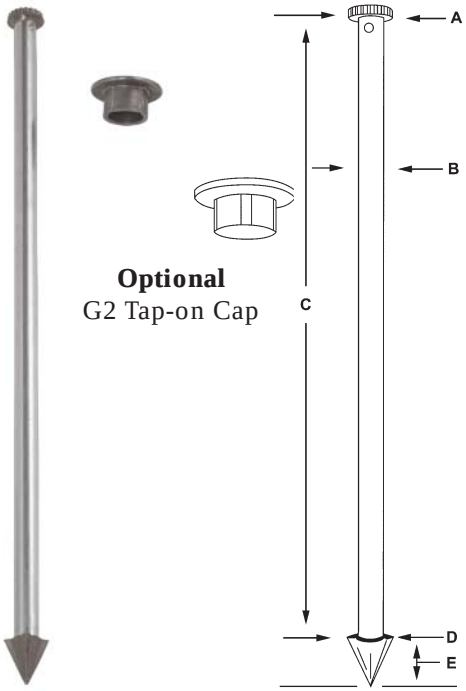
G130 Drive-in Piston Monument

- Lightweight & extremely strong and durable
- Designed for surveys where speed of installation is a primary concern
- Multiple uses: marking boundaries, an accessory to section corners, utility marking, marking cemeteries, and numerous other uses
- 6000 series aluminum driving head cap *
- 1" (50mm) diameter aluminum pipe
- Cast aluminum base point
- Driving head cap and base are held to the pipe with aluminum rivets
- Can be driven into most soil conditions with a LIXIE deadblow hammer - No hole digging

* Permanent ceramic magnets located below the break-off point in the base

Optional G2 Tap-on Cap - *page 13*

G1BR30



A = 1.625" (41 mm)
B = 1" (25 mm)
C = 30" (762 mm)
(Other lengths available)
D = 2" (51 mm)
E = 2.125" (54 mm)

WEIGHT:
1.3 lbs (.59 kg)
G2 cap: .37 lbs (.17kg)

G1BR30 Drive-in Breakaway Piston Monument

- Point is magnetized, attached to the pipe with a light press fit but *not* riveted to the pipe
- If monument is pulled from the ground, the magnetized point will pull free and allow relocation of the original location of the monument
- See G130 for material specifications - *page 12*

G2 Tap-on Cap for G1 and G1BR Monuments

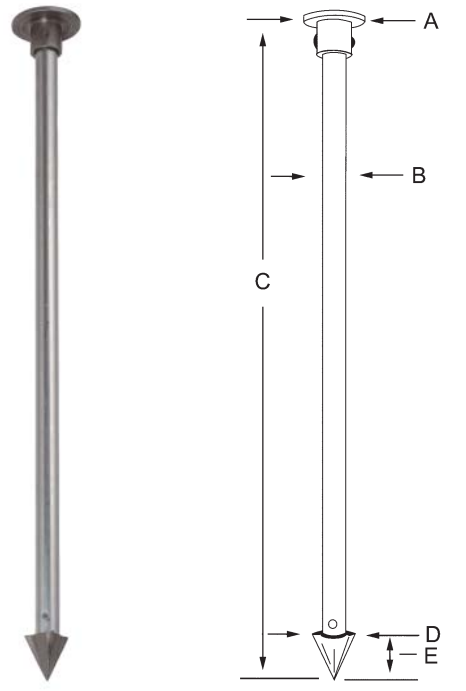
- Offers a stamping surface
- Tap onto the pipe after the monument is driven into the ground
- Specially designed serrations and a unique rim design on the driving head cap lock the Tap-On Cap to the G1 Drive-in Piston Monument or B1BR Aluminum Drive-in Breakaway Monument
- 3-1/4" (83mm) diameter series 6000 aluminum survey cap

G1PVC30 Drive-in PVC Pipe Monument

- Intended for use in harsh soil environments with high acid or alkaline content
- 2-1/2" (64mm) diameter series 6000 aluminum survey cap *
- 1" (50mm) diameter PVC pipe
- Cast aluminum base point
- Cap and base are held to the pipe with aluminum rivets
- Best installed using a LIXIE deadblow hammer - *page 27*

* Permanent ceramic magnet located on the survey cap

G3325



A = 3.25" (83 mm)
B = 1" (25 mm)
C = 30" (762 mm)
(Other lengths available)
D = 2" (51 mm)
E = 2.125" (54 mm)

WEIGHT:
1.5 lbs (.68 kg)

G3250 Aluminum Drive-in Monument

- 2-1/2" (63mm) diameter series 6000 aluminum survey cap tops the monument instead of the usual driving cap *
- 1" (50mm) diameter aluminum pipe
- Cast aluminum base point
- Cap and base are held to the pipe with aluminum rivets
- Best installed using a LIXIE deadblow hammer - *page 27*

* Permanent ceramic magnet located on the survey cap

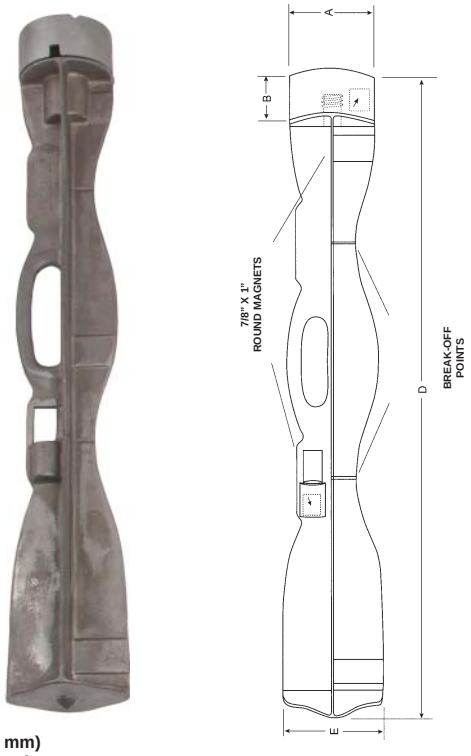
G3325 Aluminum Drive-in Monument

- 3-1/4" (83mm) diameter series 6000 aluminum survey cap tops the monument instead of the usual driving cap *
- 1" (50mm) diameter aluminum pipe
- Cast aluminum base point
- Cap and base are held to the pipe with aluminum rivets

* Permanent ceramic magnets located below the break-off point in the base

- Best installed using a LIXIE deadblow hammer - *page 27*

W1ABC



A = 4" (102 mm)
B = 2" (51 mm)
D = 30" (762 mm) Overall Length Assembled
E = 4.75" (121 mm)

WEIGHT:
5 lbs (2.3 kg)

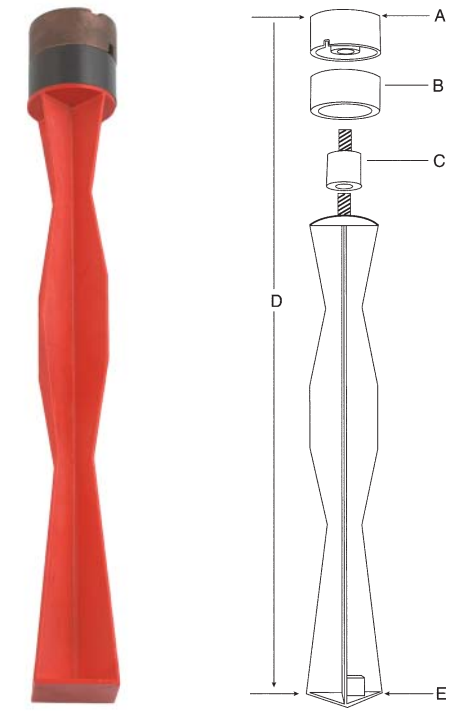
W1ABC Aluminum Highway Monument

- Designed to meet the need for a compact and lightweight monument that offers maximum stability in the ground and lighter in weight than concrete
- Extensions are available in several sizes to increase the height of the monument to a new pavement overlay without disturbing the original horizontal setting
- 4" (102mm) diameter cast aluminum survey cap *
- Survey cap can be tightened or removed from the monument with specially designed top or side spanner wrenches
- 27-1/2" (698mm) cast aluminum alloy base
- Designed with two break-off points and a permanent vertically oriented magnet located below the bottom break-off point

* Permanent ceramic magnet located on the survey cap

Monument extensions are available in 1" (25mm), 2" (50mm), 3" (76mm) and 6" (152mm) lengths

W1PBC



A = 4" (102 mm)
B = 2" (51 mm) PVC Support Ring Extension
C = 2" (51 mm) PVC Threaded Inner Support Ext.
D = 31.5" (800 mm) Overall Length Assembled
E = 3.5" (89 mm)

WEIGHT:
5 lbs (2.3 kg)

