

StiffClip® CL

Floor Tie

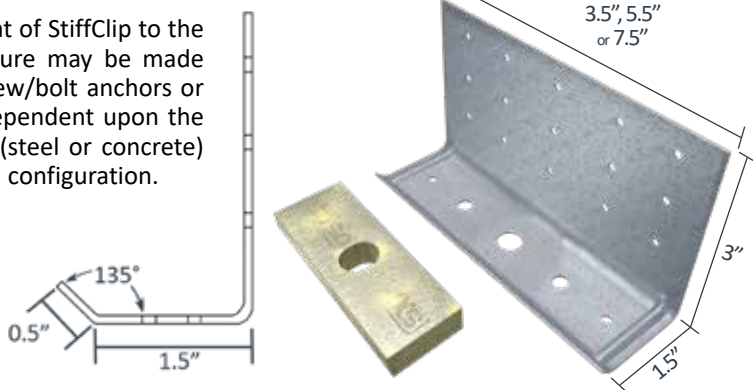
Material Composition

68mil Clip: ASTM A1003/A1003M Structural Grade 50 (340) Type H, ST50H (ST340H): 50ksi (340MPa) minimum yield strength, 65ksi (450MPa) minimum tensile strength, 68mil minimum thickness (14 gauge, 0.0713" design thickness) with ASTM A653/A653M G90 (Z275) hot dipped galvanized coating.

118mil Clip: ASTM A1003/A1003M Structural Grade 50 (340) Type H, ST50H (ST340H): 50ksi (340MPa) minimum yield strength, 65ksi (450MPa) minimum tensile strength, 118mil minimum thickness (10 gauge, 0.1242" design thickness) with ASTM A653/A653M G90 (Z275) hot dipped galvanized coating.

"H" Plate: ½" steel, ASTM A36, 36ksi min yield, 58-80ksi min tensile, with ASTM B633 Type II Yellow Zinc Coating, or Paint, or Equivalent.

The attachment of StiffClip to the primary structure may be made with PAFs, screw/bolt anchors or weld and is dependent upon the base material (steel or concrete) and the design configuration.



CL (H) Plate



US Patent #7,533,508

StiffClip CL Allowable Loads

| StiffClip® CL362/400, Recommended Allowable Load (lbs and inches): F1, F2, F3, M1 & Stiffness | | | | | | | | | | |
|---|---------------------|-------------------|-------------------|-------------------|--------------|---------------------|-------------------|-------------------|-------------------|--------------|
| Screw Patterns with #12 Screws | CL362/400-68 | | | | | CL362/400-118 | | | | |
| | Pattern 1: 4 Screws | | | | | Pattern 1: 4 Screws | | | | |
| | F1 Load Direction | F2 Load Direction | F3 Load Direction | M1 Load Direction | M1 Stiffness | F1 Load Direction | F2 Load Direction | F3 Load Direction | M1 Load Direction | M1 Stiffness |
| 33mil (20ga), 33ksi Stud | 190 | 535 | 752 | 1,096 | 108,054 | 190 | 535 | 752 | 1,096 | 297,794 |
| 33mil (20ga), 50ksi Stud | 276 | 774 | 1,088 | 1,586 | | 276 | 774 | 1,088 | 1,586 | |
| 43mil (18ga), 33ksi Stud | 248 | 796 | 1,120 | 1,633 | | 248 | 796 | 1,120 | 1,633 | |
| 43mil (18ga), 50ksi Stud | 358 | 1,152 | 1,151 | 1,804 | | 358 | 1,152 | 1,620 | 2,362 | |
| 54mil (16ga), 33ksi Stud | 312 | 1,121 | 1,151 | 1,804 | | 312 | 1,121 | 1,576 | 2,297 | |
| 54mil (16ga), 50ksi Stud | 450 | 1,618 | 1,151 | 1,804 | | 450 | 1,618 | 2,225 | 3,318 | |
| 68mil (14ga), 33ksi Stud | 392 | 1,584 | 1,151 | 1,804 | | 392 | 1,584 | 2,225 | 3,248 | |
| 68mil (14ga), 50ksi Stud | 568 | 1,917 | 1,151 | 1,804 | | 568 | 2,039 | 2,225 | 3,936 | |
| 97mil (12ga), 33ksi Stud | 560 | 1,917 | 1,151 | 1,804 | | 560 | 2,039 | 2,225 | 3,936 | |
| 97mil (12ga), 50ksi Stud | 810 | 1,917 | 1,151 | 1,804 | | 810 | 2,039 | 2,225 | 3,936 | |
| 118mil (10ga), 50ksi Stud | 988 | 1,917 | 1,151 | 1,804 | | 988 | 2,039 | 2,225 | 3,936 | |
| Max Allowable Clip Load | 1,416 | 1,917 | 1,151 | 1,804 | | 2,423 | 4,107 | 2,225 | 3,936 | |

