# Technical Evaluation Report

TO ASSIST WITH CODE COMPLIANCE

**Stanley® Fastening Systems, L.P.**
**Stanley® BOSTITCH® Pneumatic Pins**

**TER No. 1109-02**

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**DIVISION: 05 00 00 – METALS**
Section: 05 05 23 – Metal Fastenings

## 1. Products Evaluated:

**1.1.** Stanley® BOSTITCH® Pneumatic Pins

**1.1.1.** C4S100BG and GC4S100BG pins [length – $1^1/_2$" (38 mm)].

**1.1.2.** C6S100BG and GC6S100BG pins [length – 2" (51 mm)].

**1.2.** For the most recent version of this report, visit drjengineering.org. For more detailed state professional engineering and code compliance legal requirements and references, visit drjengineering.org/statelaw. DrJ is fully compliant with all state professional engineering and code compliance laws.

## 2. Applicable Codes and Standards:[1]

***2.1.*** *2009, 2012 and 2015 International Building Code (IBC)*

***2.2.*** *2009, 2012 and 2015 International Residential Code (IRC)*

***2.3.*** *AISI S213 – North American Standard for Cold-Formed Steel Framing – Lateral Design*

[1] Unless otherwise noted, all references in this code-compliant research report (TER) are from the 2012 version of the codes and the standards referenced therein, including, but not limited to, *ASCE 7*, *SDPWS* and *WFCM*. This product also complies with the 2000-2006 versions of the *IBC* and *IRC* and the standards referenced therein. As required by law, where this research report is not approved, the building official shall respond in writing, stating the reasons this research report was not approved.

***2.4.*** *ASCE/SEI 7 – Minimum Design Loads for Buildings and Other Structures*

***2.5.*** *ASTM A1003 – Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members*

***2.6.*** *ASTM E564 – Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings*

***2.7.*** *ASTM E2126 – Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings*

***2.8.*** *AWC/NDS – National Design Specification for Wood Construction*

***2.9.*** *AWC/SDPWS – Special Design Provisions for Wind and Seismic (SDPWS)*

***2.10.*** *DOC PS 1 – Structural Plywood*

***2.11.*** *DOC PS 2 – Performance Standard for Wood-Based Structural-Use Panels*

## 3. Performance Evaluation:

**3.1.** Stanley® BOSTITCH® Pneumatic Pins were tested in accordance with *ASTM E2126* techniques and the CUREE protocol. Wall assemblies were tested both as 4x8 single element walls and in a 30’ braced wall line of a 12' x 30' building. The walls consisted of oriented strand board (OSB) and plywood sheathing and CFS framing to evaluate their performance in the following conditions:

**3.1.1.** Structural performance under lateral (shear) load conditions as an alternative to walls braced in accordance with *IRC* Section R602.10 and R603.9.

**3.1.2.** Structural performance under lateral (shear) load conditions for use as an alternative to *IBC* Section 2211.6 lateral design.

**3.1.3.** Structural performance under lateral (shear) load conditions for use as an alternative to *AISI S213* for light-frame construction.

**3.1.4.** Structural performance under lateral (shear) load conditions for use as an alternative to the Wood-Frame Shear Wall Bracing provisions in *IBC* Section 2306.3.

**3.1.5.** Structural performance under lateral (shear) load conditions for use as an alternative to *IBC* Section 2308 Conventional Light-Frame Construction, and specifically, Section 2308.9.3[2] Method 3 for Type V construction.

**3.1.6.** Structural performance under transverse loading conditions.

**3.2.** Any code compliance issues not specifically addressed in this section are outside the scope of this evaluation.

## 4. Product Description and Materials:

**4.1.** Stanley® BOSTITCH® Pneumatic Pins are used to fasten wood structural panel (WSP) sheathing to cold-formed steel (CFS) framing as an alternate to screws. The pins have the following physical characteristics:

**4.1.1.** The product numbers that are the subject of this report are C4S100BG and GC4S100BG pins [length – $1^1/_2$" (38 mm)] and C6S100BG and GC6S100BG pins [length – 2" (51 mm)].

