ICC EVALUATION SERVICE

ICC-ES Evaluation Report

ESR-4238

Reissued April 2020
Revised June 2020
This report is subject to renewal April 2022.

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DIVISION: 03 00 00—CONCRETE
Section: 03 48 00—Precast Concrete Specialties

DIVISION: 31 00 00—EARTHWORK
Section: 31 60 00—Special Foundations and Load-Bearing Elements

REPORT HOLDER:

PERMA-COLUMN, LLC

LISTEES:

MIDWEST PERMA-COLUMN, INC.

PERMA COLUMN EAST, LLC

TRI-STATE PERMA-COLUMN

EVALUATION SUBJECT:

PERMA-COLUMN COLUMNS: PC6300, PC6400, PC6600, PC8300, PC8400, PC8500

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018 and 2015 *International Building Code*® (IBC)
- 2018 and 2015 *International Residential Code*® (IRC)

Property evaluated:

- Structural

2.0 USES

Perma-Column columns described in this report are used as pre-cast concrete piers with steel brackets on top for attachment of vertical wood posts in post frame buildings. Perma-Column columns are installed into holes in the ground and backfilled with suitable compacted soils, wet-poured concrete or a self-leveling and self-compacting cementitious material. Under the IRC, the Perma-Column columns may be used where an engineering design is submitted in accordance with Section R301.1.3.

3.0 DESCRIPTION

3.1 General:

The Perma-Column columns are factory manufactured precast reinforced concrete columns with a steel "U"-shaped bracket on the top for attachment to a wood post or laminated wood column. The column protrudes above finish grade, to allow for the attachment of a wood post or laminated wood column. See Figure 1 for an illustration of a typical Perma-Column column.

3.2 Materials:

3.2.1 Concrete: The concrete used for the Perma-Column column complies with the requirements shown in Table 19.3.2.1 of ACI 318 for exposure classes F2 and C1, defined in Table 19.3.1.1 of ACI 318. The concrete has a minimum compressive strength (f'_c) of 10,000 psi (70 MPa) at 28 days.

3.2.2 Reinforcement: The steel reinforcing bars used in the Perma-Column columns are No. 4 or No. 5 bars complying with ASTM A706 Grade 60.

3.2.3 Bracket: The Perma-Column column bracket is manufactured from $^1/_4$-inch (6 mm) thick steel complying with ASTM A1018 SS Grade 40. The bracket has nominal dimensions equal to the concrete portion of the column it is mated with. The legs of the bracket are 13 inches (330 mm) or 18 inches (457 mm) long with pre-drilled holes for the placement of fasteners. The bracket is powder coated with an epoxy coating.

3.2.4 Wood: Wood posts for which the brackets are used, must be made of dimension lumber, timber or glued-laminated (glulam) timber, complying with ANSI/AWC National Design Specifications (NDS) for Wood Construction. The wood posts are outside the scope of this report.

3.2.5 Fasteners: The screws used to install wood posts to Perma-Column columns must be nominally $^1/_4$ inch (6.35 mm) in diameter by 3 inches (76.2 mm) in length, carbon or stainless steel proprietary wood screws recognized in a current ICC-ES evaluation report, having a minimum bending yield strength, F_{yb}, of 164,000 psi (1130 MPa). The unthreaded portion of the screws must have an actual shank diameter of 0.24 inch (6.1 mm) and a length between 1 inch (25 mm) and $1^1/_2$ inches (38 mm).

The through-bolts used to install wood posts to Perma-Column must comply with SAE J429 Grade 5, having a minimum tensile yield strength, F_y, of 92,000 psi (635 MPa) and a minimum tensile strength, F_u, of 120,000 psi (830 MPa). The bolts must comply with the coating requirement in ASTM F1470. The minimum diameter of the bolts is $^1/_2$ inches (12.7 mm).

The screws and through-bolts are optionally supplied by Perma-Column. The fasteners are outside the scope of this report.

3.2.6 Fasteners in Contact with Treated Lumber: Fasteners used in contact with preservative-treated or fire-

retardant-treated lumber must comply with IBC Section 2304.10.5 and IRC Section R317.3, as applicable. The lumber treater or this evaluation report holder (Perma-Column, LLC), or both, must be contacted for recommendations on the appropriate coating or material to specify for the fasteners as well as the connection capacities of fasteners used with the specific proprietary preservative-treated or fire-retardant-treated lumber.