W1PBC Glass-filled Plastic Highway Monument

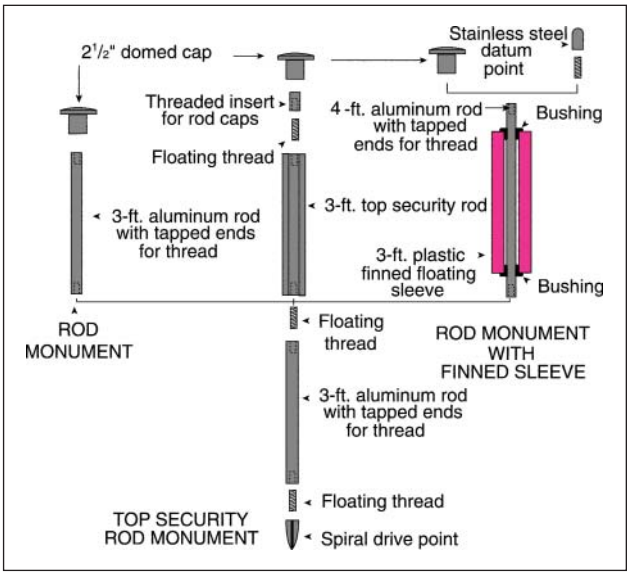
- Intended for use in harsh soil environments with high acid or alkaline content
- Highly visible color makes any remnants of the monument easy to see should excavation be necessary
- 4" (102mm) diameter cast bronze survey cap *
- 2" (51mm) threaded PVC riser with support ring
- 27-1/2" (698mm) Polyglass base
- Designed with two break-off points and a permanent vertically oriented magnet located below the bottom break-off point

* Permanent ceramic magnet located on the survey cap

SWC And SWY Spanner Wrenches

- Cap can be easily removed with specially designed spanner wrenches
- SWC wrench for soil conditions
- SWY wrench for highway conditions

ELEMENTS OF THE SYSTEM



- High Precision 3-dimensional accuracy
- Unparalleled stability for driven rod markers… stainless steel or aluminum
- Bright pink color PVC sleeve and color coded End Cap Alignment bushings for 9/16 " (14mm), 5/8" (16mm), and 3/4" (19mm) rods make installation much more precise
- Extendable 3 foot (915mm) and 4 foot (1220mm) lengths
- Lightweight-easily shipped worldwide
- Cost effective-fast and easy to install
- Vibration-resistant, precision threaded rod connections…exclusively from Berntsen!

Basic rod monuments, pioneered three decades ago by Berntsen, are composed of several basic elements including caps, rods, spiral penetrating (drive) point, and floating threads (to connect rods and the spiral penetrating drive point). Additional elements can be added to enhance the performance of rod monuments. These include finned Top Security® Rods, and Top Security Finned Sleeve(s) for additional stability.

"NGS" Style Stainless Steel Rod

Berntsen is an innovator and major supplier of stainless steel rod monuments to government agencies and private contractors around the world. Stainless steel rods are often specified for vertical control, GPS, and GIS/LIS monuments. Berntsen is well equipped to provide the finest stainless steel rods, precision machined for ease of use and installation in the field, and properly packed for ease of handling.

Stainless steel rod monuments generally are fitted with special driving points, and are topped with precision machined spherical datum points.

For additional information on the horizontal and vertical stability of stainless steel or aluminum rod monuments, see Berntsen's exclusive Top Security Sleeve on page 18 of this catalog. Call 800-356-7388 for price information.

Rotating Sectional Rod Monuments

The patented rotating sectional rod monument concept originated with Berntsen in the mid-1970's and has since developed into a wide variety of products. Although the rod monument can be used for nearly any type of survey, it was designed to meet the requirements of survey projects that involve a high degree of precision. Rod monuments and markers are often used for vertical control work and are also used for GIS/LIS. Rods are usually driven deeply into the ground to the point of refusal.

This survey monument is assembled as it is installed. It consists of a simple series of sectional rods available in one (305mm) to five (1524mm) foot lengths in even-foot (305mm) lengths. The rods are coupled together with a floating thread that aligns and connects the rods. Additional sections can be added, as required, to achieve the required depth or stability of the monument. The thread is also used to connect the point to the rod series. The unique spiral penetrating point rotates the rod series slightly as it is being driven into the ground. This slight rotation is very important as it assures that the series stays connected. The tap-on cap has a hex-socket specially designed for a compression fit when tapped onto the rod. The socket interior is fluted to allow air to escape. A permanent ceramic magnet is affixed to the inside of the cap socket.

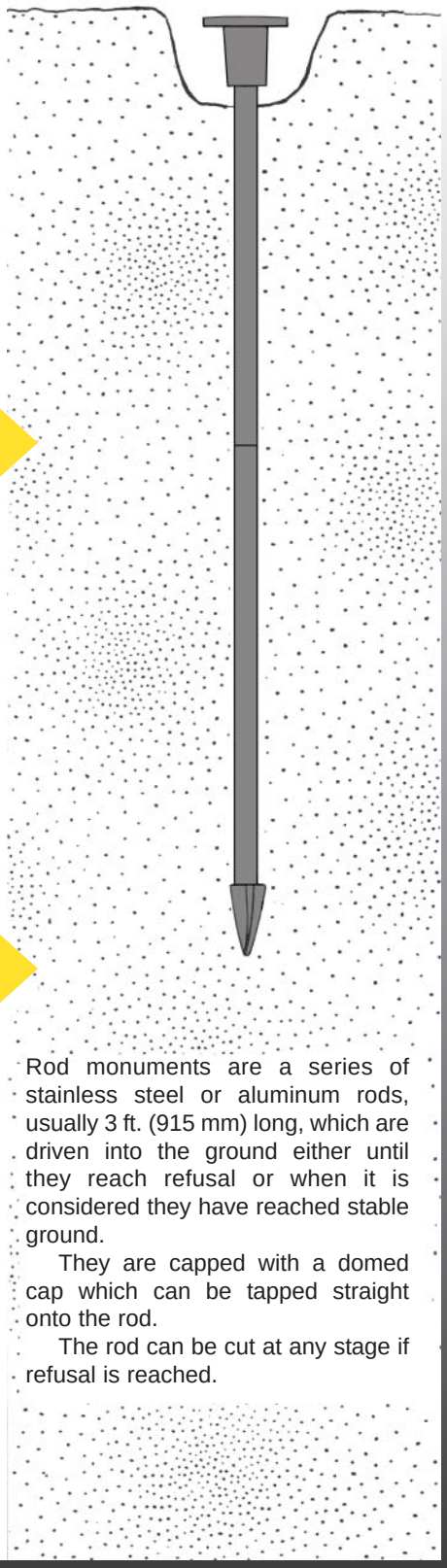
Rods are made of either 6000 series aluminum or 304 series stainless steel. Aluminum rods are available in 5/8" (16mm) or 3/4" (19mm) diameters. Stainless steel rods are available in 9/16" diameter (14mm). All rods are precision machined with appropriately sized vibration resistant precision threaded connections on each rod end. Rod ends are machine-faced flat and perpendicular to the centerline of the rod. Threaded connectors are made from 300 series stainless steel and are of appropriate size and length for joining the various rod diameters. Plastic color-coded end caps: red- 5/8" (16mm) rod, blue- 3/4" (19mm) rod, and yellow- 9/16" rod identify, protect and keep clean the rod end(s) and the threaded bore, or connecting threaded stud.

Top Security™ Rod Monuments

The Top Security Rod Monument System is a unique concept in monumentation. The monument is composed of a drive point, sectional extension rod(s), Top Security finned rod, and a compression-fit or screw on cap. All components are metallurgically-matched for resistance to corrosion. A most unique feature of this monument is the solid aluminum "Y" shaped Top Security finned rod that provides added horizontal stability to the monument structure. Top Security rod is available in 3/4" (19mm) diameter. The Top Security design provides excellent 3-dimensional stability.