**4.1.2.** Head feature and diameter:

**4.1.2.1.** C4S100BG and C6S100BG – Full-round heads with flat under head, and head diameter of 0.240" (6.1 mm)

**4.1.2.2.** GC4S100BG and GC6S100BG – Full-round heads with bugle under head, and head diameter of 0.285" (7.2 mm)

**4.1.3.** Shank feature and diameter – Helical flutes, nominal diameter 0.100" (2.54 mm) [deformed diameter, 0.110" (2.79 mm)]

**4.1.4.** Point – Ballistic

**4.1.5.** Material – UNS 10380 (AISI 1038) steel

[2] *2015 IBC* Section 2308.6

**4.1.6.** Hardness – Rockwell Hardness (HRC) 47 to 53

**4.1.7.** The pins are galvanized per Stanley® Fastening System ES3800 with a zinc coating [0.5 oz./ft.$^2$ (150 g/m$^2$)]

**4.1.8.** Stanley® BOSTITCH® Pneumatic Pins are manufactured in accordance with the Stanley® Fastening Systems quality control standards.

**Photo 1:** Stanley® BOSTITCH® Pneumatic Pins – C4S100BG, GC4S100BG & Pin Penetration through CFS Framing

### 4.2. Material Availability

**4.2.1.** Stanley® BOSTITCH® Pneumatic Pins are proprietary fasteners available as collated coils for use with the Stanley® BOSTITCH® SF150C pneumatic driver or similar. Other collations may be used by Stanley® BOSTITCH® to accommodate other fastener driving tools.

## 5. Applications:

**5.1.** Walls fastened with Stanley® BOSTITCH® Pneumatic Pins are used to resist lateral (shear), transverse and gravity loads in conventional light-frame construction as evaluated per Section 3 of this report.

**5.2.** Stanley® BOSTITCH® Pneumatic Pins are used in structures complying with the braced wall provisions of *IRC* Section R602.10 and the steel framing provisions of Section R603.

**5.3.** Stanley® BOSTITCH® Pneumatic Pins are used in structures complying with the braced wall provisions of *IBC* Sections 2211, 2306 and 2308.

**5.4.** Stanley® BOSTITCH® Pneumatic Pins are used in structures complying with *AISI S213*.

**5.5.** An engineered design is needed for top plates that are required to resist uplift or combined lateral and uplift loads due to wind.

**5.6.** Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and good technical judgment.

### 5.7. Structural Applications

#### 5.7.1. Prescriptive *IRC* Bracing Applications

**5.7.1.1.** Stanley® BOSTITCH® Galvanized Pneumatic Pins may be used in braced wall lines (BWLs) as an equivalent alternative to the *IRC* Method WSP, when installed in accordance with *IRC* Section R602.10 and this TER.

**5.7.1.2.** Stanley® BOSTITCH® Galvanized Pneumatic Pins may be used in BWLs as an equivalent alternative to the *IRC* steel framing provisions, when installed in accordance with *IRC* Section R603 and this TER.

**5.7.1.2.1.** The minimum total length of braced wall panels required along a braced wall line based on a set of equivalency factors derived from equivalency testing are provided in Table 1 for the *IRC* Table R602.10.3(1-4)[3]. All footnotes and adjustment factors found in *IRC* Section R602.10 must be used with Table 1, to adjust the bracing lengths shown to that required for end use.

**5.7.1.2.2.** When different combinations of exterior sheathing are used, the Method WSP columns are used to identify the required base bracing length.