3.2.7 Foundation: The Perma-Column columns are installed into holes in the ground and backfilled with suitable compacted soils, wet-poured concrete or a self-leveling and self-compacting material. The backfill material and foundation are outside the scope of this report.

4.0 DESIGN AND INSTALLATION

4.1 Structural Design:

4.1.1 General: The Perma-Column columns must be designed to resist the design loads in accordance with the applicable sections of the IBC.

4.1.2 Design: The reference design values provided in Tables 1 and 2 of this report are for Allowable Stress Design (ASD) method and Load and Resistance Factor Design (LRFD) method. The design values apply to the capacity of the Perma-Column column only. The bracket to post connection, and other components such as wood post and foundation described in Sections 3.2.4 through 3.2.7 must be designed and checked to determine the governing capacity in the system.

4.2 Installation:

4.2.1 General: Perma-Column columns must be installed in accordance with Perma-Column's published installation instructions, the applicable code, the approved plans, and this report. If there is a conflict between the plans submitted for approval and this report, this report governs.

4.2.2 Perma-Column Column Installation: The Perma-Column columns must be placed into holes in the ground with the top concrete end protruding above finish grade no more than 12 inches (305 mm), and no less than 8 inches (203 mm) above exposed earth in accordance with IBC Section 2304.12.2.2. Once in place, the hole must be backfilled with suitable compacted soil, wet-poured concrete, or a self-leveling and self-compacting cementitious material. See Tables 1 and 2, and Figure 1 of this report for columns sizes, and design information.

A maximum of four $^{3}/_{16}$-inch-diameter (4.8 mm) and $1^{1}/_{4}$-inch-deep (32 mm) holes may be drilled into the concrete portion of the Perma-Column column protruding from the ground for post-installed attachments. A minimum edge distance of $1^{1}/_{2}$ inches (38 mm) must be provided, and the holes must be spaced at least $2^{1}/_{2}$ inches (64 mm) apart.

5.0 CONDITIONS OF USE

The Perma-Column columns described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The columns must be installed in accordance with the applicable code, published installation instructions, the approved plans and this report.

5.2 Complete plans and calculations demonstrating compliance with this report must be submitted to the code official for approval when required. The calculations and details must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.3 The interaction between the soil and the Perma-Column column and the connection between the support column and the Perma-Column column are outside the scope of this report and must be justified to the satisfaction of the code official.

5.4 Wood posts, and fasteners must comply, respectively, with Sections 3.2.4 and 3.2.5 of this evaluation report.

5.5 Use of Perma-Column with preservative treated or fire-retardant-treated lumber must be in accordance with Section 3.2.6 of this evaluation report.

5.6 Other than as noted in Section 4.2.2, the Perma-Column columns must not be field modified (e.g. cut, drilled, torched, etc.) in any way.

6.0 EVIDENCE SUBMITTED

6.1 Manufacturer's descriptive literature and installation instructions.

6.2 Engineering calculations in accordance with ACI 318 and AISC 360.

6.3 Quality documentation in accordance with ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated January 2018.

7.0 IDENTIFICATION

7.1 The precast columns bear the name of the report holder (Perma-Column, LLC) and listee (Midwest Perma-Column, Inc., Perma Column East, LLC, or Tri State Perma-Column), Model ID, date of manufacture, and the evaluation report number (ESR-4238).

7.2 The report holder's contact information is the following:

PERMA-COLUMN, LLC
400 CAROL ANN LANE
OSSIAN, INDIANA 46777
(260) 622-7190
www.permacolumn.com
info@permacolumn.com

7.3 The Additional Listees' contact information is the following:

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sales@tristatepc.com

TABLE 1—PERMA-COLUMN COLUMNS MODEL ID AND DESIGN CAPACITIES[1,2,3]