Berntsen Rod Monument Systems have unique

THE ROD MONUMENTS



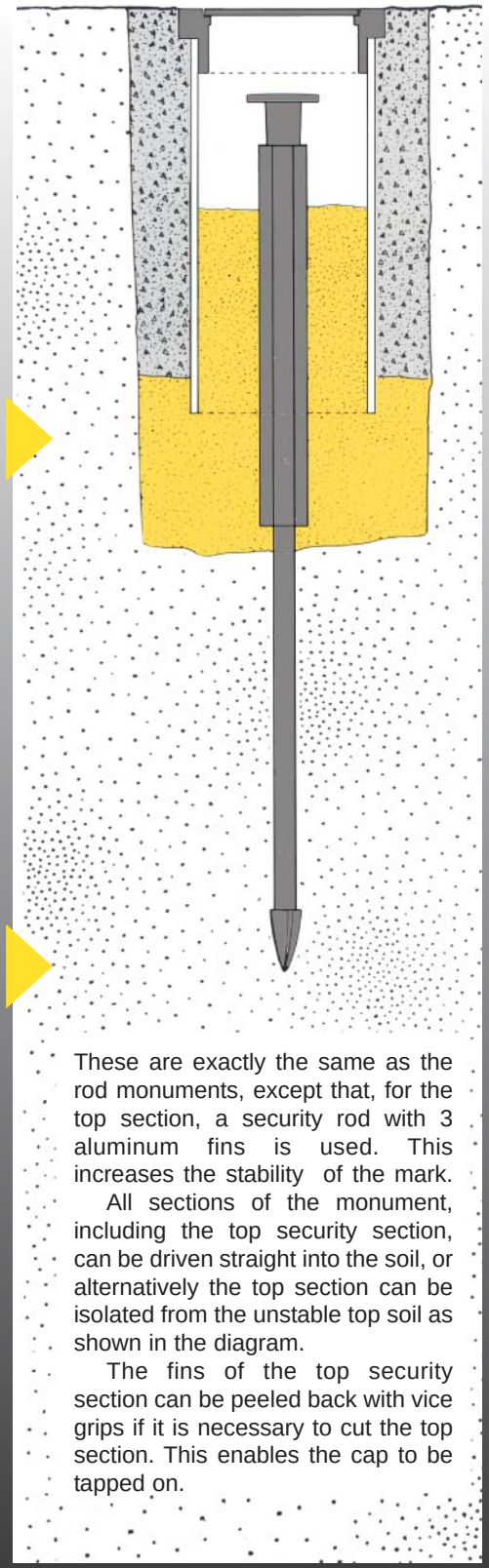
Rod monuments are a series of stainless steel or aluminum rods, usually 3 ft. (915 mm) long, which are driven into the ground either until they reach refusal or when it is considered they have reached stable ground.

They are capped with a domed cap which can be tapped straight onto the rod.

The rod can be cut at any stage if refusal is reached.

U.S. Patent 4,087,945

TOP SECURITY™ ROD MONUMENTS



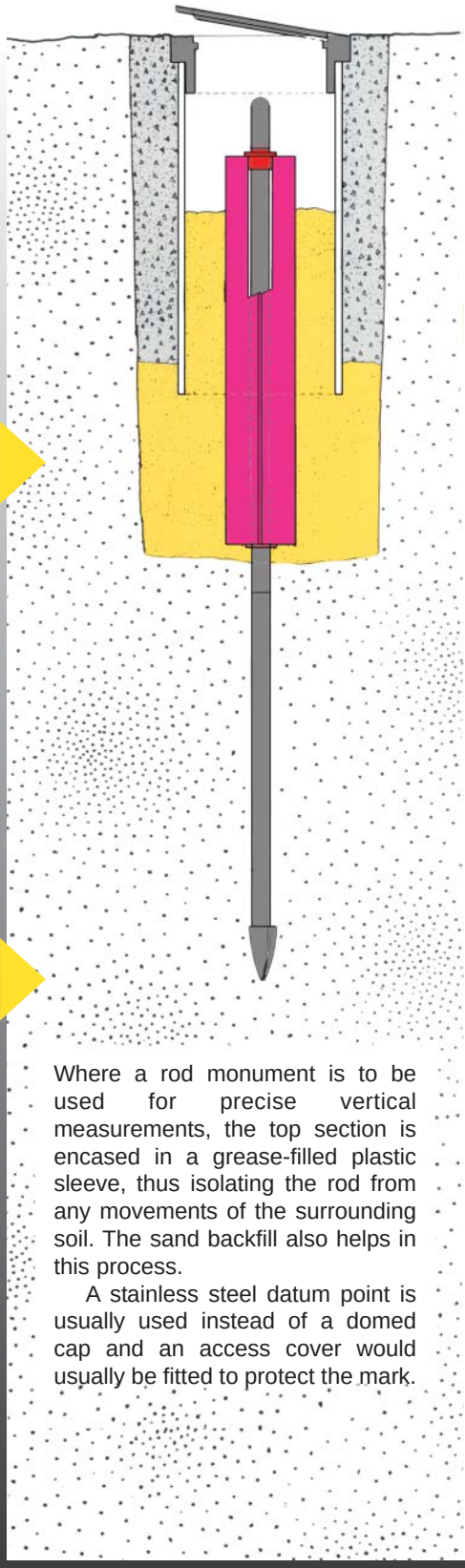
These are exactly the same as the rod monuments, except that, for the top section, a security rod with 3 aluminum fins is used. This increases the stability of the mark.

All sections of the monument, including the top security section, can be driven straight into the soil, or alternatively the top section can be isolated from the unstable top soil as shown in the diagram.

The fins of the top security section can be peeled back with vice grips if it is necessary to cut the top section. This enables the cap to be tapped on.

U.S. Patent 4,502,258; 4,625,473
Canadian Patent 1,241,536

SLEEVED ROD MONUMENT WITH FLOATING SLEEVE



Where a rod monument is to be used for precise vertical measurements, the top section is encased in a grease-filled plastic sleeve, thus isolating the rod from any movements of the surrounding soil. The sand backfill also helps in this process.

A stainless steel datum point is usually used instead of a domed cap and an access cover would usually be fitted to protect the mark.

U.S. Patent 5,148,641

SOIL CONDITIONS

In the first 2 or 3 feet (600 - 900 mm) of soil, movement - mainly vertical - may take place due to swelling and shrinking, thermal expansion or frost heave.

3 FT

Below 3 ft. (900 mm) little movement occurs. The rod monuments are firmly anchored into this stable layer by ground friction and can be driven to refusal if required.

6 FT

Experience and tests in the USA and Canada show that if rod monuments are installed to manufacturers specifications, only sub-millimeter movements may be expected in X, Y, and Z axes over a period of several years. Sample test results are available from Berntsen on request.

Installation of even the most complex Berntsen Top Security™ sleeved rod monument system is relatively easy and very fast.

A 12 inch (300 mm) hole is augered to a depth of about 3 1/2 feet (1050 mm).

The rod monument is driven into the ground, a section at a time, to refusal*. The top of the last rod should be about 6 inches (150 mm) below the surface. **See page 15*

The finned sleeve (filled with grease) is placed over the rod and the datum point added (or filed onto the rod end).

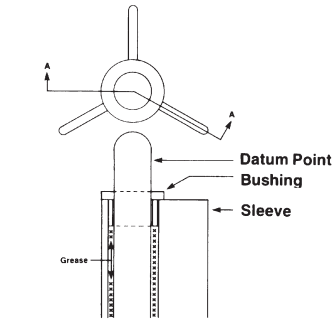
A 6 inch (150 mm) diameter PVC pipe 3 feet (915 mm) long, with access cover glued on, is placed over the finned sleeve (pipe should not touch the fins). Back-fill (INSIDE the PVC Pipe) with sand.

The hole and pipe are carefully back-filled with sand. The top 12 inches (300 mm) of the hole (OUTSIDE of the PVC Pipe) are back-filled with concrete.

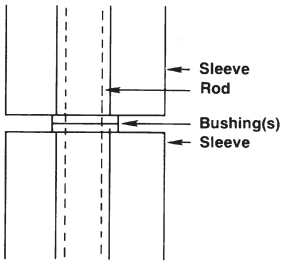
The finished mark - a well protected first-order benchmark.

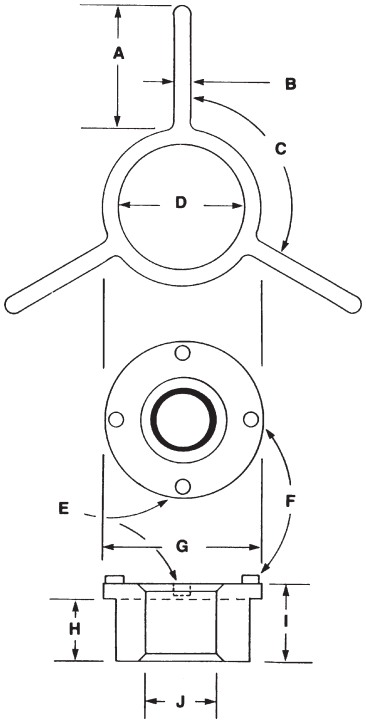
See page 26 for the Cobra Combi Gasoline Drill/Breaker for installing this monument.