[3] *2009 IRC* Table R602.10.1.2(1-3)

**5.7.1.2.3.** Stanley® BOSTITCH® Pneumatic Pins can also be used to construct walls that are in compliance with the *IRC* Continuously Sheathed Braced Wall Panel provisions of Section R602.10.4 using the bracing lengths for Method CS-WSP.

| Condition | Braced Wall Line Spacing | Stanley® BOSTITCH® Pneumatic Pin Connections into 33 mil[1] CFS Framing | | | | | |
|---|---|---|---|---|---|---|---|
| | | Length of Wall Line to be Braced (ft.) | | | | | |
| | | Method WSP[1] | Method CS-WSP[2] | Method WSP[1] | Method CS WSP[3] | Method WSP[1] | Method CS-WSP[2] |
| | | 90 mph[4] | | 100 mph[4] | | 110 mph[4] | |
| One Story or the Top of Two or Three Stories | 10 | 2.5' | 2.0' | 3.0' | 2.5' | 4.0' | 3.0' |
| | 20 | 4.5' | 4.0' | 6.0' | 5.0' | 7.0' | 6.0' |
| | 30 | 7.0' | 6.0' | 8.5' | 7.0' | 10.0' | 8.5' |
| | 40 | 9.0' | 7.5' | 11.0' | 9.5' | 13.0' | 11.5' |
| | 50 | 11.0' | 9.5' | 13.5' | 11.5' | 16.5' | 14.0' |
| | 60 | 13.0' | 11.0' | 16.0' | 13.5' | 19.5' | 16.5' |
| First Story of Two Stories or Second Story of Three Stories | 10 | 5.0' | 4.0' | 6.0' | 5.0' | 7.5' | 6.0' |
| | 20 | 9.0' | 7.5' | 11.0' | 9.5' | 13.5' | 11.5' |
| | 30 | 13.0' | 11.0' | 16.0' | 14.0' | 19.5' | 16.5' |
| | 40 | 17.0' | 14.5' | 21.0' | 18.0' | 25.5' | 21.5' |
| | 50 | 21.0' | 18.0' | 26.0' | 22.0' | 31.5' | 26.5' |
| | 60 | 25.0' | 21.0' | 31.0' | 26.0' | 37.5' | 31.5' |
| First Story of Three Stories | 10 | 7.0' | 6.0' | 9.0' | 7.5' | 11.0' | 9.0' |
| | 20 | 13.5' | 11.5' | 16.5' | 14.0' | 20.0' | 17.0' |
| | 30 | 19.5' | 16.5' | 24.0' | 20.5' | 29.0' | 24.5' |
| | 40 | 25.5' | 21.5' | 31.0' | 26.5' | 38.0' | 32.0' |
| | 50 | 31.0' | 26.5' | 38.5' | 32.5' | 46.5' | 39.5' |
| | 60 | 37.0' | 31.5' | 45.5' | 39.0' | 55.0' | 47.0' |

1. For 54 mil studs, the listed values can be decreased by a maximum of 10 percent.
2. Method WSP: wood structural panels
3. Method CS-WSP: continuously sheathed wood structural panels
4. Wind speeds given are allowable stress design wind speeds ($V_{ASD}$). For ultimate wind speeds ($V_{ult}$), multiply allowable wind speeds by 1.26.

**Table 1:** *IRC* Required Bracing Lengths for Wind & Seismic Design Categories A, B & Detached Dwellings in C

### 5.7.2. *IBC* and *SDPWS* Wall Bracing

**5.7.2.1.** CFS Framing Construction

**5.7.2.1.1.** Stanley® BOSTITCH® Pneumatic Pins may be used to construct shear walls as an equivalent alternative to *IBC* Section 2306.3 and *SDPWS* Section 4.3 when installed in accordance with the provisions therein for shear walls and this TER.

**5.7.2.1.2.** Stanley® BOSTITCH® Pneumatic Pins may be used to construct braced wall panels as an equivalent alternative to Method 3 (Method WSP) braced wall panels as referenced in *IBC* Section 2308.2, 2308.3[4], 2308.9[5] and 2308.9.3[6] and this TER.

**5.7.2.1.3.** The Nominal Unit Shear Capacities (NUSC) for shear walls where the sheathing is fastened to the CFS frame with Stanley® BOSTITCH® Pneumatic Pins are found in Table 2.

