ICC-ES Evaluation Report

ESR-4723

Issued January 2021

This report is subject to renewal January 2022.

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DIVISION: 03 00 00—CONCRETE
Section: 03 41 00—Precast Structural Concrete

REPORT HOLDER:

PEIKKO® GROUP, INC.

EVALUATION SUBJECT:

PEIKKO® HPKM COLUMN SHOES

1.0 EVALUATION SCOPE

Compliance with the following codes:

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

Property evaluated:

Structural

2.0 USES

Peikko® HPKM Column Shoes are used to transmit axial and shear forces between precast concrete columns and reinforced concrete foundations and other precast concrete columns.

3.0 DESCRIPTION

3.1 General:

Peikko® HPKM Column Shoes consist of steel base plates, angles and anchor bars welded together as shown in Figure 1.

3.2 Materials:

3.2.1 Base plates and angles: The base plates and angles are manufactured from steel conforming with the manufacturer's specifications and meeting the minimum properties of ASTM A572 Grade 50:

- Yield Strength: 50 ksi (345 MPa),
- Tensile Strength: 65 ksi (448 MPa).

3.2.2 Anchor Bars: The anchor bars are reinforcing steel bars conforming with the manufacturer's specifications and meeting the minimum properties of ASTM A706 Grade 60:

- Yield Strength: 60 ksi (420 MPa),
- Tensile Strength: 80 ksi (550 MPa).

3.2.3 Welding: All shop welding of Peikko® HPKM Column Shoe steel base plates, angles and anchor bars conform with AISC 360 and AWS D1.1.

3.2.4 Concrete: Structural concrete for precast concrete columns must comply with ACI 318 as structural normal weight concrete with a minimum compressive strength of 4,000 psi (27.6 MPa).

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: Structural design of the Peikko® HPKM Column Shoes for resisting axial and shear loads must comply with the applicable provisions of AISC 360, ACI 318, and axial and shear capacities provided in Table 1. Design must be performed by a registered design professional.

4.1.2 Design Considerations: Each Peikko® HPKM Column Shoe must be designed based on the applied design loads and connection details. Precast columns for use with Peikko® HPKM Column Shoes must have rectangular cross-sections with lengths and widths ranging from 9-1/16 in. to 14-3/16 in. (230 mm to 360 mm), and circular cross-sections with diameters ranging from 10-5/8 in. to 17-11/16 in. (270 mm to 450 mm). Anchorage of the precast column must control the design and be less than the capacities in Table 1.

4.1.3 Deflections: Design deflections of the precast concrete columns with Peikko® HPKM Column Shoes must not exceed the more restrictive of the limitations of Section 1604.3.2 through 1604.3.5 and Table 1604.3 of the IBC.

4.2 Installation:

Installation of the Peikko® HPKM Column Shoes must comply with the applicable provisions of the IBC, as well as the approved engineering plans. Installation of the Peikko® HPKM Column Shoes and grouting must be in accordance with the Peikko® recommended installation instructions.

4.3 Special Inspection:

Special inspection shall comply with Sections 1704.5, 1705.2.1 and Table 1705.3 of the IBC.

5.0 CONDITIONS OF USE

The Peikko® HPKM Column Shoes 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 Peikko® HPKM Column Shoes must be designed, manufactured and installed in accordance with this report and the design plans. In the event of conflict between this report and the design plans, the more restrictive requirement governs.

5.2 Structural design of precast concrete columns shall be in accordance with Chapters 16 and 19 of the IBC and ACI 318 Section 16.2. Structural design of concrete

foundations shall be in accordance with Chapters 16, 18 and 19 of the IBC.

5.3 Anchorage of the Peikko® HPKM Column Shoes into a concrete foundation or precast concrete column shall be designed in accordance with ACI 318 and Chapter 19 of the IBC.

5.4 Design details and drawings must be in accordance with the design requirements of Section 4.1 of this report and must be approved by the local building code official. The calculations and drawings must be prepared by a registered design professional when required by the statutes of the jurisdiction in which the project is to be built.

5.5 Peikko® HPKM Column Shoes are manufactured in Jiangsu, China under a quality-control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

6.1 Section property calculations of the Peikko® HPKM Column Shoes.

6.2 Calculations in accordance with AISC 360 for axial and shear capacities of the Peikko® HPKM Column Shoes.

6.3 Manufacturing quality documentation in accordance with ICC-ES AC10.

7.0 IDENTIFICATION

7.1 Peikko® HPKM Column Shoes are identified with a label that includes the company name (Peikko® Group, Inc.), manufacturing location (CN for China), HPKM product nomenclature, date of manufacture, ICC-ES mark and evaluation report number (ESR-4723). The Peikko® HPKM Column Shoes are color coded on the bottom of the column shoe as shown in Table 1.