Top Security Sleeve



Sleeves can be extended





A = .98" (25 mm)
B = .12" (3 mm)
C = 120
D = 1.02" (26 mm)
E = Recessed for Pin
F = Raised Alignment Pin
G = 1.25" (32 mm)
H = .49" (12.5 mm)
I = .62" (16 mm)
J = .56" (14 mm); .625" (16 mm); .75" (19 mm)

Top Security Sleeve

Exclusively from Berntsen

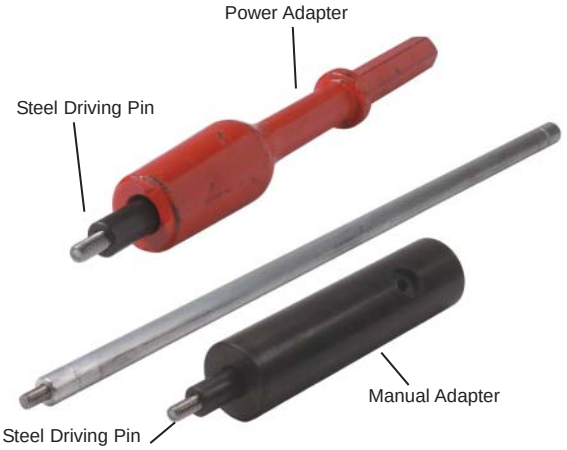
Berntsen's *exclusive* Top Security™ Sleeve 3-Dimensional Rod Monument System is a monument system specifically designed for high-precision geodetic and GPS surveys. Its patented design helps protect against excessive movements in the control monument. The Berntsen extendible rods, when driven to refusal, provide excellent vertical stability. The unique Y-shaped design of the Top Security Sleeve adds the second and third dimension to provide the most stable 3-D survey monument commercially available today. See pages 14 and 15 for additional information, including installation procedure.

It's even extendible! 18" (457mm) and 3' (914mm) lengths of Top Security Sleeves can also be connected together by Berntsen's exclusive End Cap Alignment Bushings and a little PVC Cement. When used in combination(s), nearly any length of support for the rod marker is possible. That's innovative and flexible design at work for you.

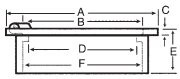
More good news! The Top Security Sleeve's greatest advantage during installation is speed. Simply drive standard Berntsen rods to refusal, slip on the grease-filled finned Top Security Sleeve (recommended sleeve length greater than maximum recorded local frost depth), back-fill around the fins with sand and tamp firmly. The color coded End Cap Alignment Bushings follow Berntsen's long established universal color codes for rod marker systems and tell other surveyors at a glance what size rod is installed - 9/16" (14 mm) Yellow; 5/8" (16 mm) Red; 3/4" (19 mm) Blue. We recommend NO-TOX lubricating grease to fill the Top Security Sleeve. It is specially formulated to be non-toxic and environmentally safe. It is available in an easy to use cartridge that fits a standard "grease gun". One cartridge should be used for each 36" (915mm) long Top Security Sleeve.

Use "NO-TOX" grease in the Top Security Sleeve.

NO-TOX Grease

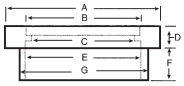


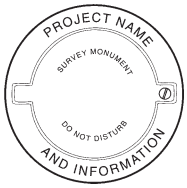
BMAC1



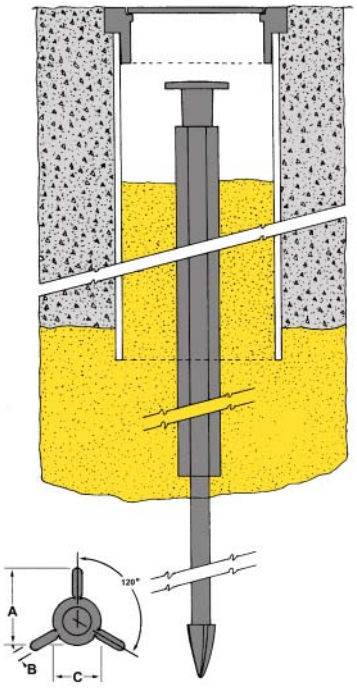
A = 7.06" (179 mm)
B = 5.5" (140 mm)
C = .3" (8 mm)
D = 5" (127 mm)
E = 2.03" (52 mm)
F = 5.58" (142 mm)

BMAC5/6





A = 7.25" (184 mm)
B = 5.5" (140 mm)
C = 5" (127 mm)
D = 1.03" (26 mm)
E = 5.35" (136 mm) (BMAC6)
5.58" (142 mm) (BMAC5)
F = 1.25" (32 mm)
G = 5.9" (150 mm)



Top View of
Top Security™ Rod

A = 1" (25 mm) and 1.18" (30 mm)
B = .125" (3 mm) and .125" (3 mm)
C = .625" (16 mm) and .75" (19 mm)

BMAC Bench Mark Access Covers

- Based on designs developed for the NGS bench mark
- Used to provide a protective cover for sectional rod monuments (stainless steel or aluminum rods) like those used for geodetic control or GPS

BMAC-1

- Designed to fit over a section of 5 inch (127mm) PVC Well Casing
- Recommended only for general use on open land due to the exposed (raised) dual hinge design
- Weighs about 1.8 pounds (.8kg)

BMAC-5 & BMAC-6

- BMAC-5 fits over 5" (127mm) PVC pipe
- BMAC-6 fits inside standard* 6" (152mm) Schedule 40 PVC pipe
- Heavy-duty design with significantly more material at critical points
- Stronger and fully recessed hinge
- Suitable for use in pavement areas such as streets or highways, as well as on open land
- Weighs about 2.5 pounds (1.3kg).
- BMAC5 and BMAC6 are available with a tamper-proof screw that requires a special tool to open

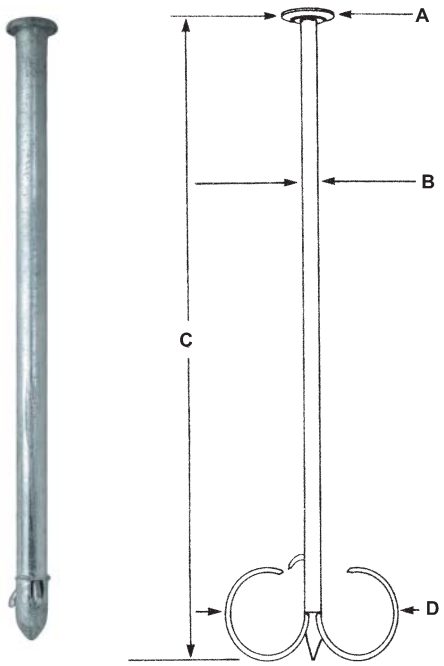
- A ring of concrete is usually poured around the outer ring of the BMAC Access Covers

* Per ASTM Standards, 6" Schedule 40 PVC pipe can vary significantly in the inside diameter (up to .090") compared to the better precision of a good casting (.010"). Additionally, pipe from various suppliers can vary significantly within that range. Generally, most suppliers try to make the pipe wall as thin as the specifications will allow in order to save material. Berntsen produced the BMAC6 to fit a generally available pipe with an average inside diameter (ID) of 6.035". Should you purchase your own PVC pipe locally, be sure the brand pipe you select fits the BMAC6 bench mark access cover to your satisfaction. Suitable pipe is available from a variety of suppliers of quality pipe. Local dealers may be willing to cut pipe to length for you. PVC pipe is always available from Berntsen and guaranteed to fit the BMAC cover with a snug, light press fit, suitable for adhesive bonding to the BMAC6.

"Went beyond the call of duty when they got our order delivered. - Have always been satisfied w/service."
- SW, Tennessee

FENO Drive-in Spike Survey Mark

FENO SPIKE



A = 2" (51 mm)
B = .67" (17 mm) 350 mm & 600 mm lengths
.83" (21 mm) 1000 mm length
C = 14" (356 mm) and 24" (610 mm), and 40" (1016 mm)
D = 6" (152 mm) 350 mm & 600 mm lengths

FENO MONUMENT CAP

F50ARA F50BRA

FENO TOOLS

DRIVER

GROUND PLATE

EXTENSION SLEEVE

FENO

The FENO anchored survey mark system offers a unique solution to surveyors who want to use a small, easy to drive quality galvanized steel survey mark. The unique FENO concept holds that in order to guarantee both the correct position and also the secure placement of marks, two conditions must be fulfilled:

1. It should be possible to move a temporary mark into a permanent position. If the marker is fitted with wings or lugs (or any other type of anchoring device) this is not possible. However, with the FENO system, the position of the marker can be easily changed at any time prior to the extension of the anchors.

2. Once the marker has been finally positioned, it must be possible to lock the marker firmly and securely in the ground. With FENO markers, when the correct position has been achieved, the strong steel anchors can be extended to secure the marker into position, much like the roots of a tree.

Easy to use
Using a hammer and inexpensive driving and fixing tools, the marker can be installed in all soil types. Eliminates digging a hole or mixing expensive concrete. Strong steel pins curve and lock securely in the ground and stay put. A FENO marker can be installed in just minutes.