[4] *2015 IBC* section 2308.6
[5] *2015 IBC* section 2308.5
[6] *2015 IBC* section 2308.6.3

**5.7.2.1.4.** The NUSC values in Table 2, 3 and 4 may not be adjusted for Duration of Load (DOL) per *NDS*[7].

| Nominal Unit Shear Capacities[1,2] for Shear Walls with Sheathing Fastened with Stanley® BOSTITCH® Pneumatic Pins For Use with the *IBC* and *SDPWS*. CFS Framing Thickness is 33 mil or 54 mil. Hold-Down Hardware is Required. | | | | | |
|---|---|---|---|---|---|
| **CFS Framing** | **Sheathing** | **Fastener Spacing[3] (in.)** | **Max. Framing Spacing, o.c. (in.)** | **Nominal Unit Shear Capacity (plf)** | |
| | | | | **Wind** | **Seismic** |
| 33 mil | 7/16" OSB & 15/32" Plywood | 6:12 | 16 | 605 | 430 |
| | | 6:12 | 24 | 555 | 400 |
| 54 mil | 7/16" OSB & 15/32" Plywood | 6:12 | 16 | 665 | 475 |
| | | 6:12 | 24 | 610 | 435 |
| 1. For LRFD, the Nominal Unit Shear Values shall be multiplied by resistance factor $\varphi_D$=0.80, and for ASD applications, the values shall be divided by 2.0. No duration of load increases are permitted. 2. WSPs up to 23/32" (18.2 mm) may be used without increased shear capacity. 3. Fastener spacing at panel edges (in.); fastener spacing at panel interior framing members (in.). | | | | | |

**Table 2:** Nominal Unit Shear Capacities[1,2] for Shear Walls with Sheathing Fastened with Stanley® BOSTITCH® Pneumatic Pins

### 5.7.3. *AISI S213* – Lateral Design

**5.7.3.1.** Nominal Unit Shear Capacities for simple shear walls (walls that are designed for gravity loads only) are given in Table 3.

**5.7.3.2.** Nominal Unit Shear Capacities for fully provisioned shear walls (walls that are designed and detailed for both gravity and lateral loads) are given in Table 4.

**5.7.3.3.** Nominal Unit Shear Capacities of Table 3 and Table 4 are adjusted using safety factors (Ω) for ASD and resistance factors (Φ) for LRFD of *AISI S213* Section C2.1. WSP up to 23/32" (18.2 mm) thick may be used without increased shear capacities. No increases for duration of load shall be applied to the reference unit shear capacities.

**5.7.3.4.** As needed, shear wall deflection shall be calculated using *AISI S213* equation C2.1-1 and C2.1-2.

[7] The listed NUSC values are based on equivalency factors derived from testing using *ASTM E2126* techniques and the 1 CUREE protocol. These are short-term loading techniques designed to simulate wind/seismic loading conditions. As such, no additional increase for short-term loading is allowed.

