TYPICAL SPECIFICATION
ECP Steel Pier™ PPB-200 and PPB-250 Footing Bracket System

Section 1- General

1.01 Typical Installation Scope

Furnish labor, equipment, tools and material to install PPB-200 or PPB-250 Under Footing Steel Piers as described in this specification in a workmanlike manner and to design criteria.

1. Prepare site for safe working conditions.
2. Thoroughly investigate the site for any and all underground utilities before excavating.
3. Excavate as required for installation of the product.
4. Prepare footing and/or grade beam of the foundation for proper bearing plate mounting.
5. Install the drive cylinder and connect hydraulics.
6. Hydraulically drive the steel pier sections to the required installation force.
7. Install the bearing plate and the pier cap, lift assemblies, hydraulic lift cylinders and connect hydraulics.
8. Transfer the load to the piers, lift the structure to designed specifications and mechanically secure to maintain elevation.
9. Remove equipment from work area.
10. Backfill and clean work areas.

1.02 Delivery, Storage and Handling

All foundation repair products, tools and equipment shall be handled and transported with care to prevent any damage or deformation. Hydraulic components shall be protected from the weather and kept clean of any dust, dirt, mud or debris.

Section 2 – Product Material

2.01 Pier Sections

Each pier section shall be manufactured from steel tubing having a nominal outside diameter of 2-7/8" outside diameter and a wall thickness of 0.165". The pier sections shall be fabricated from mill rolled, induction heat treated steel with a minimum yield strength of 55,000 psi. Each pier section shall be approximately 12" long and shall have a mill-installed coating of zinc-iron alloy, pure zinc galvanizing, a layer of zinc chromate compounds and a clear organic polymer coating. The materials conform to ASTM A500.

2.011 Lead Section – PPB-300-S

The lead section shall have a friction reduction collar welded to the bottom end of the pier pipe. The collar shall be fabricated from steel tubing having a nominal 3-3/8" outside diameter by 0.188" wall with a length of 1". The purpose of the collar is to reduce skin friction on the pier sections that follow; therefore the first section of pier pipe must have this collar attached.

2.012 Extension Section – PPB-300-EPS

The extension section shall have a coupling installed on one end of the pier pipe. This coupling shall be fabricated from steel tubing having a nominal 2-1/2" outside diameter by 0.180" wall thickness with a length of 5-7/8". Three inches of the coupling shall be inserted into the pier section and secured by two 1/2" button welds.

2.02 Load Transfer Assembly

The load transfer assembly shall be designed to support structure by transferring the foundation load from a bearing plate under the footing to a pier cap fitted to the pier pipe.

2.021 Bearing Plate Assembly

2.0211 PPB- 200 Bearing Plate Assembly

The bearing plate shall consist of a new, clean steel plate with a thickness of 3/4" conforming to ASTM A-36. The pier bracket shall have a 64 square inch bearing surface that contacts the bottom of the foundation element. The mounting plate shall have four holes that will accept 7/8" diameter B-7 threaded rod.

2.0212 PPB-250 Bearing Plate Assembly

The bearing plate shall consist of a new, clean steel plate with a thickness of 5/8" conforming to ASTM A-36. The pier bracket shall have a 100 square inch bearing surface that contacts the bottom of the foundation element. The mounting plate shall have four Williams Form WF-8, Grade 75, high strength continuously threaded bars, 15 inches long welded into holes in the bearing plate.

2.022 Pier Cap Assembly

2.0221 PPB- 200 Pier Cap Assembly

The bearing plate shall consist of a new, clean steel plate with a thickness of 3/4" and measuring 8" by 8", conforming to ASTM A-36. The pile cap shall have four recesses milled 1/4" deep at each corner in the top face of the pier cap to accept and align the lift assemblies. The bottom face of the pier cap shall have a 2" length of 3" schedule 40 pipe welded at the center of the plate to accept the pier pipe.

2.0222 PPB- 250 Pier Cap Assembly
The bearing plate shall consist of a new, clean steel plate with a thickness of one inch and measuring 8-1/2" by 8-1/2", conforming to ASTM A-36. The pile cap shall have four drilled holes at each corner of the pier cap to accept Williams Form WF-8 all thread rods. The bottom face of the pier cap shall have a 6" length of 3" schedule 40 pipe welded at the center of the plate to accept the pier pipe.

