



Polyurethane Foam
Backfill System

**Informational
Brochure**

Set Structures Faster, Easier & More Efficiently

Utility Structural Systems

8720 Tavenor Lane • Houston, Texas 77075

(800) 367-9273 • www.utilitystructural.com • info@poly-set.com

POLY-SET® Backfill Systems

Are you still using native soil or crushed rock backfill for setting and straightening poles, pilings, and other in-ground structures? Let POLY-SET® provide reliability and return on investment with every pole while saving you time and money.

POLY-SET® is a specially modified polyurethane and a state-of-the-art backfill that dramatically improves profit and productivity in setting and straightening applications.

HOW IT WORKS. POLY-SET® expands up to 15 times its premixed volume, forming a tightly packed anchoring foundation that's stronger than the pole itself. Then it hardens into a virtually indestructible pole-to-backfill-to-ground bond.

WHY IT WORKS. The tightly packed molecular structure of POLY-SET® creates a bond with the pole. POLY-SET® actually contours to the shape of the excavated area, essentially locking itself into place.

WHY IT LASTS. Unlike any alternative backfill, POLY-SET® is impervious to moisture. Compared to other backfills it is more resistant to heat, cold, microbial attack and physical stress. POLY-SET® has a compressive strength that is up to three times greater than properly tamped native soil.

APPLICATION ADVANTAGES

SETTING

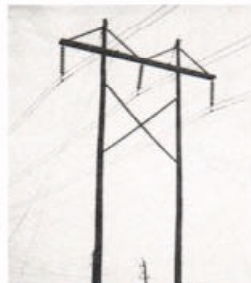
- Pre-project planning simplified, regarding manpower, materials, and time
- Makes setting operations easier requiring less manpower and equipment
- Kits can be carried on line trucks
- During actual line construction, re-plumbing of the pole is not necessary
- Short guy lines can be eliminated
- Protects the environment by sealing in pole preservatives
- Extends pole life by reducing ground-line rot
- Increase up-lift up to three times that of conventional backfill
- Increased strength reduces storm damage
- No tamping required, no outside power source needed for mixing
- Increased bearing surface enhances safety
- Sets up in wet, rock, and sandy soils
- Insect-, water-, rot-, and (on steel) corrosion- proof
- Can be used on wood, concrete, fiberglass and all types of metals
- After backfilling structures will stand alone in 10-15 minutes

STRAIGHTENING

- Corrects existing poles that are leaning due to wind damage or soil failure
- Eliminates the usual problems of excavating, hauling select backfill and re-tamping
- Most poles can be straightened with a two-man crew
- Groundline protection accomplished simultaneously with straightening



Street Lights



H-Frames



Single Structure



Leaning Poles

POLY-SET® *Reliability & Return on Investment With Every Pole!*

Deregulation really means “RE-REGULATION” for transmission and distribution companies due to the refocusing of the regulators. As we enter the initial phase of deregulation, the importance of making wise decisions will have a long-term impact on the direction and profitability of the industry.

Deregulation will force the nation’s utility companies to devote 100% of their efforts to ensuring the reliability of their electrical transportation systems while providing equal access to all electrical providers. As we all know, any interruption of service casts immediate suspicion on the entire Utility Industry, so it is imperative that the operators of the TRANSCO and DISCO systems assure consumers and providers alike that their systems are state of the art, reliable, and secure.

Utility Structural Systems devotes 100% of its energies to the foundations of your systems. Utility companies across the United States have used POLY-SET® for backfilling poles for more than 30 years. One utility customer claims a 60% reduction of structure damage in tornado prone areas by using POLY-SET® for their foundations. This means fewer outages and certainly faster restoration of services for damaged lines.

POLY-SET® is an investment in reliability when used as a part of your new or replacement foundation and therefore is included in the process of rate setting by the PUC. Your pole foundations are now as important as your conductor in earning dividends and return on investment.

POLY-SET® is a patented and proven water insensitive backfill for utility poles. The POLY-SET® system was developed in the field 30 years ago to provide an economical & sound structural backfill alternative.