StiffClip® CL362/400, Recommended Allowable Load (lbs and inches): F1, F2, F3, M1 & Stiffness

| Screw Patterns with #12 Screws | CL362/400-118 (H) | | | | |
|--------------------------------|---------------------|-------------------|-------------------|-------------------|--------------|
| | Pattern 2: 9 Screws | | | | |
| | F1 Load Direction | F2 Load Direction | F3 Load Direction | M1 Load Direction | M1 Stiffness |
| 33mil (20ga), 33ksi Stud | 285 | 1,023 | 1,692 | 1,644 | 457,277 |
| 33mil (20ga), 50ksi Stud | 414 | 1,480 | 2,448 | 2,379 | |
| 43mil (18ga), 33ksi Stud | 372 | 1,523 | 2,520 | 2,449 | |
| 43mil (18ga), 50ksi Stud | 537 | 2,203 | 3,645 | 3,542 | |
| 54mil (16ga), 33ksi Stud | 468 | 2,143 | 3,546 | 3,446 | |
| 54mil (16ga), 50ksi Stud | 675 | 3,095 | 5,121 | 4,147 | |
| 68mil (14ga), 33ksi Stud | 588 | 3,030 | 5,013 | 4,147 | |
| 68mil (14ga), 50ksi Stud | 852 | 3,900 | 5,713 | 4,147 | |
| 97mil (12ga), 33ksi Stud | 840 | 3,900 | 5,713 | 4,147 | |
| 97mil (12ga), 50ksi Stud | 1,215 | 3,900 | 5,713 | 4,147 | |
| 118mil (10ga), 50ksi Stud | 1,482 | 3,900 | 5,713 | 4,147 | |
| Max Allowable Clip Load | 1,482 | 4,978 | 5,713 | 4,147 | |

****StiffClip CL Allowable Load tables and important notes continued on next page.**

| StiffClip® CL600, Recommended Allowable Load (lbs and inches): F1, F2, F3, M1 & Stiffness | | | | | | | | | | |
|---|---------------------|-------------------|-------------------|-------------------|--------------|---------------------|-------------------|-------------------|-------------------|--------------|
| Screw Patterns with #12 Screws | CL600-68 | | | | | CL600-118 | | | | |
| | Pattern 3: 6 Screws | | | | | Pattern 3: 6 Screws | | | | |
| | F1 Load Direction | F2 Load Direction | F3 Load Direction | M1 Load Direction | M1 Stiffness | F1 Load Direction | F2 Load Direction | F3 Load Direction | M1 Load Direction | M1 Stiffness |
| 33mil (20ga), 33ksi Stud | 285 | 872 | 1,067 | 1,788 | 160,215 | 285 | 872 | 1,128 | 1,788 | 354,427 |
| 33mil (20ga), 50ksi Stud | 414 | 1,262 | 1,067 | 2,435 | | 414 | 1,262 | 1,632 | 2,588 | |
| 43mil (18ga), 33ksi Stud | 372 | 1,299 | 1,067 | 2,435 | | 372 | 1,299 | 1,680 | 2,664 | |
| 43mil (18ga), 50ksi Stud | 537 | 1,879 | 1,067 | 2,435 | | 537 | 1,879 | 2,225 | 3,853 | |
| 54mil (16ga), 33ksi Stud | 468 | 1,828 | 1,067 | 2,435 | | 468 | 1,828 | 2,225 | 3,748 | |
| 54mil (16ga), 50ksi Stud | 675 | 2,510 | 1,067 | 2,435 | | 675 | 2,640 | 2,225 | 5,413 | |
| 68mil (14ga), 33ksi Stud | 588 | 2,510 | 1,067 | 2,435 | | 588 | 2,584 | 2,225 | 5,299 | |
| 68mil (14ga), 50ksi Stud | 852 | 2,510 | 1,067 | 2,435 | | 852 | 3,327 | 2,225 | 5,702 | |
| 97mil (12ga), 33ksi Stud | 840 | 2,510 | 1,067 | 2,435 | | 840 | 3,327 | 2,225 | 5,702 | |
| 97mil (12ga), 50ksi Stud | 1,215 | 2,510 | 1,067 | 2,435 | | 1,215 | 3,327 | 2,225 | 5,702 | |
| 118mil (10ga), 50ksi Stud | 1,421 | 2,510 | 1,067 | 2,435 | | 1,482 | 3,327 | 2,225 | 5,702 | |
| Max Allowable Clip Load | 1,421 | 2,510 | 1,067 | 2,435 | | | 2,583 | 4,107 | 2,225 | |

