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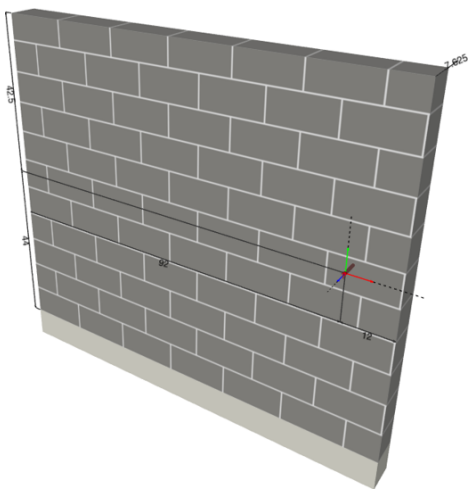
Address:	450 W 96th Street, Suite 175, Indianapolis, IN 46260	Specifier:	PAM
Phone I Fax:	|	E-Mail:	pmorr@o-n.com
Design:	Masonry - Jul 23, 2025	Date:	9/4/2026
Fastening point:			

Specifier's comments:

1 Input data

Anchor type and diameter:	**KWIK HUS-EZ (KH-EZ) (Carbon Steel) 3/4 (4)**
Item number:	418083 KH-EZ 3/4"x4 1/2"
Specification text:	HILTI ∅ 3/4 (4) KWIK HUS-EZ (KH-EZ) (CARBON STEEL) WITH 4 IN EFFECTIVE EMBEDMENT DEPTH PER TECHNICAL DATA , HAMMER DRILLED INSTALLATION PER MPII
Effective embedment depth:	h_{ef} = 4.000 in.
Material:	Carbon Steel
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ASD Masonry
Stand-off installation:	
Profile:	
Base material:	Grout-filled CMU, L x W x H: 16.000 in. x 8.000 in. x 8.000 in.; Joints: vertical: 0.375 in.; horizontal: 0.375 in. Base material temperature: 68 °F
Installation:	Face installation
Seismic loads	no

Geometry [in.]



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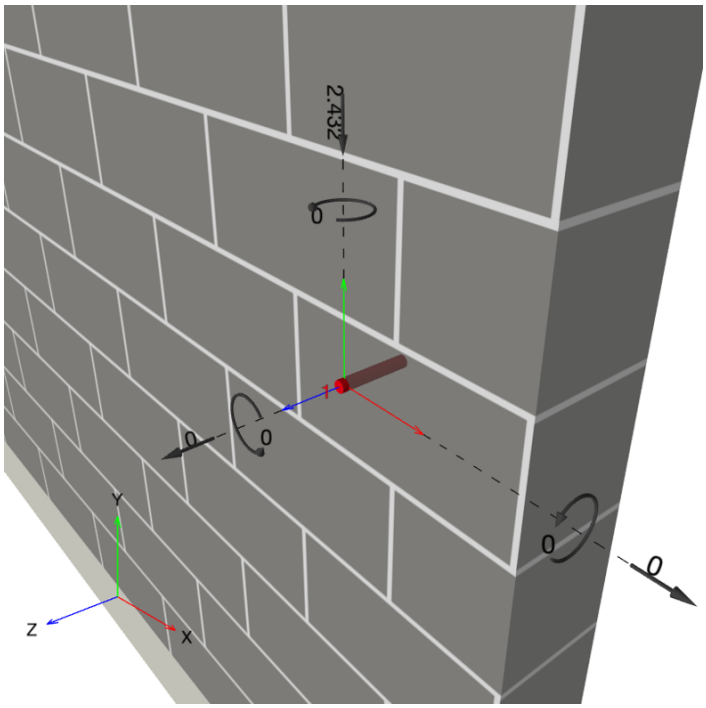
Geometry [in.] & Loading [kip, ft.kip]



1.1 Design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 0.000; V_x = 0.000; V_y = -2.432; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	no	100

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2 Load case/Resulting anchor forces

Load case: Service loads

Anchor reactions [kip]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	0.000	2.432	0.000	-2.432

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Fastening point:			

3 Tension load (Most utilized anchor 1)

	Load P_s [kip]	Capacity P_t [kip]	Utilization $\beta_P = P_s/P_t$ [%]	Status
Overall strength	N/A	N/A	N/A	N/A

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Fastening point:			

4 Shear load (Most utilized anchor 1)

	Load V_s [kip]	Capacity V_t [kip]	Utilization $\beta_V = V_s/V_t$ [%]	Status
Overall strength para and perp, (Dir. x-)[1]	-	-	100	OK

[1]Shear utilization may result from parallel and perpendicular shear (see details)

