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Initial Approval
December, 2016

Re-Approved
January, 2021

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Report Owner

Gordon Metal Products
A Division of United Metal Products
8101 Lyndon Street
Detroit, MI 48238

Products

FA-14 Anchor Strap
FA-19 Anchor Strap
FA-22 Anchor Strap

Approved Manufacturing Locations

Gordon Metal Products
A Division of United Metal Products
8101 Lyndon Street
Detroit, MI 48238

Evaluation Report Information

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General Details

United Metal Products FA-14, FA-19, and FA-22 Anchor Straps are covered under the scope of this **PER**. The manufacturing location listed above has an approved Q.C. Manual to manufacture the products described herein. **Gordon Metal Products A Division of United Metal Products** has a Product Evaluation Service Agreement with **Pei Evaluation Service® (Pei ES)** and a Follow-up Inspection Service Agreement with **Progressive Engineering Inc. (Pei)**. The approved manufacturing location shall be audited quarterly by **Pei**.

Product Description

FA-14 and **FA-19** Anchor Straps are approved to anchor 2x4, 2x6, and 2x8 nominal dimension lumber sill plates to cast-in-place concrete foundation walls. **FA-22** Anchor Straps are approved to anchor 2x4, 2x6, and 2x8 nominal dimension lumber sill plates to concrete masonry foundation walls. The **FA-14** and **FA-22** straps are designed for use with single mudsill plates while the **FA-19** strap has longer straps to accommodate a double mudsill plate. All foundation anchors are manufactured using 18ga ASTM A653 G90 hot-dipped galvanized steel with a minimum yield strength of 40-ksi and minimum ultimate tensile strength of 55-ksi.

Anchor straps consist of a two leg design where each leg is wrapped around opposite sides of the mudsill plate and fastened with a minimum of two 10d x 1-1/2" nails (0.148" Minimum Shank Diameter) per leg. Allowable anchor design loads are provided in Table 1, and minimum spacing required to achieve equivalency to code prescribed 1/2" anchor bolts is provided in Table 2. Refer to Figure 2 for anchor strap installation details.

Code and Standard Compliance

<u>2012 International Residential Code® (IRC)²</u>		<u>2012 International Building Code® (IBC)²</u>	
R104.11	R403.1.6	104.11	2304.9.3
R602.11		2304.9.5	2304.9.5.1
		2308.3.3	2308.6
<u>2015 International Residential Code® (IRC)³</u>		<u>2015 International Building Code® (IBC)^{1,3}</u>	
R104.11	R403.1.6	104.11	2304.10.3
R602.11		2304.10.5	2304.10.5.1
		2308.3.1	2308.6.7.3
<u>2018 International Residential Code® (IRC)³</u>		<u>2018 International Building Code® (IBC)^{1,2,3}</u>	
R104.11	R403.1.6	104.11	2304.10.3
R602.11		2304.10.5	2304.10.5.1
		2308.3.1	2308.6.7.3

- Notes:**
- When installed under the scope of the 2015 / 2018 IBC, the FA-14, FA-19, and FA-22 anchor straps have not been evaluated for use in seismic design category D or E as required by 2015 IBC Section 2308.3.2 or 2018 IBC Sections 2308.3.1.1 & 2308.3.1.2. Anchor strap use is limited to seismic design category A, B, and C only under the 2015 / 2018 IBC scope and shall be limited to use in the conventional light framed construction limitations outlined in 2015 IBC Section 2308.2 and 2018 IBC Sections 2308.3.1.1 & 2308.3.1.2.
 - When installed under the scope of the 2012 IBC, the FA-14, FA-19, and FA-22 anchor straps may be installed in any structure that meets the limitations for conventional light framed construction outlined in 2012 IBC Section 2308.2.
 - When installed under the scope of the 2012, 2015 & 2018 IRC, the FA-14, FA-19, and FA-22 anchor straps have not been evaluated for use in seismic design category D₀, D₁, or D₂ for wood light-frame structures or in seismic design category C for wood light-frame townhouses.

General Product Use

1. Wood sill plates shall be constructed using Southern Yellow Pine (SYP) lumber with a minimum specific gravity of 0.55.
2. Sill plates shall be a minimum size of 2x4 dimension lumber, but shall not exceed nominal 2x8 dimension lumber.
3. Cast-in-place concrete shall obtain a minimum 28-day compressive strength of 3000-psi.
4. Anchors shall be spaced in accordance with Table 2 or an engineering analysis using the design loads provided in Table 1. A minimum of two (2) anchors shall be installed per sill plate section, and anchors shall be located between 4-inches and 12-inches of each end of the sill plate section.
5. Each anchor shall be fastened to the sill plate using two 10d x 1-1/2" nails (0.148" Minimum Shank Diameter) per anchor leg (4 total per anchor).
6. Anchors must be embedded a minimum of 6.25-inches into concrete foundation and be installed in accordance with the details provided in Figure 2.
7. FA-14 and FA-22 straps shall only be installed in single sill plate application. See Figure 2 for details.
8. FA-19 straps have longer legs intended for use with double sill plate applications. See Figure 2 for details.
9. Fasteners including nuts and washers, in contact with Preservative-treated wood shall be hot-dipped zinc-coated galvanized stainless steel, silicon bronze or copper.