LOAD AND RESISTANCE FACTOR DESIGN (LRFD)							
MODEL ID	**WIDTH (in)**	**DEPTH (in)**	**LENGTH[4] (in)**	**P_{LRFD} (lb)**	**M_{LRFD-x} (ft-lb)**	**M_{LRFD-z} (ft-lb)**	**T_{LRFD} (lb)**
PC6300	$5^3/_8$	$5^3/_8$	$59^3/_4$	113100	6517	6620	10320
PC6400	$6^7/_8$	$5^3/_8$	$59^3/_4$	140100	9217	6723	9070
PC6600	$6^3/_8$	$5^3/_8$	$59^3/_4$	131100	8317	6694	9360
PC8300	$5^3/_8$	$7^1/_8$	$59^3/_4$	153100	9781	14545	15710
PC8400	$6^7/_8$	$7^1/_8$	$59^3/_4$	188900	13966	14792	13590
PC8500	$8^3/_8$	$7^1/_8$	$59^3/_4$	223000	17955	14945	12340
ALLOWABLE STRENGTH DESIGN (ASD)							
MODEL ID	**WIDTH (in)**	**DEPTH (in)**	**LENGTH[4] (in)**	**P_{ASD} (lb)**	**M_{ASD-x} (ft-lb)**	**M_{ASD-z} (ft-lb)**	**T_{ASD} (lb)**
PC6300	$5^3/_8$	$5^3/_8$	$59^3/_4$	70700	4073	4137	6870
PC6400	$6^7/_8$	$5^3/_8$	$59^3/_4$	87600	5761	4202	6030
PC6600	$6^3/_8$	$5^3/_8$	$59^3/_4$	82000	5198	4184	6230
PC8300	$5^3/_8$	$7^1/_8$	$59^3/_4$	95700	6113	9091	10450
PC8400	$6^7/_8$	$7^1/_8$	$59^3/_4$	118100	8729	9245	9040
PC8500	$8^3/_8$	$7^1/_8$	$59^3/_4$	139400	11222	9341	8210

For **SI:** 1 inch = 25.4 mm, 1 pound = 4.4482 N

[1]For biaxial bending: $\frac{mx}{Mx} + \frac{mz}{Mz} \leq 1$

[2]The tabulated values account for combined axial compression load and bending moment load. No reduction in axial compression loads and bending moment loads for combined axial compression and bending moment is required.

[3]For combined tension loads and bending moment loads: $\frac{t}{T} + \frac{m}{M} \leq 1$

[4]Length is measured from the top of the concrete to the bottom of the concrete.

P_{LRFD} = Maximum compression capacity (ΦP_n) of the column based on Load and Resistance Factor Design (LRFD).
P_{ASD} = Maximum compression capacity (P_n/Ω) of the column based on Allowable Strength Design (ASD).
M_{LRFD-x} = Maximum moment capacity (ΦM_n) of the column about the x-axis based on LRFD.
M_{ASD-x} = Maximum moment capacity (M_n/Ω) of the column about the x-axis based on ASD.
M_{LRFD-z} = Maximum moment capacity (ΦM_n) of the column about the z-axis based on LRFD.
M_{ASD-z} = Maximum moment capacity (M_n/Ω) of the column about the z-axis based on ASD.
T_{LRFD} = Maximum tension (ΦP_n) of the column based on LRFD.
T_{ASD} = Maximum tension (P_n/Ω) of the column based on ASD.
m = Design moment load.
t = Design tension load.

TABLE 2—PERMA-COLUMN SHEAR CAPACITIES[1]