4.1 Overall strength parallel

$V_{t,Base,||}$ = Value refer to Hilti Technical Data

$V_{t,||} = V_{t,Base,||} \cdot f_{red,E,||} \cdot f_{red,s,||} \cdot f_{red,Temp}$

$V_{t,||} \geq V_{s,||}$

Allowable capacity = 3.040k in Table 31 (attached to last page)

Variables

c_{min} [in.]	c_{cr} [in.]	s_{min} [in.]	s_{cr} [in.]	Temperature [°F]
4.000	12.000	4.000	12.000	68

Results

$V_{t,||}$ [kip]	$V_{t,Base,||}$ [kip]	$V_{s,||}$ [kip]	$f_{red,E,||}$	$f_{red,S,||}$	$f_{red,Temp}$	Utilization $\beta_{V,||}$ [%]
2.432	2.432	-2.432	1.000	1.000	1.000	100

4.2 Overall strength perpendicular

$V_{t,Base,\perp}$ = Value refer to Hilti Technical Data

$V_{t,\perp} = V_{t,Base,\perp} \cdot f_{red,E,\perp} \cdot f_{red,s,\perp} \cdot f_{red,Temp}$

$V_{t,\perp} \geq V_{s,\perp}$

Variables

c_{min} [in.]	c_{cr} [in.]	s_{min} [in.]	s_{cr} [in.]	Temperature [°F]
4.000	12.000	4.000	12.000	68

Results

$V_{t,\perp}$ [kip]	$V_{t,Base,\perp}$ [kip]	$V_{s,\perp}$ [kip]	$f_{red,E,\perp}$	$f_{red,S,\perp}$	$f_{red,Temp}$	Utilization $\beta_{V,\perp}$ [%]
0.000	2.432	0.000	0.000	0.000	1.000	0

4.3 Shear interaction

$\beta_{V,||} = \frac{V_{s,||}}{V_{t,||}}$	$\beta_{V,\perp} = \frac{V_{s,\perp}}{V_{t,\perp}}$	δ	Utilization β_V [%]	Status
1.000	0.000	1.667	100	OK

$\beta_V = \beta_{V,||}^{\delta} + \beta_{V,\perp}^{\delta} <= 1.0$

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5 Warnings

- The anchor forces were determined under the assumption that the baseplate cannot deform under loading. The load distribution to the anchors is determined based on the assumption of linear elastic strains and strain compatibility between steel and concrete. No load re-distribution due to elastic deformations is considered. The proof that the rigid base plate assumption is valid is not carried out for the current design.
- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (EN1992-4, AS5216, etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with FEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- The equations presented in this report are based on imperial units. When inputs are displayed in metric units, the user should be aware that the equations remain in their imperial format.
- Refer to the manufacturer's product literature for cleaning and installation instructions.
- The min. sizes of the bricks, the masonry compressive strength, the type / strength of the mortar and the grout (in case of fully grouted CMU walls) has to fulfill the requirements given in the relevant ESR-approval or in the PTG.
- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered by PROFIS!
- Wall is assumed as being perfectly aligned vertically – checking required(!): Noncompliance can lead to significantly different distribution of forces and higher tension loads than those calculated by PROFIS. Masonry wall must not have any damages (neither visible nor not visible)! While installation, the positioning of the anchors needs to be maintained as in the design phase i.e. either relative to the brick or relative to the mortar joints.
- The effect of the joints on the compressive stress distribution on the plate / bricks was not taken into consideration.
- If no significant resistance is felt over the entire depth of the hole when drilling (e.g. in unfilled butt joints), the anchor should not be set at this position or the area should be assessed and reinforced. Hilti recommends the anchoring in masonry always with sieve sleeve. Anchors can only be installed without sieve sleeves in solid bricks when it is guaranteed that it has not any hole or void.
- The accessories and installation remarks listed on this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- The compliance with current standards (e.g. 2018, 2015, 2012, 2009 and 2006 IBC) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the approval!
- Masonry should be built according to industry standards.

Fastening meets the design criteria!

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Fastening point:			

6 Installation data

Anchor type and diameter: KWIK HUS-EZ (KH-EZ) (Carbon Steel) 3/4 (4)

Profile: -

Item number: 418083 KH-EZ 3/4"x4 1/2"

Hole diameter in the fixture: -

Maximum installation torque: 0.07000 ft.kip

Plate thickness (input): -

Hole diameter in the base material: 0.750 in.

Hole depth in the base material: 4.375 in.

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 7.625 in.