POLY-SET®

- Reduces the labor requirements 75%. Only 1/4 of the man-hours are needed to install Poly-Set compared to conventional backfills.
- Provides the best rate of return on your investment in foundations and assures longevity in the life of your structures.
- Achieves 100% compaction on every pole, every time, in most conditions and is structurally superior to most backfill.
- Allows you to transfer loads into the soil uniformly and efficiently and this directly affects crew performance and system reliability.
- Enhances the life of the pole by preventing the pole preservatives from leaching into the soil.
- Provides an environmentally safe backfill material that ensures strong foundational support for your structures.

Competitive Utilities Need Reliability & ROI !

Today's high-tech information systems and standards of living have created environments that are completely dependent on consistent electrical power. Reliability in these new environments is an imperative for the utility companies to achieve and maintain. Our goal at Utility Structural Systems is to help the de-regulated "Wires" companies achieve this reliability while realizing a return on investment on every pole.

The revenues for a Wires company will exclusively come from the tariffs associated with power running reliably through your system. Therefore your tariff-based revenue is now directly tied to the reliability of each of the poles that make up your system.

The most vulnerable material associated with a component for any transmission, or distribution system is the pole material. The pole material, specifically at the ground line, is the most vulnerable, and are therefore the most likely to fail. Original POLY-SET® is a time-proven backfill solution for converting what could be your systems' greatest vulnerability into an asset that actually provides a return on investment! New POLY-GROUND® retains the structural capabilities of POLY-SET® and enhances your system safety and reliability.

De-Regulation allows a return on investment on expenditures like POLY-GROUND®, which improves the reliability of your wires system. Your capital investment base for your transmission and distribution wires system is realized after depreciation. Wires companies must make an investment to realize a return on investment. Investment is also required to maintain a reliable system, and POLY-GROUND® is an investment in the reliability of your system.

POLY-SET®

- Supplies you with a patented and proven water insensitive backfill system we originally developed and continually improved for over 30 years for your wood, steel, and concrete poles.
- Provides a structurally superior backfill solution where water or freezing temperatures are present.
- Provides an environmentally safe backfill material.
- Reduces labor requirements to set or straighten poles compared to conventional backfills.
- Enhances pole life by preventing the preservatives from leaching into the soil.
- Offers the best rate of return on your foundation investment by ensuring the reliability and longevity of your utility poles.

POLY-GROUND®

- Has the equivalent of 15 to 25 times more surface area than a 5/8" by 8' grounding rod at each pole installation, enhancing system safety and reliability.
- Increases the area in which electrical energy can use the Earth's crust, so the electrical system operates more efficiently with less maintenance.
- Supplies you with a proven water insensitive backfill system.
- Provides a structurally superior backfill solution where water or freezing temperatures are present.
- Provides an environmentally safe backfill material.
- Reduces labor requirements to set or straighten poles compared to conventional backfills.
- Enhances pole life by preventing the preservatives from leaching into the soil below groundline.
- Offers the best rate of return on your foundation investment by ensuring the reliability and longevity of your utility poles.

Utility Structural Systems focuses exclusively on your system's foundations, and our goal is to help you achieve your goals for reliability and return on investment with every pole.

PS210W – Straightening Kit

This kit will fill 2 cubic feet of void and is designed primarily to straighten leaning distribution poles.

This kit contains:

- 1- 2 Gal Plastic Jug “A”
- 1- ½ Gal Plastic Jug “B”
- 1- Pair of Vinyl Gloves
- 1- Stir Stick



This kit comes with mixing instructions on both of the jugs and is packaged together in a box and the boxes are put on pallets. The 2 Gal plastic jug serves as the mixing container.

PS215W – Straightening Kit

This kit will fill 3 cubic feet of void and is designed primarily to straighten leaning transmission poles and set small street light standards.

This kit contains:

- 1- 2 Gal Plastic Jug “A”
- 1- ½ Gal Plastic Jug “B”
- 1- Pair of Vinyl Gloves
- 1- Stir Stick



This kit comes with mixing instructions on both of the jugs and is packaged together in a box and then put on pallets. The 2 Gal plastic jug serves as the mixing container.

PS230W – Setting Kit

This kit will fill 6 cubic feet of void and is designed primarily to set distribution poles.

This kit contains:

- 1- 5 Gal Pail “A”
- 1- 2 Gal Pail “B”
- 1- Pair of Vinyl Gloves
- 1- Stir Stick



This kit comes with mixing instructions on the 2 Gal pail and is shipped individually on pallets. The 5 Gal pail serves as the mixing container.