LOAD AND RESISTANCE FACTOR DESIGN (LRFD)												
P (lb)	**PC6300**		**PC6400**		**PC6600**		**PC8300**		**PC8400**		**PC8500**	
	V_{LRFD-x} (lb)	V_{LRFD-z} (lb)	V_{LRFD-x} (lb)	V_{LRFD-z} (lb)	V_{LRFD-x} (lb)	V_{LRFD-z} (lb)	V_{LRFD-x} (lb)	V_{LRFD-z} (lb)	V_{LRFD-x} (lb)	V_{LRFD-z} (lb)	V_{LRFD-x} (lb)	V_{LRFD-z} (lb)
10000	3722	3706	4610	4977	4314	4556	5121	4640	6386	6305	7592	7878
9000	3668	3652	4555	4918	4260	4498	5063	4587	6327	6247	7533	7817
8000	3614	3598	4501	4860	4205	4441	5004	4534	6269	6190	7475	7756
7000	3559	3544	4447	4801	4151	4384	4946	4481	6210	6132	7416	7695
6000	3505	3490	4392	4742	4097	4326	4887	4428	6151	6074	7357	7634
5000	3451	3436	4338	4684	4042	4269	4828	4375	6093	6016	7299	7573
4000	3397	3382	4284	4625	3988	4212	4770	4321	6034	5958	7240	7513
3000	3342	3328	4229	4566	3934	4154	4711	4268	5976	5900	7181	7452
2000	3288	3274	4175	4507	3879	4097	4653	4215	5917	5843	7123	7391
1000	3234	3220	4120	4449	3825	4039	4594	4162	5858	5785	7064	7330
0	3180	3166	4066	4390	3771	3982	4535	4109	5800	5727	7005	7269
-1000	2963	2950	3849	4155	3553	3753	4301	3897	5566	5495	6771	7026
-2000	2746	2734	3631	3921	3336	3523	4067	3684	5331	5264	6536	6782
-3000	2528	2518	3414	3686	3119	3294	3832	3472	5097	5033	6301	6539
-4000	2311	2302	3196	3451	2901	3064	3598	3260	4862	4801	6067	6295
-5000	2094	2086	2979	3216	2684	2835	3363	3047	4628	4570	5832	6051
ALLOWABLE STRENGTH DESIGN (ASD)												
P (lb)	**PC6300**		**PC6400**		**PC6600**		**PC8300**		**PC8400**		**PC8500**	
	V_{ASD-x} (lb)	V_{ASD-z} (lb)	V_{ASD-x} (lb)	V_{ASD-z} (lb)	V_{ASD-x} (lb)	V_{ASD-z} (lb)	V_{ASD-x} (lb)	V_{ASD-z} (lb)	V_{ASD-x} (lb)	V_{ASD-z} (lb)	V_{ASD-x} (lb)	V_{ASD-z} (lb)
6250	2326	2316	2881	3111	2696	2847	3201	2900	3991	3941	4745	4924
5625	2292	2283	2847	3074	2662	2812	3164	2867	3954	3905	4708	4886
5000	2259	2249	2813	3037	2628	2776	3128	2834	3918	3869	4672	4848
4375	2225	2215	2779	3001	2594	2740	3091	2800	3881	3832	4635	4810
3750	2191	2181	2745	2964	2560	2704	3054	2767	3845	3796	4598	4771
3125	2157	2148	2711	2927	2526	2668	3018	2734	3808	3760	4562	4733
2500	2123	2114	2677	2891	2492	2632	2981	2701	3771	3724	4525	4695
1875	2089	2080	2643	2854	2458	2596	2944	2668	3735	3688	4488	4657
1250	2055	2046	2609	2817	2425	2561	2908	2635	3698	3652	4452	4619
625	2021	2013	2575	2780	2391	2525	2871	2601	3662	3615	4415	4581
0	1987	1979	2541	2744	2357	2489	2835	2568	3625	3579	4378	4543
-625	1852	1844	2405	2597	2221	2345	2688	2435	3478	3435	4232	4391
-1250	1716	1709	2270	2450	2085	2202	2542	2303	3332	3290	4085	4239
-1875	1580	1574	2134	2304	1949	2058	2395	2170	3186	3145	3938	4087
-2500	1445	1439	1998	2157	1813	1915	2249	2037	3039	3001	3792	3934
-3125	1309	1303	1862	2010	1677	1772	2102	1905	2893	2856	3645	3782

For **SI:** 1 inch = 25.4 mm, 1 pound = 4.4482 N

[1]The tabulated shear values are for columns with axial compression or axial tension load (ACI 318-14 Eq. 22.5.6.1 and 22.5.7.1 respectively)

P = Axial design load (negative value represents axial compression, positive value represents axial tension)
V_{LRFD-x} = Maximum shear capacity (ΦV_n) of the column parallel to the x-axis based on LRFD.
V_{ASD-x} = Maximum shear capacity (V_n/Ω) of the column parallel to the x-axis based on ASD.
V_{LRFD-z} = Maximum shear capacity (ΦV_n) of the column parallel to the z-axis based on LRFD.
V_{ASD-z} = Maximum shear capacity (P_n/Ω) of the column parallel to the z-axis based on ASD.