2.023 Lift Assembly

2.0231 PPB- 200 Lift Assembly
The lift assembly shall consist of 1-1/4" x 1-1/4" x 3/16" square mechanical tubing by 5" long with a 7/8"-9 B-7 nut centered and welded on one end, four required. Supplied loose shall four 9" lengths of 7/8"-9 B7 rod.

2.0232 PPB-250 Lift Nuts
Supplied loose shall four Williams Form WF-8 heavy duty nuts.

Section 3 – Tools and Equipment

3.01 Single Acting Drive Cylinder – HYD-258
A single acting hydraulic cylinder shall be used to drive the pier pipe. The hydraulic cylinder shall be single acting and rated at 10,000 psi of hydraulic pressure. Return shall be by an internal heavy duty return spring. The minimum cylinder bore shall be 5.15 in^2 and a stroke of 12". (Enerpac RC-258-12 or equal)

3.02 Hydraulic Pumps – HYD-5420

3.021 Pier Installation Pump
A gasoline or electrically operated hydraulic pump is required to install the pier pipe. The pump shall be capable of providing 10,000 psi of hydraulic pressure and a dual flow rate of 480 in^3/min up to 2,000 psi and a rate of 100 in^3/min above 2,000 psi. The pump shall have a 4-way, 3 position valve for double acting cylinder service. (Enerpac PGM-5204R or equal)

3.022 Hand Pump – HYD-801
One or more hand pumps may be required to transfer structural load and to recover lost elevation. The hand pump(s) are connected to hydraulic lifting rams via a manifold arrangement. This provides uniform force to several pier placements at the same time. The hand pump assembly shall provide two stages of displacement at pressures up to 10,000 psi. Below 400 psi the displacement shall be 2.4 in^3 per stroke and above 400 psi, 0.15 in^3. (Enerpac P801 or equal)

3.03 Single Acting Lift Cylinder – HYD-254
A single acting hydraulic cylinder shall be positioned at each placement during the load transfer phase of the restoration. The hydraulic cylinder shall be rated at 10,000 psi of hydraulic pressure and heavy duty return spring. The minimum cylinder bore shall be 5.16 in^2 and a stroke of 4". (Enerpac RC-254 or equal)

3.04 Pressure Gauge – HYD-2535
A pressure gauge shall be provided to monitor the installation force placed upon the pier pipe by the single acting drive cylinder. The gauge shall be capable of measuring 0 – 10,000 psi with minor graduations of not less than 200 psi. (Enerpac G4088L or G2535 or equal)

Section 4 – Steel Pier Installation

Warning!

Utilities:	**Thoroughly investigate the job site for the possible existence and location of all underground utilities before proceeding. Avoid any contact with ALL underground utilities!**
Excavations:	**Collapsing soil can be dangerous. Follow OSHA requirements at all times.**
Pier Placement:	**Excessive distance between pier placements can damage the concrete foundation from structural overload. Verify that the foundation has sufficient structural integrity to carry the load between placements.**
Drive Cylinder:	**Do not exceed the hydraulic drive cylinder manufacturer's working pressure during pier installation.**
Hydraulic Equipment:	**Inspect all hydraulic equipment prior to using. Do not use any leaking or damaged components such as cracked, crimped or cut hoses, leaking fittings, etc.**
Heavy Lifting:	**Many pieces of equipment used to install steel foundation underpinning are very heavy. Use proper lifting techniques, back supports, and help from others when lifting heavy objects.**

Safety Devices: **When driving pier pipe all face plates must be fastened in place on the drive stand and pier bracket to enhance the integrity of the system and to secure the pier pipe.**

Safety Devices: **All persons in and around the work area must use personal safety protection.**

Warning! **FAILURE TO HEED THESE WARNINGS OR TO FOLLOW SAFE WORK HABITS MAY RESULT IN SERIOUS INJURY OR DEATH!**

4.01 Excavating to Expose Footing or Grade Beam

Locate the pier placements prior to excavation and verify that the locations are free from any utility lines. An excavation shall be prepared under the foundation to expose footing or the bottom of the grade beam. The excavation shall be to a depth of 26 inches below the bottom of the foundation and 6" beyond the centerline of the footing. The excavated work area must be wide enough for safe working conditions, typically two to three feet wide is usually adequate, taper or shore deep excavations per OSHA guidelines. Move excavated soil away from the work area by at least two feet and store in such a safe manner.