Hilti ∅ 3/4 (4) KWIK HUS-EZ (KH-EZ) (Carbon Steel) with 4 in effective embedment depth per Technical data , Hammer drilled installation per MPII

Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	0.000	0.000	92.000	12.000	44.000	42.500

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7 Remarks; Your Cooperation Duties

- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

DESIGN INFORMATION IN MASONRY

Table 30 — Allowable tension loads for Hilti KH-EZ, KH-EZ P, KH-EZ PM, KH-EZ PL, KH-EZ C and KH-EZ CRC installed in grout-filled masonry walls (lb)[1,2,3,4,5]

Nominal anchor diameter in.	Embedment in.[6]	Loads @ c_{cr} and s_{cr}	Spacing			Edge distance
			Critical - s_{cr} in.[7]	Minimum - s_{min} in.[7]	Load reduction factor at s_{min}[8]	Critical - c_{cr} Minimum- c_{min} in.[9]
1/4	1-5/8	530[10]	4	2	0.70	4
	2-1/2	910[11]		4	1.00	
3/8	1-5/8	535[11]	4	2	0.70	4
	2-1/2	895	6	4	0.80	
	3-1/4	1,210				
1/2	2-1/4	710	4	2	0.60	4
	3	1,110	8	4		
	4-1/4	1,515				
5/8	3-1/4	1,155	10	4	0.60	4
	5	1,735				
3/4	4	1,680	12	4	0.60	4
	6-1/4	2,035				

Table 31 — Allowable shear loads for Hilti KH-EZ, KH-EZ P, KH-EZ PM, KH-EZ PL, KH-EZ C and KH-EZ CRC installed in grout-filled masonry walls (lb)[1,2,3,4,5]

Nominal anchor diameter in.	Embedment in.[6]	Load at c_{cr} and s_{cr}	Spacing			Edge distance			
			Critical - s_{cr} in.[7]	Minimum - s_{min} in.[7]	Load reduction factor at s_{min}[8]	Critical - c_{cr} in.[9]	Minimum - c_{min} in.[9]	Load reduction factor at c_{min}	
								perpendicular to edge	parallel to edge
1/4	1-5/8	675[10]	4	4	1.00	4	4	1.00	1.00
	2-1/2	840[11]						1.00	1.00
3/8	1-5/8	1,140[11]	6	4	0.94	6	4	0.61	1.00
	2-1/2	1,165						0.70	1.00
	3-1/4	1,190						0.70	1.00
1/2	2-1/4	1,845	8	4	0.88	8	4	0.50	1.00
	3	2,055						0.45	0.94
	4-1/4	2,745						0.40	0.89
5/8	3-1/4	3,040	10	4	0.36	10	4	0.36	0.82
	5	3,485						0.34	0.92
3/4	4	3,040	10	4	0.36	10	4	0.36	0.82
	6-1/4	3,485						0.34	0.92

1 All values are for anchors installed in fully grouted masonry with minimum masonry prism strength of 1,500 psi. Concrete masonry units may be lightweight, medium-weight or normal-weight.

2 Anchors may not be installed within one inch in any direction of a vertical joint.

3 Linear interpolation of load values between minimum spacing s_{min} and critical spacing s_{cr} and between minimum edge distance c_{min} and critical edge distance c_{cr} is permitted.

4 For combined loading: For 1/4-in. $\frac{T_{applied}}{T_{allowable}} + \frac{V_{applied}}{V_{allowable}} \leq 1$ For 3/8- through 3/4-in. $\left(\frac{T_{applied}}{T_{allowable}}\right)^{5/3} + \left(\frac{V_{applied}}{V_{allowable}}\right)^{5/3} \leq 1$

5 See Figure 5 on Page 21 of this document for anchor locations for anchor locations.

6 Embedment depth is measured from the outside face of the concrete masonry embedment.

7 Critical spacing s_{cr} is the anchor spacing where full load values may be used. The minimum spacing s_{min} is the minimum spacing for which values are available and installation is recommended. Spacing is measured from the center of one anchor to the center of the adjacent anchor.

8 Load reduction factors are multiplicative, both spacing and edge distance load reduction factors must be considered. Load values for anchors installed at less than c_{cr} or s_{cr} must be multiplied by the appropriate load reduction factor based on actual edge distance (c) or spacing (s).

9 The critical edge distance c_{cr} is the edge distance where full load values may be used. The minimum edge distance c_{min} is the minimum edge distance for which values are available and installation is recommended. For tension, c_{cr} equals c_{min}. Edge distance is measured from the center of the anchor to the closest edge.

10 Load values must be reduced by 21% for installations within 1-1/4 inches of the bed joint.

11 Load values must be reduced by 13% for installations within 1-1/4 inches of the bed joint.