PS240W – Setting Kit

This kit will fill 8 cubic feet of void and is designed primarily for setting larger distribution poles and smaller transmission poles.

This kit contains:

- 1- 6 Gal Pail “A”
- 1- 2 Gal Pail “B”
- 1- Pair of Vinyl Gloves
- 1- Stir Stick



This kit comes with mixing instructions on the 2 Gal pail and is shipped individually on pallets. The 6 Gal plastic pail serves as the mixing container.

Select Backfill Kits

PS250W – Setting Kit

This kit will fill 10 cubic feet of void and is designed primarily for setting transmission poles or larger applications.

This kit contains:

- 1- 6 Gal Pail “A”
- 1- 2 GalPail “B”
- 1- Pair of Vinyl Gloves
- 1- Stir Stick



This kit comes with mixing instructions on the 2 Gal pail and is shipped individually on pallets. The 6 Gal pail serves as the mixing container.

SHIPPING INFORMATION All shipments are FOB Houston, Texas.

Full pallet information:

Boxes Kits:

PS210W Kits = 45 boxes per pallet

PS215W Kits = 45 boxes per pallet

Pail Kits (“A” and “B” pail shipped on separate pallets):

PS230W Kits = 24 “A” pails per pallet and 60 “B” pails per pallet

PS240W Kits = 24 “A” pails per pallet and 60 “B” pails per pallet

PS250W Kits = 24 “A” pails per pallet and 60 “B” pails per pallet

ORDERING INFORMATION

Please fax billing and shipping addresses and information when placing the actual order. Payment terms are net 30 days. We also accept most major credit cards for purchases. See product label for warranty and limitation of remedy and liability. (Fax #: 713-991-1737)

We are happy to ship any quantity the customer needs and the above numbers are provided for shipping information purposes only. If you have questions or need additional information on our **POLY-SET**® product lines please contact the Customer Service center or a Sales Representative at (800) 367-9273. You can also visit our website at www.utilitystructural.com or send an e-mail to info@poly-set.com

The amount each kit fills in void is base on temperatures of 78°F. Utility Structural Systems reserve the right to change these kits without notice. SK 06.15.04



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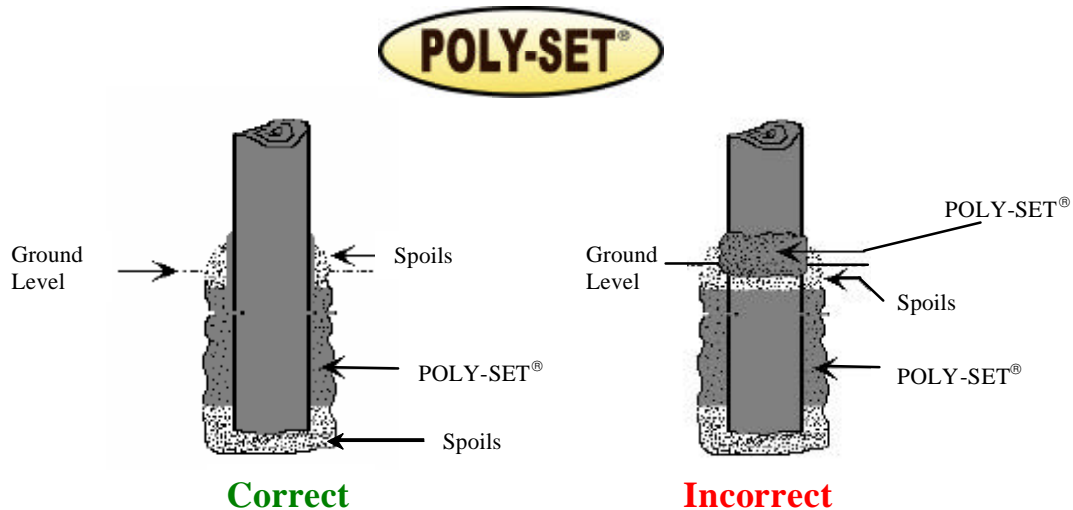
INSTALLATION PROCEDURE

Proper installation of POLY-SET[®] will assure that the advantages of POLY-SET[®] will be realized.

After the hole has been dug and the pole is in place, throw in some spoils to keep foam away from butt of pole for grounding purposes, usually 3" to 6".

