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NER-579

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Reissued 06/2017

This report is subject to renewal 06/2018.

DIVISION: 31 00 00—EARTHWORK

SECTION: 31 63 00—BORED PILES

REPORT HOLDER:

HUBBELL POWER SYSTEMS, INC.

**210 NORTH ALLEN STREET
CENTRALIA, MISSOURI 65240**

EVALUATION SUBJECT:

ATLAS PIERS: AP2-3500 SERIES AND AP2-3500M SERIES



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1.0 SUBJECT

Atlas Piers:

- 1.1 AP2-3500 Series
- 1.2 AP2-3500M Series

2.0 PROPERTY FOR WHICH EVALUATION IS SOUGHT

- 2.1 Structural

3.0 DESCRIPTION

3.1 General

Atlas Piers are used as foundation systems to support gravity loads from structures by end bearing action. Atlas Piers AP2 Series are resistance products designed for foundation slab underpinning. The piers consist of 42-inch-long (1066.8 mm) pipe sections which can be coupled together to achieve the desired lengths to reach firm bearing strata. Coupling is achieved by a 6-inch-long (152.4 mm) tubular steel section of suitable diameter to fit inside the pier section. The coupling is inserted 3 inches (76.2 mm) inside one end of each pier section and attached by an embossed mechanical connection, while the other end of the coupling extends into the other pier section being coupled. The initial section shall have a collar of 4 inches (101.6 mm) outside diameter welded to the lead end of the pipe to assist in reducing wall friction during drive of the pile.

3.2 Models

3.2.1 The AP2-3500 Series pier section is fabricated from 3¹/₂-inch (88.9 mm) outside diameter by 42-inch-long (1066.8 mm) steel section with a wall thickness of 0.160 inches (4.06 mm).

3.2.2 The AP2-3500M Series is a modified form of AP2-3500 and has a 4-inch (101.6 mm) outside diameter, 0.219-inch-thick (5.56 mm) by 42-inch-long (1066.8 mm) steel pipe sleeve mounted over the AP2-3500 pier section. This series is used in weaker soil to increase the moment transfer capacity from the top pier platform to the

pier section, and does not participate in the axial load transfer.

3.3 Connections to Structure

Connections to structure are made by a pier bracket which is a welded assembly of ⁵/₈-inch- and ¹/₂-inch-thick (15.88 and 12.7 mm) steel plates, which positively engage the bottom and side of the footing. The bracket is connected to the foundation by listed steel concrete expansion bolts. The bracket has guides which slip into the top of the pier platform which is a welded assembly consisting of an 18-inch-long (457.2 mm) steel tube of suitable size to fit over the pier section to form the cap cylinder. The cap cylinder has two 10-inch-long (254 mm) by ⁵/₈-inch-thick (15.88 mm) steel plates welded as vertical stabilizers to the sides of the cylinder, and the top of the cylinder has a 1-inch-thick (25.4 mm) plate welded to the top.

Load transfer from the bracket to the top pier platform is achieved through two ⁵/₈-inch-diameter (15.88 mm) by 3-inch-long (76.2 mm) pier pins which bear on lift shims. The lift shims are used as required and are ⁵/₈ inch by 1¹/₂ inch (15.88 by 38.1 mm) by 7 gauge or 16 gauge steel shims which bear against the vertical plates of the top pier platform. The top pier platform then transfers the load to the pier section through the bearing action of the pier section against the 1-inch-thick (25.4 mm) plate welded to the cap cylinder of the top pier platform.

3.4 Material

3.4.1 Pier Shaft – AP2-3500 and AP2-3500M Series pier sections are mill-rolled galvanized steel sections with a yield strength of 50 ksi and tensile strength of 55 ksi conforming to ASTM A513. The AP2-3500M modified pier utilizes a pipe sleeve that is mill-rolled steel pipe with a yield strength of 50 ksi conforming to ASTM A513.

3.4.2 Pier Bracket – welded assembly of flame-cut steel plates conforming to ASTM A36.

3.4.3 Top Pier Platform – welded assembly of steel tub and steel plates conforming to ASTM A36 and ASTM A513, respectively.

3.4.4 Anchor Bolts used to connect the pier bracket to the foundation are steel bolts, not provide by Hubbell Power Systems. The bolts do not participate in load transfer, and are used to hold the assembly in position.

3.4.5 Pier Pins - high-strength cadmium plated steel pins meeting the strength requirements of ASTM A490.

3.4.6 Lift shims - cadmium plated hot-rolled steel shims conforming to ASTM A36.

4.0 INSTALLATION

4.1 General

Atlas Piers are installed in accordance with the manufacturer's published installation instructions, specifications, engineering drawings, and this report. The manufacturer's published installation instructions and this report shall be strictly adhered to and a copy of these instructions shall be available at all times on the job site during installation. The instructions within this report govern if there are any conflicts between the manufacturer's instructions and this report.

4.2 Design Capacities

4.2.1 AP2-3500 Series - Ultimate load capacity is 85,000 pounds (382.5 kN), design load capacity is 42,500 pounds (189 kN).

4.2.2 AP2-3500M Series - Ultimate load capacity is 90,000 pounds (405 kN); design load capacity is 45,000 pounds (202.5 kN).