Table 1 - Foundation Anchor Allowable Design Loads^{3,4}

Anchor Strap	Anchor Dimensions ¹ (in)				Design Load ² (lbf)		
	A	B	C	D	Perpendicular	Parallel	Vertical
FA-14	14 3/4	6 7/8	1 1/4	5/8	538	307	452
FA-19	17 1/2	10 7/8	1 1/4	5/8	581	408	440
FA-22	21 1/2	6 7/8	1 1/4	5/8	538	307	452

Notes:

1. Refer to Figure 1 for foundation anchor strap dimension locations.
2. Allowable design loads are provided in three directions: Perpendicular refers to the direction normal to the plane of the wall, parallel refers to the direction in-plane with the wall, and vertical refers to the uplift tension load on the anchor strap. Refer to Figure 2 for more details.
3. Allowable design loads are based upon the worst case of tested design values divided by a safety factor of 2.5 and engineering analysis. Additional load adjustment factors shall not be applied.
4. Cast-in-place concrete foundation walls shall have a minimum 28-day compressive strength of 3,000-psi, 8-in minimum wall thickness, and 12-in minimum concrete depth.
5. FA-22 straps are approved for use in normal weight concrete masonry units (CMUs) with grout filled cells at all anchor locations. Grout shall consist of Type S mortar with sand aggregate and obtain a minimum specified compressive strength of 2,000-psi. Straps shall be installed in a nominal 8-inch CMU foundation wall with a minimum specified compressive strength of 2,000-psi.

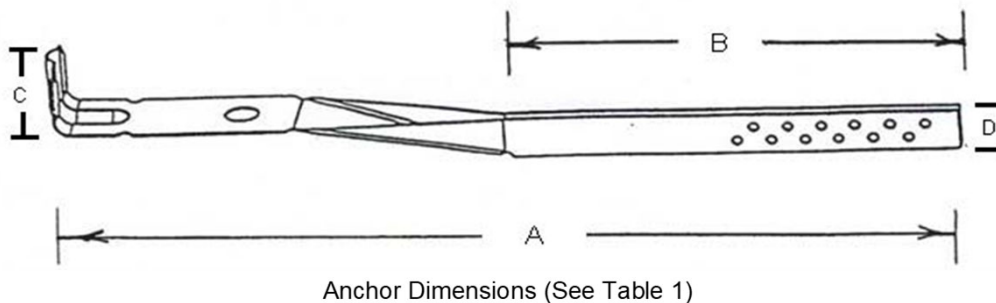


Figure 1 - FA-Series Anchor Strap Dimensions

Table 2 - Required Spacing of Foundation Anchor for Braced Wall Lines in Conventional Light-Frame Construction⁴

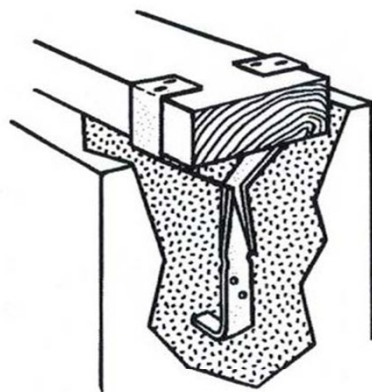
Type of Wood Frame Structure ^{1,2}	Maximum Intermediate Spacing			
	FA-14	FA-19	FA-22	1/2" Anchor Bolts ³
1 & 2 Stories	3'-1"	2'-3"	1'-8"	6'-0"
3 Stories	2'-0"	1'-6"	1'-1"	4'-0"