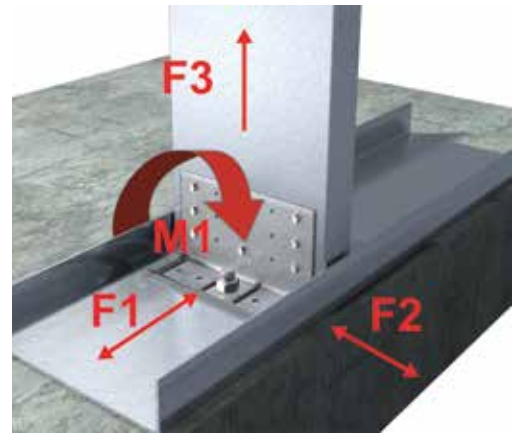
| StiffClip® CL600, Recommended Allowable Load (lbs and inches): F1, F2, F3, M1 & Stiffness | | | | | |
|---|----------------------|-------------------|-------------------|-------------------|--------------|
| Screw Patterns with #12 Screws | CL600-118 (H) | | | | |
| | Pattern 4: 10 Screws | | | | |
| | F1 Load Direction | F2 Load Direction | F3 Load Direction | M1 Load Direction | M1 Stiffness |
| 33mil (20ga), 33ksi Stud | 380 | 1,478 | 1,880 | 3,157 | 525,127 |
| 33mil (20ga), 50ksi Stud | 552 | 2,138 | 2,720 | 4,568 | |
| 43mil (18ga), 33ksi Stud | 496 | 2,201 | 2,800 | 4,702 | |
| 43mil (18ga), 50ksi Stud | 716 | 3,184 | 4,050 | 6,801 | |
| 54mil (16ga), 33ksi Stud | 624 | 3,097 | 3,940 | 6,617 | |
| 54mil (16ga), 50ksi Stud | 900 | 4,473 | 5,690 | 7,306 | |
| 68mil (14ga), 33ksi Stud | 784 | 4,379 | 5,570 | 7,306 | |
| 68mil (14ga), 50ksi Stud | 1,136 | 5,636 | 6,007 | 7,306 | |
| 97mil (12ga), 33ksi Stud | 1,120 | 5,636 | 6,007 | 7,306 | |
| 97mil (12ga), 50ksi Stud | 1,620 | 5,636 | 6,007 | 7,306 | |
| 118mil (10ga), 50ksi Stud | 1,976 | 5,636 | 6,007 | 7,306 | |
| Max Allowable Clip Load | 4,158 | 6,455 | 6,007 | 7,306 | |

| StiffClip® CL800, Recommended Allowable Load (lbs and inches): F1, F2, F3, M1 & Stiffness | | | | | | | | | | |
|---|---------------------|-------------------|-------------------|-------------------|--------------|---------------------|-------------------|-------------------|-------------------|--------------|
| Screw Patterns with #12 Screws | CL800-68 | | | | | CL800-118 | | | | |
| | Pattern 3: 6 Screws | | | | | Pattern 3: 6 Screws | | | | |
| | F1 Load Direction | F2 Load Direction | F3 Load Direction | M1 Load Direction | M1 Stiffness | F1 Load Direction | F2 Load Direction | F3 Load Direction | M1 Load Direction | M1 Stiffness |
| 33mil (20ga), 33ksi Stud | 285 | 973 | 1,077 | 2,483 | 190,670 | 285 | 973 | 1,128 | 2,483 | 548,677 |
| 33mil (20ga), 50ksi Stud | 414 | 1,408 | 1,077 | 2,860 | | 414 | 1,408 | 1,632 | 3,592 | |
| 43mil (18ga), 33ksi Stud | 372 | 1,449 | 1,077 | 2,860 | | 372 | 1,449 | 1,680 | 3,697 | |
| 43mil (18ga), 50ksi Stud | 537 | 2,096 | 1,077 | 2,860 | | 537 | 2,096 | 2,430 | 5,348 | |
| 54mil (16ga), 33ksi Stud | 468 | 2,039 | 1,077 | 2,860 | | 468 | 2,039 | 2,364 | 5,203 | |
| 54mil (16ga), 50ksi Stud | 675 | 2,662 | 1,077 | 2,860 | | 675 | 2,945 | 2,666 | 7,514 | |
| 68mil (14ga), 33ksi Stud | 588 | 2,662 | 1,077 | 2,860 | | 588 | 2,883 | 2,666 | 7,355 | |
| 68mil (14ga), 50ksi Stud | 852 | 2,662 | 1,077 | 2,860 | | 852 | 3,711 | 2,666 | 8,229 | |
| 97mil (12ga), 33ksi Stud | 840 | 2,662 | 1,077 | 2,860 | | 840 | 3,711 | 2,666 | 8,229 | |
| 97mil (12ga), 50ksi Stud | 1,215 | 2,662 | 1,077 | 2,860 | | 1,215 | 3,711 | 2,666 | 8,229 | |
| 118mil (10ga), 50ksi Stud | 1,435 | 2,662 | 1,077 | 2,860 | | 1,482 | 3,711 | 2,666 | 8,229 | |
| Max Allowable Clip Load | 1,435 | 2,662 | 1,077 | 2,860 | | | 3,356 | 6,410 | 2,666 | |