4.3 Footings and Slabs on Grade

Atlas Piers are installed as underpinning for foundations and slabs. The piers are designed by a registered engineer to resist the gravity loads on the foundation and shall not be used to resist uplift loads. Location, spacing, and number of piers shall be shown on the engineering drawings. Design loads on the foundation shall be determined in accordance with Chapter 16 of the *Standard Building Code*[®], *International Building Code*[®], *BOCA National Building Code*[®], or the *Uniform Building Code*[®], whichever is applicable, and shall not exceed the design load capacity for the Atlas Piers listed in section 4.2 of this report.

The piers are installed in accordance with the manufacturer's specifications. The following is a general installation procedure; for a detailed installation procedure, see the manufacturer's specifications and engineering drawings.

The edge of the footing or slab to be underpinned is excavated to expose the bottom of the concrete to a width of at least 36 inches and to a depth of at least 15 inches beneath the base of the foundation element. The concrete is smoothed and/or notched to receive the Pier Bracket. Reinforcing steel shall not be cut. The surface of the concrete shall be smooth, free of all dirt, debris and loose concrete to provide a firm bearing surface for the Pier Bracket. The Pier Bracket is installed in accordance with the specifications. The Pier Sections are driven to bedrock or a firm bearing stratum using a Drive Stand Assembly. Each pier is load tested in accordance with the specification. The last Pier Section is saw cut to length suitable for installing the Top Pier Platform.

The Pipe Sleeve is then pushed over the last Pier Section of the AP2-3500M using the Drive Stand Assembly. The Top Pier Platform is installed over the last Pier Section in accordance with the specifications. The Two Piece Lift Head Assembly is temporarily attached to the Pier Bracket using locking pins and clips. The lifting and holding operation for the footing or slab then proceeds as noted in the specifications.

5.0 IDENTIFICATION

Each Atlas Pier covered by this report shall be labeled with the manufacturer's name/and or trademark, address, the product name, and this ICC-ES legacy evaluation report number NER-579, for field identification.

6.0 EVIDENCE SUBMITTED

- 6.1 Atlas Systems Inc., 2000 Technical Manual, includes: Technical Guide, 2000 Edition 1.4
Installation Details,
Quality Assurance and Testing
Design Steps, Design Tables, Design Example, and
Typical Specifications
Design procedure and tables signed and sealed by David C. Kraft, P.E. July 16, 2000.
- 6.2 Quality Control Manual and Inspection Procedures for Hubbell Power Systems, Inc., Centralia Operations, prepared by RADCO, issued November 2008.
- 6.3 Test report, field load testing of Atlas Piers steel pipe piles under ASTM D1143, Managing Technology, Inc., August, 1989, signed and sealed by David C. Kraft, P.E.
- 6.4 Test reports on load testing of piers, Hauser Laboratories, November 8, 1988, Test Report No. 88-0889b; October 14, 1988, Test Report No. 88-0889, signed by David W. Woods and Robert Wehner.
- 6.5 Mill order certificates ASTM A36, ASTM A709-94a
GR 36, ASTM A500, ASTM A513:
 - Northwestern Steel and Wire Company, 09-03-99.
 - North Star Steel Iowa, 12/12/98, 01/03/99.
 - Birmingham Steel Corp., 10/14/99.
 - Birmingham Southeast, LLC, 12/28/99, 06/29/00.
 - EMJ, 17-JUL-2000.
 - Allied Tube & Conduit, 3/13/00.
 - Bayou Steel Corporation, 05/15/00, 11/04/99.
 - Nucor Corporation, 4/30/97.

7.0 CONDITIONS OF USE

The ICC-ES Subcommittee for the National Evaluation Service finds that Atlas Piers as described in this report complies with or are suitable alternates to that specified in the 2000 *International Building Code*[®], the *BOCA National Building Code*[®]/1999, the 1999 *Standard Building Code*[®], the 1997 *Uniform Building Code*[™], the 2000 *International Residential Code*[®], the 2002 *Accumulative Supplement to the International Codes*[™], and the 1998 *International One- and Two-Family Dwelling Code*[®], subject to the following conditions:

This evaluation report and the installation instructions, when required by the code official, shall be submitted at the time of permit application.

- 7.1 Atlas Piers shall be installed in accordance with manufacturer's published installation instructions, specifications, engineering drawings, and this report.
- 7.2 Atlas Piers shall be installed only by contractors trained and authorized by Hubbell Power Systems, Inc. A member of the installing crew shall have a valid certification card in their possession.
- 7.3 Engineering calculations and drawings shall be submitted to the code official when applying for a permit. The calculation and drawings shall be signed and sealed by the responsible professional engineer when required by the applicable code.

- 7.4 The connection between the Atlas Pier and the structure is not within the scope of this report.
- 7.5 The bearing load on the foundations is determined in accordance with the applicable code and shall not exceed the design load capacity for the Atlas Piers listed in Section 4.2 of this report.
- 7.6 Atlas Piers are used to resist gravity loads and provide underpinning of foundations and slabs and shall not be used to resist uplift loads.
- 7.7 Atlas Piers have not been evaluated for earthquake loads and shall be limited to structures covered under the exceptions noted in:

Section 1607.1.1 *Standard Building Code*® Section
1614.1 *International Building Code*®

Section 1610.1 *BOCA*® *National Building Code*®
Section 1610 *Uniform Building Code*™

Section R301.2.2 *International Residential Code*®

- 7.8 Each Atlas Pier shall be load tested after installation in accordance with the manufacturer's specifications. Records of load testing shall be maintained at the job site and shall be available to the code official upon request.
- 7.9 This report is subject to periodic re-examination. For information on the current status of this report, contact the ICC-ES.

LEGACY
REPORT