One of the advantages of POLY-SET[®] is to help curtail ground line rot on wood poles and ground line corrosion on steel poles.

Have the proper size kit close to the hole. Mix the A and B components in accordance with the mixing instructions and pour POLY-SET[®] on pole about 6" to 12" above the ground line, walking around the pole while pouring. Pour the remaining POLY-SET[®] down the annulus, walking around the pole while pouring. The "foamed" material should come up to within 6" of ground line and blend with POLY-SET[®] poured on the pole. Drive ground rods outside the foam.

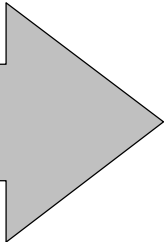


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POLY-SET[®] MIXING INSTRUCTIONS

Poly-Set[®] is supplied in paired pail kits, proportionately packaged by the mixing ratio of A and B components. **Keep the lids sealed until ready for use. READ ALL DIRECTIONS BEFORE STARTING.**

1. Equipment needed: agitator (stir stick), rubber gloves, goggles, and a screwdriver.
2. Place number of needed Poly-Set[®] kits (A and B components) near void to be filled on the job site. It is important to have the pole in the exact desired position before pouring the Poly-Set[®] into the void.
3. Pour "B" component into pail containing "A" component.
4. Agitate or stir mixture according to time chart below.

	<u>COMPONENT TEMP IN °F</u>	<u>MIXING TIME IN SECONDS</u>
<p><u>Note:</u> Times are approximate and may vary according to individual application. Contact factory for assistance.</p> 	30	85
	40	75
	55	60
	70	20
	85	10
	100	5

5. Pour the mixed Poly-Set[®] material into the hole immediately.
 - A. **FOR SETTING:** Walk around the pole while pouring so the material will be evenly dispensed around the structure. Poly-Set[®] should be poured down the side of the pole about one foot above ground line. This will give the pole a coating, which will help to prevent ground line rot on wood poles and ground line corrosion on metal poles.
6. After the material has expanded (5 minutes) the process can be repeated until the cavity has been filled. It is usually desirable to let the Poly-Set[®] rise stop short (about 6 inches below ground line) and finish filling cavity with tailings.
7. Be sure to have the pole in its exact desired position prior to pouring and not moved for at least 20 minutes after pouring the last kit of Poly-Set[®] into the void. The pole may be released in 8 to 10 minutes. Drive ground rods outside the foam.
8. Place dirt around base of pole and spread or remove remainder from the job site.

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POLY-SET^â STORAGE & HANDLING

Containers of Poly-Set[®] should be stored in an enclosed dry area out of the weather, and extreme temperatures should be avoided. The material should be stored between 50 and 90°F. Cold temperatures do not ruin the material, but when material is below 75 to 80° during mixing, the material will not react and expand as efficiently as it should. Excessively hot temperatures make the material react too fast, giving little time to mix and pour.

When handling Poly-Set[®] liquids, contact with skin should be avoided. Rubber gloves should be worn. When mixing the materials, protective goggles should be worn to avoid splashing chemical in eyes.

POINTS TO REMEMBER

1. Read all directions carefully.
2. Use proper safety equipment, goggles and gloves.
3. Do not auger holes too large. This will result in excessive material usage. Hole diameter need only be 4 to 6 inches larger than pole diameter.
4. Avoid extreme storage temperatures. Store between 50⁰ F. - 90° F.
5. **Do the mixing close to hole. When the “A” and “B” components are combined the reaction cannot be stopped.**
6. **The colder the materials, the slower the reaction time. The hotter the material, the faster the reaction time will be.** Excessively hot or cold material may increase density; reduce expansion, causing an increase in material requirements.
7. Cleaning solvent will not dissolve Poly-Set[®] that has completely cured.
8. Avoid skin and eye contact. In case of contact, flush with water. Obtain medical attention if necessary. *
9. Avoid breathing vapors. Use only in well-ventilated areas. *
10. Keep containers tightly closed. Do not allow water contamination.

* If necessary, refer to Material Safety Data Sheet and / or call: CHEMTREC 1-800-424-9300

FORWARD Enterprises & Utility Structural Systems assumes no risk whatsoever as a result of the use or misuse of Poly-Set^â. The customer's exclusive remedy as to any breach of warranties or negligence claim shall be limited to the materials' purchase price.