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

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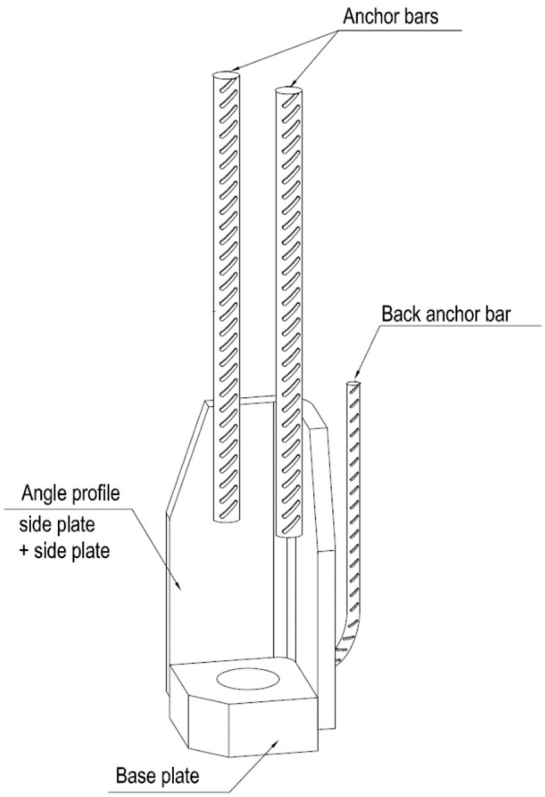
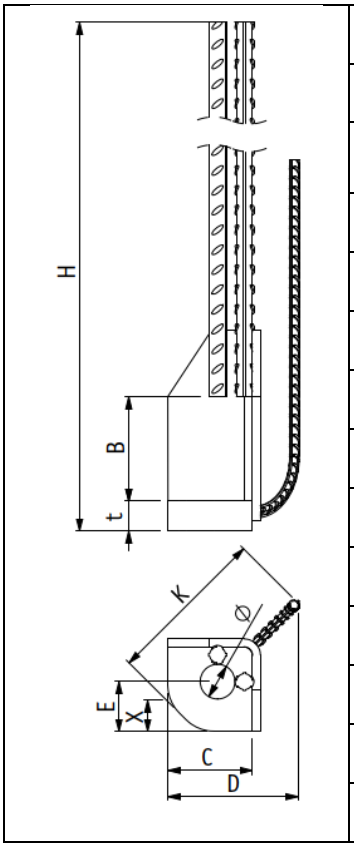


FIGURE 1—HPKM COLUMN SHOE

TABLE 1—HPKM COLUMN SHOE DIMENSIONS, AXIAL CAPACITIES AND SHEAR CAPACITIES



	HPKM 16	HPKM 20	HPKM 24	HPKM 30	HPKM 39
LRFD Axial Capacity φN_{sa}	14.1 kips (63 kN)	21.7 kips (97 kN)	31.6 kips (141 kN)	50.2 kips (224 kN)	87.4 kips (390 kN)
LRFD Shear Capacity φV_{sa}	6.3 kips (28 kN)	9.6 kips (43 kN)	13.9 kips (62 kN)	22.2 kips (99 kN)	38.8 kips (173 kN)
B	3.35 in. (85 mm)	3.75 in. (95 mm)	4.13 in. (105 mm)	4.72 in. (120 mm)	5.91 in. (150 mm)
C	2.95 in. (75 mm)	3.15 in. (80 mm)	3.35 in. (85 mm)	3.54 in. (90 mm)	4.33 in. (110 mm)
D	4.53 in. (115 mm)	4.72 in. (120 mm)	4.92 in. (125 mm)	5.51 in. (140 mm)	7.09 in. (180 mm)
E	1.97 in. (50 mm)	1.97 in. (50 mm)	1.97 in. (50 mm)	1.97 in. (50 mm)	2.36 in. (60 mm)
H	28.54 in. (725 mm)	34.45 in. (875 mm)	43.50 in. (1105 mm)	56.30 in. (1430 mm)	74.21 in. (1885 mm)
K	5.31 in. (135 mm)	5.71 in. (145 mm)	5.91 in. (150 mm)	6.89 in. (175 mm)	8.85 in. (225 mm)
t	0.59 in. (15 mm)	0.79 in. (20 mm)	1.18 in. (30 mm)	1.77 in. (45 mm)	1.97 in. (50 mm)
X	1.18 in. (30 mm)	1.18 in. (30 mm)	1.18 in. (30 mm)	1.18 in. (30 mm)	1.46 in. (37 mm)
φ	1.10 in. (28 mm)	1.22 in. (31 mm)	1.38 in. (35 mm)	1.57 in. (40 mm)	2.17 in. (55 mm)
Weight	5.1 lbs (2.3 kg)	8.6 lbs (3.9 kg)	14.3 lbs (6.5 kg)	30.4 lbs (13.8 kg)	58.1 lbs (26.4 kg)
Color Code	Yellow	Blue	Gray	Green	Orange

For SI: 1 inch = 25.4 mm, 1 kip = 4.448 kN.