The FENO Monument is available in three standard lengths: 350mm (13.77 inches), 600mm (23.62 inches), and 1000mm (39.37 inches)

FENO Monument Cap

- Available in 2" (51mm) or 3-1/2" (89mm) diameters with domed top
- 6000 series aluminum or silicon bronze alloy
- Compression fits to inside of Feno pipe

FENO Installation Tools

- Three installation tools are used with the FENO marker system:
  - The Driver drives the spike into the ground (using a hammer)
  - The Extension Sleeve extends the anchors of the spike into the ground
  - The Ground Plate prevents the spike from sinking into the ground as the survey cap is installed
  - Available individually or as a TOOLKIT consisting of all three tools
- Installation adapter for the Thunderbolt Manual Impact Tool available

POLYROC BLOCKS

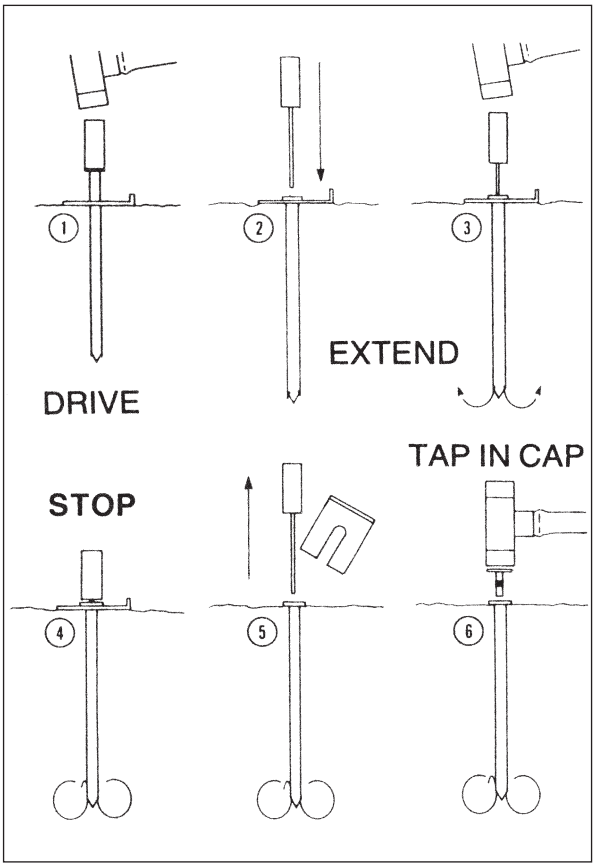
F110

F90

SQUARE TOPS

F350/600SQA

F1000SQA



FENO Polyroc Heads

- Provide a large, easy to see head for the top of the mark.
- Ideal for marking cemetery corners, rights-of-ways, and survey corners where visibility is key
- Available in red, white, or yellow for the 350mm, 600mm or 1000mm spikes

To use simply drive the FENO spike through the Polyroc Head when setting the mark.

F350/600SQA Square Aluminum Top

- Designed to help add horizontal stability to the top of the FENO marker
- Square aluminum head with four "anchoring" points at right angles to the top of the marker

To install simply drive the FENO spike through the F350/600SQA when setting the mark.

F1000SQA Square Aluminum Top

- Designed to help add horizontal stability to the top of the FENO marker
- Square galvanized steel head with two opposing anchors at right angles to the top of the marker

To install simply drive the FENO spike through the F1000SQA when setting the mark.

FENO Accessories

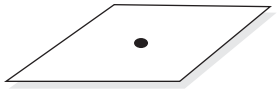
- F50PLCAP 50mm (2") diameter Plastic Cap for the 350mm and 600mm spikes
- Ideal for projects that need an easily visible mark flush with the ground

- F300PHPLW 300mm (11.8") Square Photogrammetric Plate for the 350mm and 600mm spikes
- Highly visible plastic target that can be used with the FENO mark for high altitude visibility
- Made from durable corrugated plastic material

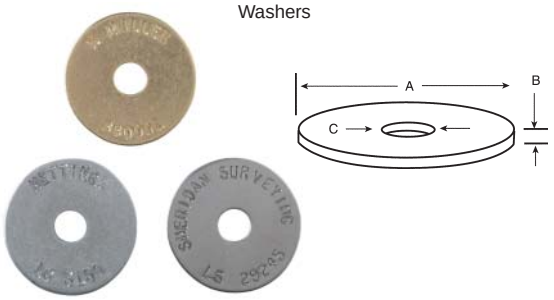
To use simply drive the FENO spike through the F300PHPLW when setting the mark.

F50PLCAP

F300PHPLW

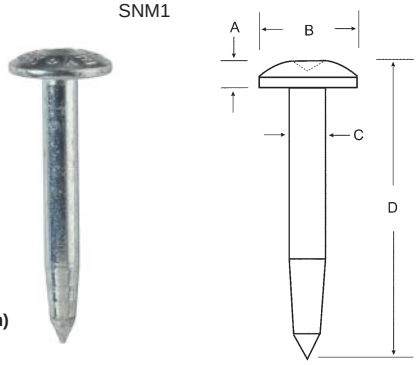


Washers



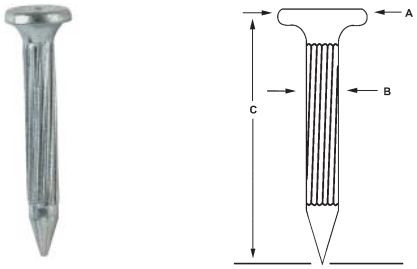
A = 1.56" (40 mm) and 2" (51 mm)
B = .09" (2 mm)
C = .375" (10 mm)

SNM1



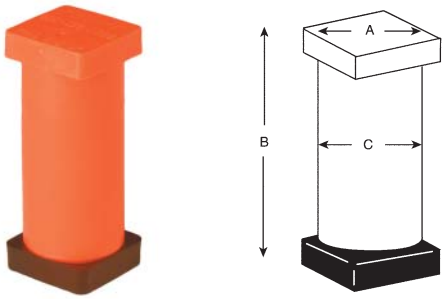
A = .187" (5 mm)
B = 1" (25 mm)
C = .35" (9 mm)
D = 3" (76 mm)

MAGNAIL



A = .56" (14 mm)
B = .26" (7 mm)
C = 1.6" (41 mm), 2.1" (53 mm), and 2.6" (66 mm)

DEEP1



A = 1.06" (27 mm)
B = 2.625" (67 mm)
C = 1" (25 mm)

AT1, BT1, SST1 Washer

- Available in aluminum, brass, or stainless steel
- All washers available in 1-1/2" (38mm) diameter
- Brass washer also available in 2" (50mm) diameter
- Fits 1/4" (6mm) PK nail, MAGNAIL, or Berntsen's SNM1 Steel Nail Marker
- Personalized with name and LS number at no additional charge on orders of 100 or more identical washers [Up to 28 characters on one row can be stamped on the 1-1/2" washers. Two rows (outer row: 40 characters, inner row: 28 characters) can be stamped on 2" (50mm) brass washer.]

SNM1 Steel Nail Marker

Exclusively from Berntsen!

- Super strong
- Formed from solid steel
- Can be driven easily into asphalt
- 1" (25mm) convex top and conical recessed center chamfer for pinpoint accuracy
- Raised "SURVEY MARK" imprint

MAGNAIL® Survey Nail

- Designed to retain magnetism
- Provides improved toughness and ease of detection
- Detectability with a metal locator has doubled to quadrupled any nail on the market today, depending on the type of surface the nail is being driven into
- Larger center-point and increased elasticity helps to dramatically reduce breakage
- Available in three lengths: 1-1/2" (38mm), 2" (51mm), and 2-1/2" (64mm)
- Packaged 100 per box

DEEP1® Magnetic Markers

- Available in two series - for land surveys and marking under ground utilities
- High-strength, permanent magnetic material in a rugged polyethylene color-coded case
- Can be located up to 10 feet (3.05m)
- For surveys: an authorized way to mark references to government land survey monuments
- They conform to U.S. government instructions for color codes of collateral evidence of cadastral surveys
- Colors include: Clear (under monument), Metallic Silver (Northeast Quadrant), Fluorescent Pink (SE Quadrant), Fluorescent Blue (SW Quadrant), Fluorescent Orange (NW Quadrant)
- For utilities: APWA color codes: Blue (water), Green (sewer), Orange (communications), Red (electric), Yellow (gas)

BENCHTIE

BENCHTIE® Vertical Surface Control Point

- Use on trees and poles
- Comes with a high visibility tag for marking data
- Lightweight casing with a recessed dimple on top, molded around a five-inch (127mm) hardened zinc-coated spike
- Can be customized to your special needs
- Available in high visibility yellow or urban brown for residential areas

POLYETHYLENE SIGN

Polyethylene Signs

- Rugged weather resistant polyethylene signs available in .055 or .125 gauge material
- Standard sign colors: orange, white and yellow
- Standard one color printing - additional color ink(s) are available at increased cost.
- Standard sizes: 4" (101.6 mm) x 6" (152.4 mm) and 6" (152.4 cm) x 8" (203.2 mm)
- Call for pricing on custom signs