POLY-SET[®] DISPOSAL **LIQUID COMPONENTS "A" and "B"**

There are occasions when pouring "A" into "B" or "B" into "A" that some of the liquid remains in one of the containers.

To properly dispose of the residue:

After mixing and pouring of the Poly-Set[®], pour as much of the residue as you can into the mixing container.

Either component will react with any residue in the mixing container to become "inert" polyurethane.

If unable to pour the entire liquid residue, 40 CFR 261 is applicable, since the liquids "A" or "B" are classified as non-hazardous waste. As long as the liquid residue is less than 1" or 3% of the total volume by weight in a container of less than 110 gallons, the waste may be disposed of as non-hazardous.

In some locations, a solid landfill that accepts high-density polyethylene containers is a suitable disposal site.

Refer to all state and local regulations for your location concerning types of landfill available.

DISPOSAL **SOLIDS**

For purposes of definition, Solid shall mean cured polyurethane foam.

Once the components A & B have been mixing and 'foamed up' and cured (full curing time is 24 hours), it becomes an inert material. This is a material in which no further chemical reaction will take place.

In accordance with the 1992 EPA TCLP tests, Poly-Set[®] does not leachate any material detrimental to the environment.

The inert 'foamed up' Poly-Set[®] may be disposed of to a solid landfill that accepts inert solid materials.

Refer to all state and local regulations for your location concerning the type of landfills available.

Polyurethane Foam History

Mankind's curiosity, ingenuity and needs have driven the research and development of a myriad of products. Once the basic product has been 'invented', the questions are asked, "How can it be used in other applications?" and "How can it be produced at a lower cost?". So it was, is, and will continue to be with polyurethane foams.

The initial polyurethanes came from the development work of Otto Bayer in the late 1930's. Early in the 1940's such prestigious companies as I.G. Farben of Germany, ICI of the United Kingdom and E.I. Dupont of the United States developed urethane systems for such applications as coatings for the Barrage balloon, synthetic bristles and submarine insulation/flotation, to name a few.

Further development brought progress in the base products of urethanes. The new base products greatly expanded markets for flexible, rigid and energy-absorbing foams. This research has led us first to Poleset then on to freon-free Poly-Set and now our newest backfill system, Poly-Ground.

Forward Enterprises was the pioneer in the use of a rigid polyurethane foam to set direct-embedment utility structures. The question "Can a rigid polyurethane foam be used as a foundation for utility structures?" needed to be answered. Through research of products and methods the use was proven not only possible, but also cost-effective in both the short and long terms.

Numerous companies have investigated the effectiveness of the use of foam in areas of corrosion-protection and structural integrity for direct-embedment structures. Forward Enterprises supplied Poleset to these organizations to carry out their experiments.

During the late 1960's Forward Enterprises embarked on a program to market Poleset to the utility industry. The purpose was to prove that through the use of the Poleset method, more poles could be set in a day and the structural integrity of the Poleset would keep the pole in place. Forward Enterprises has continued to improve Poleset with the addition of water-immiscible constituents and the elimination of fluorocarbons while enhancing the products' physical characteristics.

The long-term effectiveness of polyurethane foams has been established not only by Forward Enterprises, but also by E. I. Dupont. Their studies show that partial embedment of foam-faced panels in soil for ten years "showed negligible deterioration of the foam and of the attached metal protected by the foam."

Bayer has numerous case studies of urethane foam applications for protecting metal structures from chemical attack, both above and below ground level. It also shows that urethane applications counteract the porosity of masonry structures.

A Homer Research Laboratories report dated 1970 on behalf of Bethlehem Steel lists development and testing of buried steel structures protected by rigid polyurethane foams. Bulletins issued by Bethlehem Steel reveal numerous applications of rigid polyurethane foam in the protection of underground steel structures for construction, refrigeration and industry.

Forward Enterprises has been setting all types of structures in the ground, from transmission poles to vertical support members in the Arctic. We have an extensive library on the use of polyurethane foam for direct-embedment of structures. Also, Forward Enterprises has documentation of the effectiveness of "Pour-in-Place" for any type of in-ground setting. Our documentation starts with wood poles that have been set in the ground since 1970, with comprehensive testing done on the poles and the Poleset.