- Notes:**
1. In accordance with 2015 IBC Section 2308.2, 2018 IBC Section 2308.3.1.1 & 2308.3.1.2 conventional light-frame construction is limited to a maximum of three stories in seismic design category A and B or two stories in seismic design category C.
 2. In accordance with 2012 IBC Section 2308.3.3, conventional light-frame construction is limited to a maximum of three stories in seismic design category A, B, and C.
 3. FA-Series anchor straps are not approved for use in 2012/2015/2018 IBC seismic design category D, E, or F, 2012/2015/2018 IRC seismic design category D₀, D₁, D₂, or wood light-frame townhouses in seismic design category C.
 4. Anchor Bolts (1/2") are permitted at 6'-0" on center spacing as sill plate anchorage for conventional light frame construction with 1 or 2 stories and a seismic design category A, B, or C. Conventional light frame structures with 3 stories require 1/2" anchor bolts at 4'-0" on center. FA-14, FA-19, & FA-22 tabulated spacing indicates the required strap spacing to obtain equivalency to the 1/2" anchor bolt spacing required by the 2012/2015/2018 IBC and 2012/2015/2018 IRC.
 5. Cast-in-place concrete foundation walls shall have a minimum 28-day compressive strength of 3,000-psi, 8-in minimum wall thickness, and 12-in minimum concrete depth.
 6. FA-22 straps are approved for use in normal weight concrete masonry units (CMUs) with grout filled cells at all anchor locations. Grout shall consist of Type S mortar with sand aggregate and obtain a minimum specified compressive strength of 2,000-psi. Straps shall be installed in a nominal 8-inch CMU foundation wall with a minimum specified compressive strength of 2,000-psi.

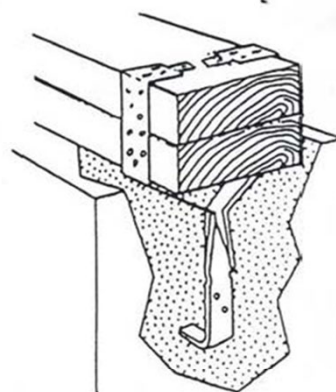
Table 3 - Required Spacing of Foundation Anchor for Non-Braced Wall Lines in Conventional Light-Frame Construction^{1,3}

Type of Wood Frame Structure	Maximum Intermediate Spacing ²			
	FA-14	FA-19	FA-22	1/2" Anchor Bolts
Up to 3 Stories	4'-11"	5'-2"	4'-11"	6'-0"

- Notes:**
1. Non-braced wall lines refers to sections of wall that are not considered part of the lateral force resisting system (i.e. shearwalls) of the building.
 2. The tabulated anchor strap spacing indicates the spacing required for equivalent out-of-plane performance to 1/2" anchor bolts at 6'-0" on center as prescribed per the 2012/2015/2018 IBC and 2012/2015/2018 IRC.
 3. Cast-in-place concrete foundation walls shall have a minimum 28-day compressive strength of 3,000-psi, 8-in minimum wall thickness, and 12-in minimum concrete depth.
 4. FA-22 straps are approved for use in normal weight concrete masonry units (CMUs) with grout filled cells at all anchor locations. Grout shall consist of Type S mortar with sand aggregate and obtain a minimum specified compressive strength of 2,000-psi. Straps shall be installed in a nominal 8-inch CMU foundation wall with a minimum specified compressive strength of 2,000-psi.



FA-14 & FA-22 Installation



FA-19 Installation

Installation Notes:

1. Strap must be installed exactly as shown in diagrams above with vertical leg flush with the edge of the sill plate and 10d x 1-1/2" nails connecting the strap to the sill plate (one into the top and one into the side).
2. Care should be taken to ensure the strap protrudes from the cast-in-place concrete (CMU for FA-22) within the footprint of the sill plate. Strap legs protruding at locations wider than the sill plate width could result in lateral movement of the sill plate exceeding that allowed by the governing building code. Manufacturer Installation Instructions must be followed to ensure proper performance of the anchor strap.

Figure 2 - FA-Series Anchor Strap Typical Installation

Product Labeling

Each FA-14, FA-19, and FA-22 anchor strap shipment that is covered by this **PER** must have a label attached with at least the following information:

1. **Gordon Metal Products A Division of United Metal Products** Name and Address
2. Product Name
3. Manufacturing Plant Identifier
4. Date of Manufacture
5. Product Evaluation Report No. PER-16104 and *Pei* **ES** Logo

Acceptable Evaluation Marks



Product Documentation

A Product Evaluation Service Agreement between *Pei Evaluation Service*[®] and **Gordon Metal Products A Division of United Metal Products**

A Follow-up Inspection Service Agreement between *Progressive Engineering Inc.* and **Gordon Metal Products A Division of United Metal Products**

A Quality Control Manual - Dated: January, 2018

A *Pei* Test Report No. 95-1284 - Concrete Anchor Test on FA-14 Foundation Anchors - Dated: 9/15/1995

A *Pei* Test Report No. 2003-0234 - Foundation Anchor Test on Poured Concrete Walls with a Double 2x8 Sill Plate - Dated: 2/4/2003

A *Pei* Test Report No. 2016-0442 - ASTM E488 Fastener Tension and Shear Testing using FA-22Z Foundation Anchor Straps in CMU's - Dated: 2/2/2017

Pei Engineering Calculation No. 2016-0442 - Foundation Anchor Verification Calculations & Equivalent Spacing - Dated: 5/10/2017