4.02 Footing or Grade Beam Preparation

A pneumatic or electrical chipping hammer with a chipping bit and then a bushing tool for smoothing the bottom of the footing at the location of the pier shall be used. The bottom area of concrete where the bearing plate will be located must be prepared to a smooth and level condition. Prior to acceptance of the preparation of the bottom of the footing or bottom of the grade beam, a level shall be used to verify that the portion that the bearing area is level both perpendicular to the foundation and parallel to the structure. The soil at the bottom of the excavation shall be made lever where the pier pipe will enter the soil.

4.03 Driving Pier Pipe

Drive the lead pier section into the soil using the hydraulic drive cylinder and high pressure hydraulic pump to nearly the full extension of the cylinder rod. Retract the cylinder rod and document the force used to drive the section of pier pipe into the ground. The pier installation process shall continue by adding extension pier sections until the design load or a suitable bearing stratum is reached. Hold the final driving load on the pier to check for pier creep. Record the driving force for each extension section installed.

4.04 Field Proof Loading

Load test the pier to the required proof load above the design or working load, or until lift of the structure is encountered. It is not recommend applying a proof load to the system at a load greater than 37,500 pounds (PPB- 200) or 40,500 pounds (PPB-250), which is 1.5 times the anticipated maximum service load.

4.07 Cutting Final Pier Section to Length

After verifying the pier capacity, it may be necessary to cut the final pier section to optimize the amount of lift available. The pier pipe shall be cut very carefully to insure that the cut is perpendicular to the axis of the pipe. The load transfer assemblies are shipped with lift rods sized for lifts up to 4". For larger lifts, contact a licensed professional engineer to insure that using longer continuously threaded lifting rods will not reduce the system capacity due to buckling of the rods.. The length to cut the pier section will vary depending upon the required lift, the thickness of the bearing plate and the pier cap and the collapsed length of the lifting ram.

4.08 Load Transfer Assembly Installation

Install load transfer assemblies at each pier placement location. Place the pier cap on top of the steel pier and assemble the bearing plate to the pier cap using the lift assembly components supplied with the product being installed. Carefully check for alignment and proper bearing between the bearing plate and the bottom of the footing. If any voids or anything less that full contact between the bearing plate and the concrete is observed, install high strength non-shrink grout between the bearing plate and the foundation following the manufacturer's instructions and curing time. While the grout sets, activate the cylinder to achieve gentle force between the bearing plate and the footing while the grout cures.

Install a 25-ton ram at each pier placement between the bearing plate and the pier cap. The rams shall be connected by hydraulic hoses through manifolds and cut-off valves to one or more hydraulic hand pumps and gauges. The foundation shall be restored as specified in section 4.04 to provide the most accurate restoration and least stress on the foundation element.

4.09 Load Transfer

Transfer the structural load to the piers uniformly and evenly by activating many hydraulic rams simultaneously. As the hand pumps are actuated, a force is applied to the pier caps. As the load is transferred from the soil under the foundation to the piers, the interior and exterior of the structure must be carefully monitored to insure that the restoration occurs to plan and the structure is stabilized or lifted to the design elevation. As each placement reaches the desired load and/or elevation, the cut-off valve for the ram at the pier is closed and the pressure at the time of closure is recorded for that placement. The four lift assemblies attached to the all thread rods that were threaded into the bearing plate shall be adjusted to provide equal bearing at the pier cap (PPB-200); or the nuts on the continuously threaded rods welded to the bearing plate shall be adjusted to provide

bearing at the pier cap. (PPB-250). Once the structure has been restored to as close to the original elevation as the construction will allow or until the design elevation has been reached, the hydraulic rams and hydraulics from each pier placement shall be removed. Clean all hydraulics, replace dust caps on the hydraulic couplings and store the equipment in a clean, dry environment.