| Nominal Unit Shear Capacities for Simple Shear Walls (Designed for gravity loads; not designed and detailed for supplemental forces associated with lateral shear resistance.) CFS Framed Using OSB/Plywood Attached with Stanley® BOSTITCH® Pneumatic Pins [1,2,3,4] | | | | |
|---|---|---|---|---|
| **Sheathing** | **Fastener Spacing[5]** | **CFS Thickness (mil)** | **NUSC Capacity (Seismic)** | **NUSC Capacity (Wind)** |
| 7/16" OSB | 6:12 | 33 | 625 | 810 |
| 15/32" 4-Ply Structural 1 Plywood | 6:12 | 33 | 785 | 810 |
| 7/16" OSB | 4:12 | 33 | 810 | 810 |
| 15/32" 4-Ply Structural 1 Plywood | 4:12 | 33 | 810 | 810 |
| 7/16" OSB | 3:12 | 33 | 810 | 810 |
| 15/32" 4-Ply Structural 1 Plywood | 3:12 | 33 | 810 | 810 |
| 7/16"OSB | 2:12 | 33 | 810 | 810 |
| 15/32" 4-Ply Structural 1 Plywood | 2:12 | 33 | 810 | 810 |
| 7/16" OSB | 6:12 | 54 | 685 | 865 |
| 15/32" 4-Ply Structural 1 Plywood | 6:12 | 54 | 790 | 865 |
| 7/16" OSB | 4:12 | 54 | 865 | 865 |
| 15/32" 4-Ply Structural 1 Plywood | 4:12 | 54 | 865 | 865 |
| 7/16" OSB | 3:12 | 54 | 865 | 865 |
| 15/32" 4-Ply Structural 1 Plywood | 3:12 | 54 | 865 | 865 |
| 7/16" OSB | 2:12 | 54 | 865 | 865 |
| 15/32" 4-Ply Structural 1 Plywood | 2:12 | 54 | 865 | 865 |

1. Studs shall be spaced 16" or 24" (406 or 610 mm) o.c. and fastened with screws to the tracks.
2. Chord studs shall be selected such that compression forces from gravity and lateral loads can be resisted.
3. Hold-downs must be selected that provide adequate overturning resistance for the shear wall assembly.
4. Fastener spacing on panel edges (in.); fastener spacing on interior framing members (in.).
5. Thickness of CFS studs and tracks.

**Table 3:** Nominal Unit Shear Capacities for Simple Shear Walls

| Nominal Unit Shear Capacities for Fully Provisioned Shear Walls (Designed and detailed for gravity and supplemental forces associated with lateral shear resistance) CFS Framed Using OSB/Plywood Attached with Stanley® BOSTITCH® Pneumatic Pins[1,2] | | | | |
|---|---|---|---|---|
| **Sheathing** | **Fastener Spacing[5]** | **CFS Thickness (mil)** | **NUSC Capacity (Seismic)** | **NUSC Capacity (Wind)** |
| 7/16" OSB | 6:12 | 33 | 625 | 875 |
| 15/32" 4-Ply Structural 1 Plywood | 6:12 | 33 | 785 | 1100 |
| 7/16" OSB | 4:12 | 33 | 842 | 1180 |
| 15/32" 4-Ply Structural 1 Plywood | 4:12 | 33 | 970 | 1355 |
| 7/16" OSB | 3:12 | 33 | 1295 | 1815 |
| 15/32" 4-Ply Structural 1 Plywood | 3:12 | 33 | 1490 | 2085 |
| 7/16" OSB | 2:12 | 33 | 1750 | 2450 |
| 15/32" 4-Ply Structural 1 Plywood | 2:12 | 33 | 2015 | 2820 |
| 7/16" OSB | 6:12 | 54 | 685 | 960 |
| 15/32" 4-Ply Structural 1 Plywood | 6:12 | 54 | 790 | 1105 |
| 7/16" OSB | 4:12 | 54 | 1035 | 1450 |
| 15/32" 4-Ply Structural 1 Plywood | 4:12 | 54 | 1190 | 1670 |
| 7/16" OSB | 3:12 | 54 | 1495 | 2090 |
| 15/32" 4-Ply Structural 1 Plywood | 3:12 | 54 | 1720 | 2405 |
| 7/16" OSB | 2:12 | 54 | 1950 | 2735 |
| 15/32" 4-Ply Structural 1 Plywood | 2:12 | 54 | 2245 | 3145 |

1. Studs shall be spaced 16 or 24 (406 or 610 mm) o.c. and fastened with screws to the tracks.
2. Chord studs shall be selected such that compression forces from gravity and lateral loads can be resisted.
3. Hold-downs must be selected that provide adequate overturning resistance for the shear wall assembly.
4. Fastener spacing on panel edges (in.); fastener spacing on interior framing members (in.).
5. Thickness of CFS studs and tracks.