TUFF TAG

Tuff Tag PVC Signs

- Low cost, quality sign alternative
- 3" (76 mm) x 5" (127 mm) PVC about .020 " (0.5 mm) thick
- Lightweight durable PVC material is rot proof, waterproof and tear resistant
- Standard stock sign available in orange, white, and yellow with black lettering
- Call for pricing on custom signs

TRAFFIC SAFETY SIGNS

STORAGE VIEW

Traffic Safety Signs

- Meets Federal regulations
- 2 sign sizes: 36" (914 mm) x 36" (914 mm) and 48" (1219 mm) x 48" (1219 mm)
- 2 stands: Stand with Spring and Springless Stand
- Available in Fluorescent Orange

Stamp Sets / Thin Line Post

COMBO STAMP SET

Stamp Sets

- Letter and number stamp sets made from quality steel to mark additional data in the field
- . Letter sets consist of 27 stamps: A through Z and a period
- Figure sets consist of nine stamps: figures 0 thru 8 (the 6 is also used for a 9)
- Combination Set includes all letters and numbers and a handy wooden storage box
- Standard stock sizes: 1/8" (3.2 mm) and 3/16" (4.75 mm) sizes
- Special orders from 1/16" (1.6mm) thru 5/8" (16mm)

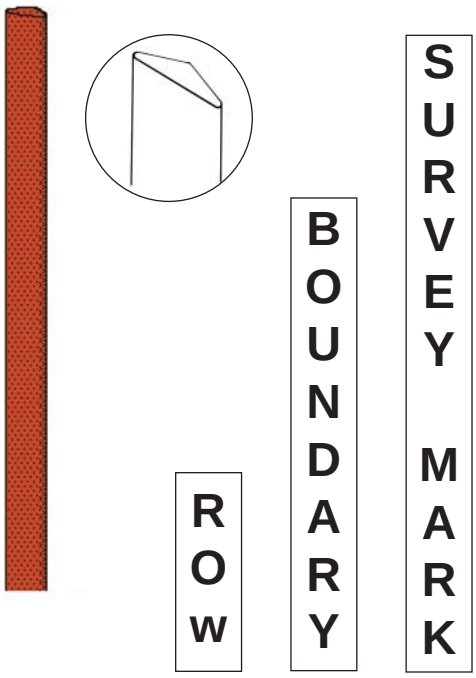
See page 28 for Carrying Pouch custom made for the Combination Stamp Set.

ROTARY STAMP SET

Rotary Stamp Sets

- Significantly faster field stamping than a standard stamp set
- Easier to carry and use. . .harder to lose
- Consists of three steel holders with 12-character wheels (36 characters, letters and numbers in all)
- Larger holder is easier to hold and use
- Set includes a compact and very convenient pocket size wood carrying case
- Standard stock sizes: 1/8" (3mm) and 3/16" (5mm)
- Other sizes available by special order

THIN LINE POST

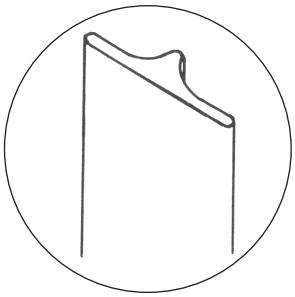


THIN LINE POST
STANDARD DECALS

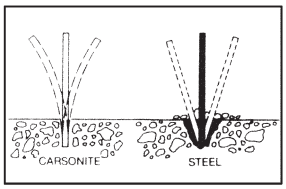
Thin Line Post

- Use to mark a boundary, Right of Way, or as a witness post for a survey marker
- Lightweight post, 5' length weighs less than 1 pound
- Post width: 1"(25mm)
- Standard lengths: 60" (1.52m) and 72" (1.83m)
- Easy to install in most soil conditions
- Recommend 24" burial depth
- Weather resistance against rot and will not become brittle in the cold
- Available with pre-applied standard or custom decals
- Standard colors: Orange, yellow, white, blue, black

"Every time I call, every person I speak to is very helpful, upbeat, and able to access our past information quickly to minimize my phone time. Can't say enough good things." - TMW, Minnesota



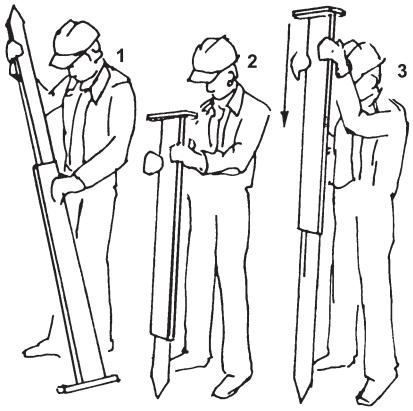
Unique "T" design takes repeated twisting and abuse. Other Carsonite post designs available where repeated direct motor vehicle tire impact is probable.



Once installed, a Carsonite post flexes above ground, but not below, which eliminates the loosening of surrounding soil - resisting removal by impacts or vandals.

Installation is Easy!

1. Insert marker into Driver.
2. Rotate driver 180° and twist for alignment.
3. Drive marker into ground with a series of light taps.



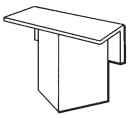
Recommended Burial Depth: 18 to 24 inches
Design of boundary marker driver similar to illustration.

Fiberglass Flexible Boundary Posts

- Call attention to nearby GPS marks, survey markers, or survey monuments
- Help prevent costly maintenance accidents that lead to marker damage or replacement
- Lightweight reinforced composite material provides maximum weather resistance against rot and embrittlement from cold or UV exposure
- Fast and easy installation in most soil conditions
- Lightweight...6 foot (1830mm) post weighs less than 1-1/2" pounds (0 .68 kg)
- Available with pre-applied standard or custom decals
- Standard length: 72" (1.83m)
- Custom lengths are available
- Standard Color: Orange, Brown, Red, White, and Yellow
- Standard Decal Color: Black letter on white background
- Other colors and multiple color decals available
- Custom or special features are at additional cost

- Carsonite introductory kit consists of 20 standard 72" (1.83m) length orange posts with the SM110 decal (Witness Post - Do Not Disturb Nearby - Survey Marker), Boundary Marker Driver, and Pilot Hole Punch at a special price

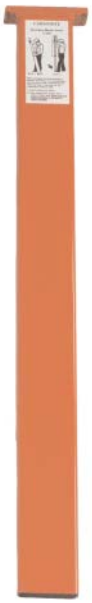
Visit www.berntsen.com for our extended line of Carsonite Products.



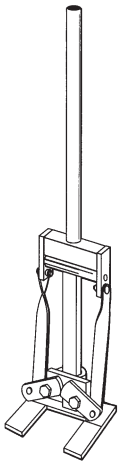
DFW250
FEATHER WEIGHT
DRIVING CAP

DP18
PILOT
PUNCH

DP100R
PILOT
DRIVER



D250R
BOUNDARY
MARKER
DRIVER



CPP-1R
POST
PULLER

Gas Powered Drill/Breaker

COBRA COMBI

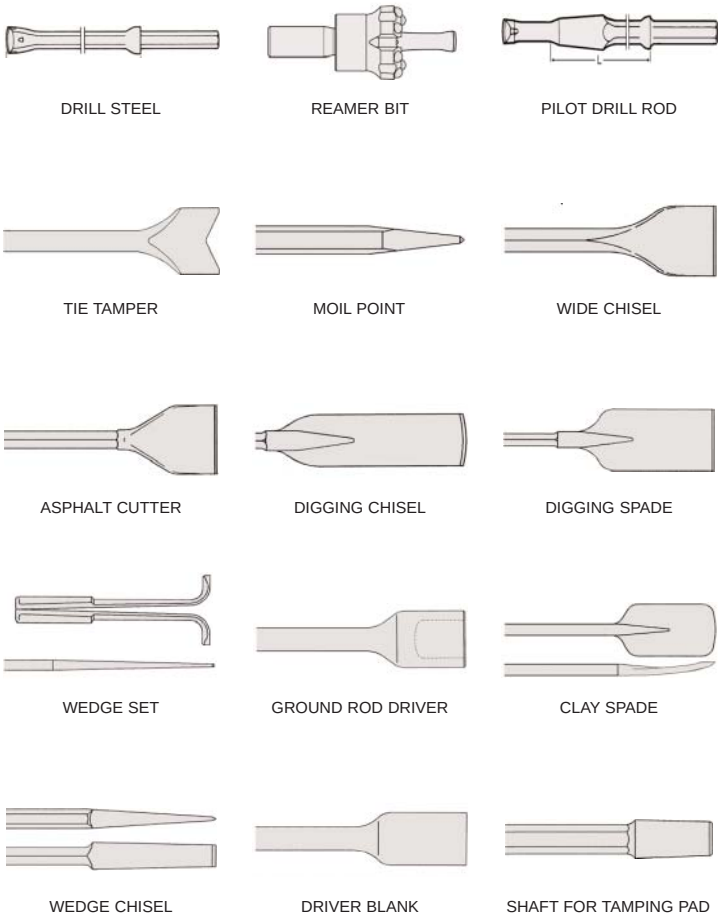
Technical Data

Weight:	55 lbs.
Length:	28.8 in
Depth:	11 in
Width:	23 in
Tool Shank:	7/8” x 4-1/4”
Sound Level:	110 dB
Impact Energy:	24 J
Impact Rate:	2600 BPM
Drilling Speed:	11.8 in/min
Max Drilling Depth:	6.5 ft
Engine Type:	2 stroke
Power:	1kW
Cooling System:	Forced air
Fuel:	Unleaded
Oil Type:	Two-stroke oil
Oil Mix:	1:50
Fuel Capacity:	0.31 US gallon
Fuel Consumption:	0.36 US gallon/hour