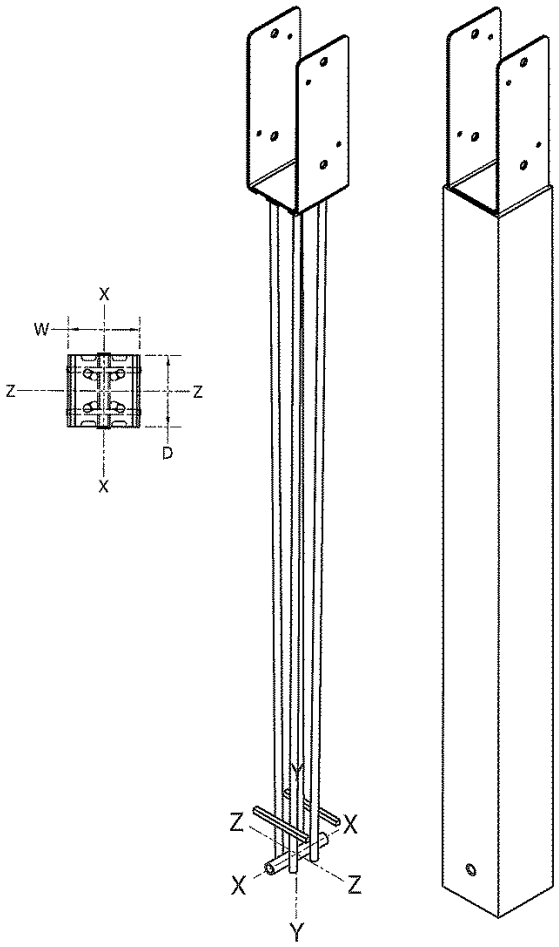

FIGURE 1—PERMA-COLUMN COLUMN

DIVISION: 03 00 00—CONCRETE
Section: 03 48 00—Precast Concrete Specialties

DIVISION: 31 00 00—EARTHWORK
Section: 31 60 00—Special Foundations and Load-Bearing Elements

REPORT HOLDER:

PERMA-COLUMN, LLC

EVALUATION SUBJECT:

PERMA-COLUMN COLUMNS: PC6300, PC6400, PC6600, PC8300, PC8400, PC8500

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that Perma-Column Columns: PC6300, PC6400, PC6600, PC8300, PC8400, PC8500, recognized in ICC-ES evaluation report ESR-4238, have also been evaluated for compliance with the code*s* noted below.

Applicable code editions:

- 2016 *California Building Code* (CBC)
- 2016 *California Residential Code* (CRC)

2.0 CONCLUSIONS

The Perma-Column Columns: PC6300, PC6400, PC6600, PC8300, PC8400, PC8500, described in Sections 2.0 through 7.0 of the evaluation report ESR-4238, comply with CBC Chapters 19 and 19A and CRC Section R301.1.3 provided the design and installation are in accordance with the 2015 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of the CBC Chapters 16, 16A, 17, 17A, 18, 18A, 19 and 19A, as applicable.

3.0 CONDITIONS OF USE

The Perma-Column Columns: PC6300, PC6400, PC6600, PC8300, PC8400, PC8500, described in this evaluation report must comply with the following conditions:

- The ASD capacities described in the evaluation report must not be increased for seismic or wind load combinations.

This supplement expires concurrently with the evaluation report, reissued April 2020 and revised June 2020.

DIVISION: 03 00 00—CONCRETE
Section: 03 48 00—Precast Concrete Specialties

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Applicable code editions:

- 2017 *Florida Building Code—Building*
- 2017 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The Perma-Column Columns: PC6300, PC6400, PC6600, PC8300, PC8400, PC8500, described in Sections 2.0 through 7.0 of the evaluation report ESR-4238, comply with the *Florida Building Code—Building* and *Florida Building Code—Residential*, provided the design and installation are in accordance with the 2015 *International Building Code®* provisions noted in the evaluation report.

Use of the Perma-Column Columns: PC6300, PC6400, PC6600, PC8300, PC8400, PC8500 has also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and *Florida Building Code—Residential*.

For products falling under Florida Rule 9N-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official, when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, reissued April 2020 and revised June 2020.