4.10 Backfill and Cleanup

Remove all scrap and other construction debris from the site. Remove all tools and equipment, clean them and store them. The excavations shall now be backfilled using the soil that was removed and stored nearby. The backfill shall be placed excavation then properly tamped to achieve maximum density. Dispose of all construction debris in a safe and legal manner.

END OF SPECIFICATION

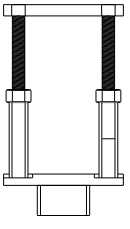
ECP Steel Pier™ -- PPB-200 & PPB-250 Under Footing Bracket Pier System

- **PPB-200 Ultimate Capacity – 50,000 lb**
- **Maximum Proof Load – 37,500 lb**
- **68 Square Inches Bearing Surface**

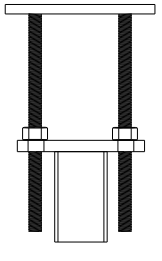
- **PPB-250 Ultimate Capacity – 54,000 lb**
- **Maximum Proof Load – 40,500 lb**
- **100 Square Inches Bearing Surface**

- **Standard Lift – 4”**
- **Fully Adjustable Unlimited Lift Capability**
- **Installs Under Footing**
- **Friction Reduction Collar On Lead Pier Section**
- **2-7/8” Diameter High Strength, Galvanized Tubular Pier**

- **Installs With Portable Equipment**
- **Installed With Little or No Vibration**
- **Installs To Rock or Verified Load Bearing Stratum**
- **100% of Piers Proof Tested When Installed**
- **Manufacturer’s Warranty**

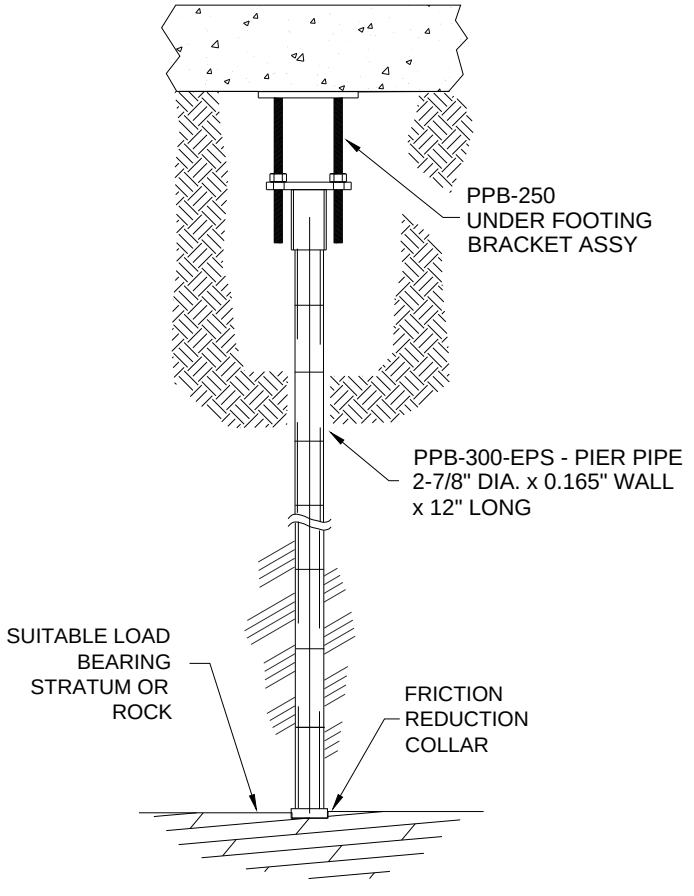


PPB-200 BRACKET ASSY



PPB-250 BRACKET ASSY

PPB-200 & PPB-250 Under Footing Bracket Details



PPB-250 Under Footing Pier System Application Details

The capacity of the PPB-200 and PPB-250 under foundation support system is a function of the capacity of pier pipe and soil surrounding the pipe, capacity of the load bearing stratum, capacity of the foundation bracket, foundation strength and strength of the bracket to foundation connection. Actual capacities could be lower than the bracket capacity.

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