Cobra Combi® Gas Powered Drill/Breaker

- From same company that made Pionjar 120
- Equipped with a catalytic converter and a new carburetor - *meets the tough US EPA Phase I emission regulations*
- Wide range of tools for drilling, compacting and breaking
- Recommended for Berntsen’s Top Security Rod Monuments
- Features vibration-dampening handles
- Easy to start

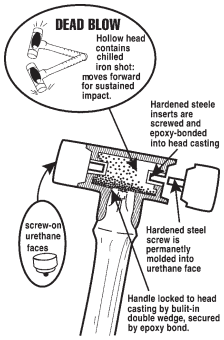
Cobra Combi® Tools



Not Pictured:

TAMPING PAD ROUND 6”
TAMPING PAD SQUARE 7”
TAMPING PAD SQUARE AND SHAFT

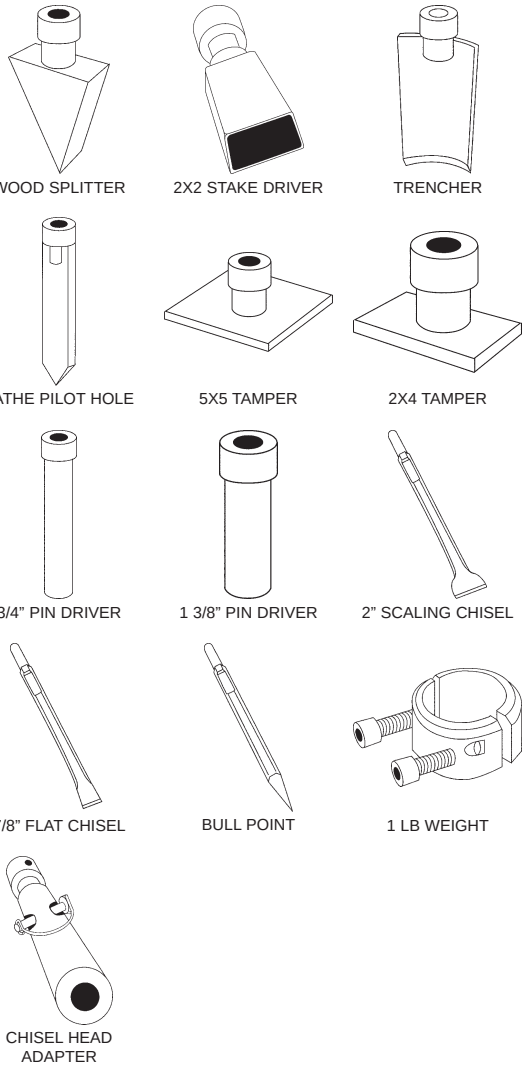
LIXIE HAMMER



LIXIE® Deadblow Hammers

- Drive survey monuments and caps quickly and safely
- Urethane faces eliminate metal to metal contact
- Absorbs a portion of the blow not absorbed by the object and returns through the hammer to create a rebound
- Steel shot inside the hammer head casting moves forward and strikes the forward part of the cavity, providing maximum dampening dead blow action
- Several sizes are available
- Replacement faces and handles available

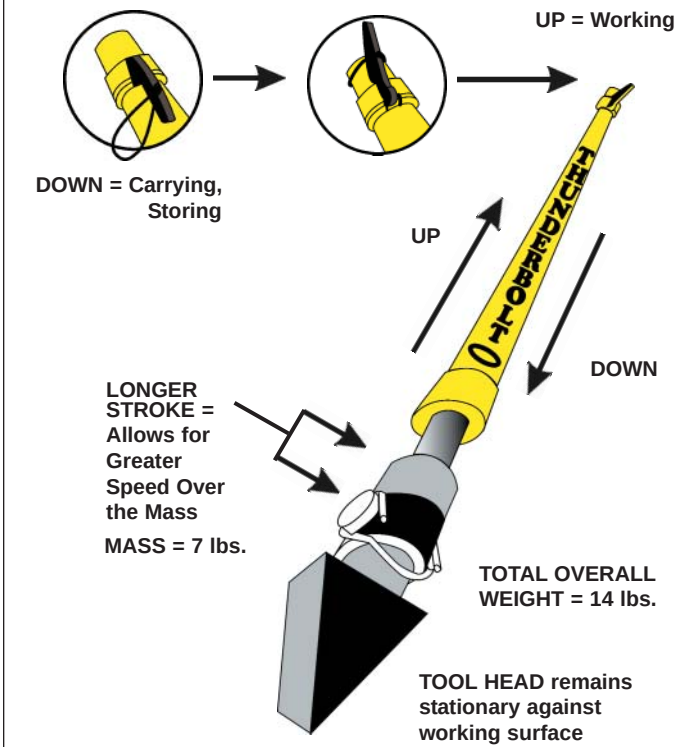
THUNDERBOLT™ INDUSTRIES LTD.



THUNDERBOLT® Manual Impact Tool

- Manual impact tool that never misses
- Multi-functional tool features a revolutionary design that enables the user to minimize the amount of energy and power usually required with comparable conventional tools
- Developed to reach the highest level of user safety and maximize natural body mechanics to limit strain on the hands, legs and back.
- Accurate, safe and easy to use
- Creates over 3000 lbs. p.s.i (211 kg/cm) on impact

THUNDERBOLT™ INDUSTRIES LTD.



LATH BAG

Lath Bag

- Made of "Tough Duck" PVC backed fabric for maximum strength that will resist tears and repel water
- The bottom is layered with "Tough Duck" and a 1000 ballistic nylon fabric to avoid punctures
- Heavy-duty loop for a hammer
- Shoulder strap is double stitched at the top and has a 12" padded comfort strap made of a heavy nylon
- Available in fluorescent orange
- Dimensions: 32" (813mm) Length, 14.5" (254mm) width, 5" (127mm) depth
- Made in the USA

MULTI-PURPOSE FIELD BAG

Multi-Purpose Field Bag

- Designed with the surveyor in mind
- Features two large pockets, one on the front and one on the back, plus several smaller pockets for your paint cans, cell phones, pens and pencils, and markers
- Made of "Tough Duck" PVC backed fabric for maximum strength that will resist tears and repel water
- The bottom is layered with "Tough Duck" and a 1000 ballistic nylon fabric to avoid punctures
- A sturdy Velcro strap on the side carries the Berntsen flag pouch or holds wire flags in the side pocket
- Heavy-duty side handles for easy carrying
- Shoulder strap is double stitched at the top and has a 12" padded comfort strap made of a heavy nylon
- Available in fluorescent orange
- Dimensions: 37" (1041mm) Length, 14.5" (368mm) width, 5" (127mm) depth
- Made in the USA

"Thanks for the free hat, that is by far the best hat I've ever owned, very good quality." - Kyle, Minnesota

FLAG POUCH

Flag Pouch

- Holds two rolls of flagging tape
- Belt loop attaches to your waist or the Multi-Purpose Field Bag
- Made of Cordura, a tough, heavy nylon fabric that resists abrasions, punctures and tears and has a urethane coating to repel water
- Two grommets on each side for both the right and left handed
- Available in fluorescent orange
- Made in the USA

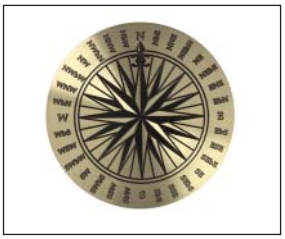
COMBO POUCH

Combo Pouch

- Designed to carry the combination letter/number steel stamp sets - *page 24*
- Helps to keep your set intact - no more missing numbers or letters
- Made of Cordura, a tough, heavy nylon fabric that resists abrasions, punctures and tears and a urethane coating to repel water
- Available in fluorescent orange
- Made in the USA

BOOKS

PAPERWEIGHTS



MEDALLIONS

PEWTER PINS

BASEBALL HATS

GOLF SHIRT

Collector's Corner

Books

- Murder In The Catskills • Mayhem In The Catskills
- Mischief In The Catskills • Murder In The Shawangunks
- Geodasia • A History of the Boundaries of Nebraska
- The Jefferson Stone • The Last 300 Miles

Brass Commemorative Paperweights

- 3-1/4" (83mm) Paperweights - Four Corners - NASA - Census 2000 Center of Population - Mile High - First Flight
- 4" (102mm) Paperweights - Cape Hatteras - Lewis & Clark - Compass Rose
- Includes a wooden display stand

Bronze and Silver Collector Medallions

- Silver contains one troy ounce of .999 silver bullion
- Approximately 1-1/2" (38mm) in diameter
- Yearly Series - Lewis & Clark - Mason-Dixon - Abe Lincoln

Pewter Pins

- Approximately 1" (25mm) in diameter
- Reproductions of authentic survey markers from summits around the world

Baseball Caps

- Soft brushed cotton cap with an adjustable velcro strap
- Berntsen Logo - Survey This Logo

Golf Shirt

- Made of 100% Pre-Shrunk Cotton
- Survey This Logo

Visit the Collector's Corner at **www.berntsen.com** for full details on all these items and more!