**Table 4:** Nominal Unit Shear Capacities for Fully Provisioned Shear Walls

### 5.7.4. Transverse Loading

**5.7.4.1.** Where required to resist transverse wind pressures, Table 5 shall be used to determine the required fastening schedule.

| Fastening Schedule[1] to Resist Transverse Wind Loads Using Stanley® BOSTITCH® Pneumatic Pins with 7/16" OSB and 15/32" Plywood Sheathing on CFS Framing that is at Least 33-mil Thick and Spaced No Greater than 24" o.c. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Exposure | MRH[2] | Wind Speed[3] (MPH 3-second gust), Studs Spaced 24" o.c. | | | | | | |
| | | 100 | 110 | 120 | 130 | 140 | 150 | 170 |
| B | 15 | 6:12 | 6:12 | 6:12 | 6:6 | 4:12 | 4:12 | 2:12 |
| | 20 | 6:12 | 6:12 | 6:12 | 6:6 | 4:12 | 4:12 | 2:12 |
| | 25 | 6:12 | 6:12 | 6:12 | 6:6 | 4:12 | 4:12 | 2:12 |
| | 30 | 6:12 | 6:12 | 6:12 | 6:6 | 4:12 | 4:12 | 2:12 |
| | 35 | 6:12 | 6:12 | 6:12 | 6:6 | 4:12 | 4:12 | 2:12 |
| | 40 | 6:12 | 6:12 | 6:12 | 6:6 | 4:12 | 4:6 | 2:12 |
| | 45 | 6:12 | 6:12 | 6:12 | 4:12 | 4:12 | 4:6 | 2:12 |
| | 50 | 6:12 | 6:12 | 6:6 | 4:12 | 4:12 | 2:12 | 2:12 |
| | 55 | 6:12 | 6:12 | 6:6 | 4:12 | 4:12 | 2:12 | 2:12 |
| | 60 | 6:12 | 6:12 | 6:6 | 4:12 | 4:6 | 2:12 | 2:12 |
| C | 15 | 6:12 | 6:12 | 6:6 | 4:12 | 4:6 | 2:12 | 2:12 |
| | 20 | 6:12 | 6:12 | 6:6 | 4:12 | 4:6 | 2:12 | 2:12 |
| | 25 | 6:12 | 6:12 | 4:12 | 4:12 | 2:12 | 2:12 | 2:12 |
| | 30 | 6:12 | 6:6 | 4:12 | 4:12 | 2:12 | 2:12 | 2:12 |
| | 35 | 6:12 | 6:6 | 4:12 | 4:6 | 2:12 | 2:12 | 2:12 |
| | 40 | 6:12 | 6:6 | 4:12 | 4:6 | 2:12 | 2:12 | 2:12 |
| | 45 | 6:12 | 6:6 | 4:12 | 4:6 | 2:12 | 2:12 | 2:12 |
| | 50 | 6:12 | 6:6 | 4:12 | 2:12 | 2:12 | 2:12 | 2:12 |
| | 55 | 6:12 | 4:12 | 4:12 | 2:12 | 2:12 | 2:12 | N/A |
| | 60 | 6:12 | 4:12 | 4:12 | 2:12 | 2:12 | 2:12 | N/A |
| D | 15 | 6:12 | 6:6 | 4:12 | 4:6 | 2:12 | 2:12 | 2:12 |
| | 20 | 6:12 | 6:6 | 4:12 | 2:12 | 2:12 | 2:12 | 2:12 |
| | 25 | 6:12 | 4:12 | 4:12 | 2:12 | 2:12 | 2:12 | N/A |
| | 30 | 6:6 | 4:12 | 4:6 | 2:12 | 2:12 | 2:12 | N/A |
| | 35 | 6:6 | 4:12 | 4:6 | 2:12 | 2:12 | 2:12 | N/A |
| | 40 | 6:6 | 4:12 | 4:6 | 2:12 | 2:12 | 2:12 | N/A |
| | 45 | 6:6 | 4:12 | 4:6 | 2:12 | 2:12 | 2:12 | N/A |
| | 50 | 6:6 | 4:12 | 4:6 | 2:12 | 2:12 | 2:12 | N/A |
| | 55 | 6:6 | 4:12 | 2:12 | 2:12 | 2:12 | 2:12 | N/A |
| | 60 | 6:6 | 4:12 | 2:12 | 2:12 | 2:12 | 2:12 | N/A |