ML1M

SUBSURFACE® ML1M Magnetic Locator

- **ML1M**: Digital meter with visual signal strength, polarity indication, gain setting plus battery life display
- **ML-1**: Non-metered device (audio only)
- Soft pack carrying case included, optional hard case available
- Weighs 2 pounds (.9 kg)
- Limited Lifetime Warranty

GA52Cx

SCHONSTEDT® GA52Cx Magnetic Locator

- Regarded as one of the finest locators available for finding buried magnetic objects
- Improved circuitry and sensitivity ranges
- Ideal for locating buried magnetic aluminum survey monuments, buried iron or steel pipelines, and other magnetized objects
- Hard shell plastic carrying case included
- Weighs 2.5 pounds (1.1 kg)
- Five Year Warranty

GA72Cd

SCHONSTEDT® GA72Cd Magnetic Locator

- Ideal for locating buried magnetic aluminum survey monuments, buried iron or steel pipelines, and other magnetized objects
- Easy-to-read meter and bar graph display of signal strength, polarity, and battery status
- Hard shell plastic carrying case included
- Weighs only 2.5 pounds (1.1 kg)
- Three Year Warranty

MAGNATRAK® 100

SCHONSTEDT® GA92XT Locator

- One hand operation
- **XTd**: LCD gain, battery, signal strength and polarity
- **XTi**: LCD gain and battery display only
- Holster and hard shell plastic carrying case included
- Seven Year Warranty

MAC51Bx

SCHONSTEDT® MAC51Bx Locator

- Cable and Magnetic locator
- Best all-purpose locator ever developed
- Trace buried telephone cables, buried pipeline, and nearly any buried target with magnetic, conductive, or inductive tracing
- Hard shell plastic carrying case included
- Weighs 2.64 pounds (1.2 kg)
- Three Year Warranty

Product Information

Berntsen survey monuments and markers are manufactured from a wide variety of carefully researched materials selected for optimum corrosion resistance and strength for the use intended at the most reasonable cost. Materials include alloys of aluminum, brass, bronze, iron, steel, stainless steel. Non-metallic materials include plastic and glass-filled plastic, ceramic, and fiberglass.

Because of a wide variety of possible factors associated with any given environmental condition, any underground structure may, over time, either last virtually indefinitely or deteriorate faster than would normally be expected. As a general rule, unprotected buried structures made from materials such as aluminum, brass, bronze, plastic, stainless steel, and ceramic or glass materials have been found to outlive other typical constructed materials such as cast iron, steel, and concrete. Combinations of dissimilar materials such as iron and brass, aluminum and brass, or aluminum and iron or steel have been found to have a shorter life due to dissimilar metal corrosion action. The inert permanent ceramic magnets in Berntsen survey monuments should provide a lasting remnant that should last virtually indefinitely and, together with other remnants of the structure, provide an easily recoverable and distinctly identifiable survey monument site.

Berntsen continues to be a leader in the innovation of new survey monument designs and materials and is involved in many long-term cooperative test sites worldwide to gain knowledge and improve product design in corrosion resistance, stability, and overall durability.

Because product innovation and improvement is a continuous endeavor at Berntsen, specifications and materials are subject to change without notice. We welcome the opportunity to make special items and to do custom work made to your requirements. For additional information, please contact the Customer Service Department at Berntsen International, Inc.

The term "form follows function" is often used to describe the process of good product design. Good designs are more than shapes that are good looking and functional. Selection of materials is critical to the design-life of any product, and also is dependent on how the product is used. Berntsen products use component parts selected to work together-a concept we call "metallurgically matched." Through the continuous input of our customers, we can not only make our products look better, but also select the best materials that last longer in most situations.

Aluminum Alloys

In high purity form, aluminum is a soft and ductile metal. Aluminum of 99 percent or higher purity has many applications but has very low structural strength. Most commercial applications for aluminum require greater strength than can be achieved with high purity aluminum. Additional strength is achieved in aluminum by adding other elements to produce alloys. These elements, either alone, or in combination impart strength to the metal. Additional strengthening is also possible by means of heat treating techniques or other processes such as cold forging. (Cold forging provides only a moderate increase in strength in high purity 1000 Series aluminum; 1000 Series aluminum is not heat-treatable). Commercially pure aluminum components can also function like anodes used to protect buried pipelines and sacrifice themselves to protect the (iron or steel) pipe.

A Better Way

6000 Series Aluminum-Berntsen has always worked with strong corrosion resistant alloys such as those found in the 6000 Series. Alloys in this group contain magnesium and silicon (which form magnesium silicide) and make the alloy heat-treatable. Alloys in this series can also gain considerable strength through cold working techniques such as orbital cold forming-a Berntsen exclusive in survey monument components since 1986. Several components of Berntsen survey monuments and markers such as caps, pipe, and rods are manufactured from this versatile alloy series, and, depending on the intended use, may be heat-treated for added strength.

Orbital formed survey caps from Berntsen are guaranteed to not to crack, chip, or break.

Other Aluminum Alloys

Occasionally, a part must, because of its design characteristics, be manufactured by casting. Alloys such as ALMAG 35 (an aluminum alloy that contains silicon and magnesium) are used to assure optimum compatibility with 6000 Series aluminum alloys. Under sufficient stress, aluminum castings can crack or break.

Brass Alloys

Brass has been used in the manufacture of survey monuments and markers for many years. Iron pipe monuments with brass caps were used by federal government surveyors at least as early as the first part of the 20th century. Certain brass alloys, notably those with a high lead (a hazardous material) content, equal or greater than five (5) percent, are now viewed as archaic metals. Alloys that were typically used in survey monument components were Leaded Semi-Red Brass 81-3-7-9 (7 percent lead), and Leaded Red Brass 85-5-5 (5 percent lead). Few customers require these alloys for any reason other than tradition.

A Better Way

Berntsen pioneered the introduction of non-leaded brass alloys for survey monuments and markers in the mid-1980's. Through our continued research and testing we have found that brass or bronze alloys containing high amounts of coppers provide the best characteristics in corrosion resistance, strength, and durability. We now exclusively use silicone bronze alloy (97 percent copper, 3 percent silicon) for our cold forged survey markers and caps. In an independently conducted test, Berntsen's silicon bronze cap was found to have essentially no corrosion after 200 hours of salt spray per ASTM B-117.

Stainless Steel, Iron

Berntsen first introduced stainless steel monuments in the early 1970's as an ultimate solution to the search for a permanent survey monument. At that time, most customers wanted the traditional iron pipe/brass cap monuments or concrete monuments. Today, stainless steel is an accepted material for survey monuments, and the stainless steel monument is in greater demand than ever before. Our customers have found that dollar for dollar, a stainless steel monument is a better buy than an iron pipe monument because, even though it costs more to purchase, it lasts longer and therefore costs less. (In many soil conditions, aluminum has also been found to outlive iron pipe.)

Stainless steels are typically alloys of iron to which a minimum of about 12 percent chromium has been added to impact significant corrosion resistance. Alloys containing 12 percent chromium will not "rust" when exposed to weather, and additional amounts of chrome will provide even further corrosion resistance. Like alloys of aluminum, stainless steel is a material that is uniform in composition that will form its own protective coating. Stainless steel alloys used by Berntsen have a minimum chromium contact of 16 percent and a minimum of 8 percent nickel, which, along with other elements, enhances the favorable characteristics of the stainless steel alloys.

Plastic, Fiberglass

The way our customers use our products and their budget usually dictates the materials that are chosen. Various plastic components are now part of the Berntsen product line. Materials include PVC, Polystyrene, Polyethylene, Glass-filled plastics, and Fiberglass. Plastic materials are generally quite resistance to chemical attack in harsh soil conditions, and are compatible with the various metals parts made by Berntsen. Plastic "insulators" are, for example, used to isolate steel rebar from the aluminum in a Berntsen rebar cap, virtually eliminating the destructive problem of dissimilar metal corrosion in the combining of the two.

Reservation of Rights

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