1. Based on pin withdrawal using the average tributary area of fasteners in a 4x8 WSP using the fastening pattern indicated.
2. Mean Roof Height per *ASCE 7*.
3. Wind speeds given are allowable stress design wind speeds ($V_{ASD}$). For ultimate wind speeds ($V_{ult}$), multiply allowable wind speeds by 1.26.

**Table 5:** Fastening Schedule[1] to Resist Transverse Wind Loads Using Stanley® BOSTITCH® Pneumatic Pins

### 5.7.5. Seismic Provisions

**5.7.5.1.** Seismic design for categories other than A, B and detached dwellings in C is outside the scope of this TER.

## 6. Installation:

**6.1.** The WSP sheathing shall be minimum 7/16" (11 mm) thick OSB or 15/32" (12 mm) thick plywood sheathing complying with *DOC PS-1* or *PS-2* as applicable. Thicker WSP panels up to 23/32" (18 mm) may be used but without increased design values.

**6.2.** The CFS framing shall be nominal 33 mil to 54 mil thick, *ASTM A1003* Type H or *ASTM A653 SS*, Grades 33 and 50 ksi (224 MPa and 340 MPa).

**6.3.** The CFS studs shall be C-sections with lips where the web is not less than 3.50" (89 mm), and the flange width is not less than 1.625" (41 mm).

**6.4.** The studs shall not be spaced greater than 24" (610 mm) o.c.

**6.5.** The CFS tracks shall be compatible with the studs. Pneumatic pins for sheathing fastening shall be placed not less than $^3/_8$" (9.5 mm) from the sheathing edges.

**6.6.** Stanley® BOSTITCH® Pneumatic Pins are installed using the Stanley® BOSTITCH® SF150C pneumatic tool or similar.

**6.7.** Pneumatic pins shall be driven such that they pierce the WSP sheathing and the CFS framing member and protrude through the CFS framing member a minimum of $^1/_2$" (13 mm).

**6.8.** The heads of the pneumatic pins shall firmly contact the sheathing and be flush with the sheathing surface, so that the sheathing is held tight to the CFS framing members.

**6.9.** The pneumatic pins shall not be overdriven, which is defined as the head breaking the surface fibers of the sheathing.

**6.10.** The sheathing joints shall be butted over the studs with a gap for panel expansion. Edge fastening shall be a single row of pneumatic pins along the panel edge that penetrate the WSP and the framing member.

## 7. Test and Engineering Substantiating Data:

**7.1.** Lateral shearwall testing and data in accordance with *ASTM E564* and *ASTM E2126* conducted by SBCRI under contract with Qualtim, Inc.

**7.2.** The product(s) evaluated by this TER falls within the scope of one or more of the model, state or local building codes for building construction. The testing and/or substantiating data used in this TER is limited to buildings, structures, building elements, construction materials and civil engineering related specifically to buildings.

**7.3.** The provisions of model, state or local building codes for building construction do not intend to prevent the installation of any material or to prohibit any design or method of construction. Alternatives shall use consensus standards, performance-based design methods or other engineered alternative means of compliance. This TER assesses compliance with defined standards, generally accepted engineering analysis, performance-based design methods, etc. in the context of the pertinent building code requirements.

**7.4.** Some information contained herein is the result of testing and/or data analysis by other sources, which DrJ relies on to be accurate as it undertakes its engineering analysis.

**7.5.** DrJ has reviewed and found the data provided by other professional sources are credible. This information has been approved in accordance with DrJ's procedure for acceptance of data from approved sources.

**7.6.** DrJ's responsibility for data provided by approved sources is in accordance with professional engineering law.

**7.7.** Where appropriate, DrJ relies on the derivation of design values, which have been codified into law through codes and standards (e.g., *IRC*, *WFCM*, *IBC*, *SDPWS*, etc.). This includes review of code provisions and any related test data that helps with comparative analysis or provides support for equivalency to an intended end-use application.

## 8. Findings:

**8.1.** Shear walls fastened with Stanley® BOSTITCH® Pneumatic Pins as described in this TER comply with, or are suitable alternatives to, the codes and standards listed in Section 2.

**8.2.** This TER uses professional engineering law, the building code, ANSI/ASTM consensus standards and generally accepted engineering practice as its criteria for all testing and engineering analysis. DrJ's professional engineering work falls under the jurisdiction of each state Board of Professional Engineers, when signed and sealed.

**8.3.** *IBC* Section 104.11 and *IRC* Section R104.11 (*IFC* Section 104.9 is similar) state:

> **104.11 Alternative materials, design and methods of construction and equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at

> least the equivalent of that prescribed in this code. … Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.[8]

**9. Conditions of Use:**

**9.1.** Where required by the authority having jurisdiction (AHJ) in which the project is to be constructed, this report and the installation instructions shall be submitted at the time of permit application.

**9.2.** Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the code official for review and approval.

**9.3.** Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.

**9.4.** Design

**9.4.4.** Building Designer Responsibility

**9.4.4.1.** Unless the AHJ allows otherwise, the Construction Documents shall be prepared by a Building Designer (e.g., Owner, Registered Design Professional, etc.) for the Building and shall be in accordance with *IRC* Section R106 and *IBC* Section 107.

**9.4.4.2.** The Construction Documents shall be accurate and reliable and shall provide the location, direction and magnitude of all applied loads and shall be in accordance with *IRC* Section 301 and *IBC* Section 1603.

**9.4.5.** Construction Documents

**9.4.5.1.** Construction Documents shall be submitted to the Building Official for approval and shall contain the plans, specifications and details needed for the Building Official to approve such documents.

**9.5.** Responsibilities

**9.5.4.** The information contained herein is a product, engineering or building code compliance research report performed in accordance with the referenced building codes, testing and/or analysis through the use of accepted engineering procedures, experience and good technical judgment.

**9.5.5.** DrJ research reports provide an assessment of only those attributes specifically addressed in the Products Evaluated or Code Compliance Process Evaluated section.

**9.5.6.** The engineering evaluation was performed on the dates provided in this TER, within DrJ's professional scope of work.

**9.5.7.** This product is manufactured under a third-party quality control program in accordance with *IRC* Section R104.4 and R109.2 and *IBC* Section 104.4 and 110.4.

**9.5.8.** The actual design, suitability and use of this research report for any particular building is the responsibility of the Owner or the Owner's authorized agent, and the report shall be reviewed for code compliance by the Building Official.

**9.5.9.** The use of this TER is dependent on the manufacturer's in-plant QC, the ISO/IEC 17020 third-party inspection process, proper installation per the manufacturer's instructions, the Building Official's inspection and any other code requirements that may apply to assure accurate compliance with the applicable building code.

**10. Identification:**

**10.1.** The Stanley® BOSTITCH® Pneumatic Pins described in this TER are identified by a label on the board or packaging material bearing the manufacturer's name, product name, TER number, and other information to confirm code compliance.

**10.2.** Additional technical information can be found at Stanley® BOSTITCH® website.

**11. Review Schedule:**

**11.1.** This TER is subject to periodic review and revision. For the most recent version of this report, visit drjengineering.org.

[8] The last sentence is adopted language in the 2015 codes.

**11.2.** For information on the current status of this report, contact DrJ Engineering.

- Mission and Professional Responsibilities
- Product Evaluation Policies
- Product Approval – Building Code, Administrative Law and P.E. Law