****StiffClip CL Allowable Load tables and important notes continued on next page.**

| StiffClip® CL800, Recommended Allowable Load (lbs and inches): F1, F2, F3, M1 & Stiffness | | | | | |
|---|----------------------|-------------------|-------------------|-------------------|--------------|
| Screw Patterns with #12 Screws | CL800-118 (H) | | | | |
| | Pattern 4: 10 Screws | | | | |
| | F1 Load Direction | F2 Load Direction | F3 Load Direction | M1 Load Direction | M1 Stiffness |
| 33mil (20ga), 33ksi Stud | 380 | 1,661 | 1,880 | 4,748 | 696,515 |
| 33mil (20ga), 50ksi Stud | 552 | 2,402 | 2,720 | 6,869 | |
| 43mil (18ga), 33ksi Stud | 496 | 2,473 | 2,800 | 7,071 | |
| 43mil (18ga), 50ksi Stud | 716 | 3,577 | 4,050 | 10,227 | |
| 54mil (16ga), 33ksi Stud | 624 | 3,480 | 3,940 | 9,950 | |
| 54mil (16ga), 50ksi Stud | 900 | 5,026 | 5,690 | 11,143 | |
| 68mil (14ga), 33ksi Stud | 784 | 4,920 | 5,570 | 11,143 | |
| 68mil (14ga), 50ksi Stud | 1,136 | 6,333 | 7,170 | 11,143 | |
| 97mil (12ga), 33ksi Stud | 1,120 | 6,333 | 7,170 | 11,143 | |
| 97mil (12ga), 50ksi Stud | 1,620 | 6,333 | 7,170 | 11,143 | |
| 118mil (10ga), 50ksi Stud | 1,976 | 6,333 | 7,170 | 11,143 | |
| Max Allowable Clip Load | 4,816 | 8,274 | 7,446 | 11,143 | |

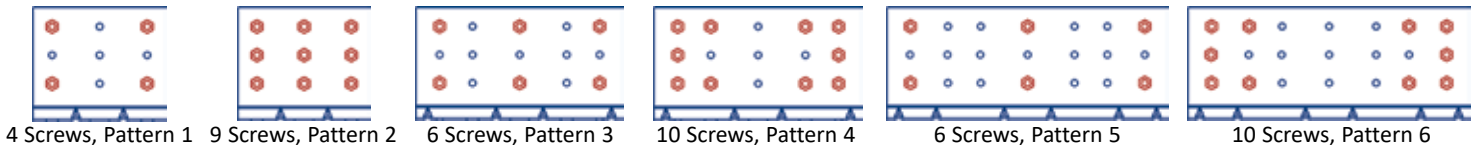
Load Direction



Load Table Notes:

1. Design loads are for attachment of StiffClip CL to stud only. Load tables reflect in plane of wall loads (F1), horizontal loads (F2), vertical loads (F3), and overturning loads (M1).
2. M1 loads are reported as Max. Load divided by a Factor of Safety. M1 loads may be limited by the Serviceability Load calculated as Clip Stiffness times the Serviceability Limit in radian.
3. Stiffness is the Allowable Clip Moment divided by the clip rotation measured at half of the Max Allowable Clip Moment.
4. Design loads consider loads on the clip and #12 screw fasteners to the stud web.
5. Loads listed reflect force in a single direction. When multiple loads react on the connection, it is the responsibility of the designer to check the interaction of forces.
6. Torsional effects are considered on screw group for F2 allowable loads. It is assumed that half of the torsional moment is taken by the connection to the structure and half is taken by the connection to the stud.
7. Attachment to structure engineered by others.
8. Allowable loads have not been increased for wind, seismic, or other factors.
9. Allowable load tables incorporate eccentric loading of fasteners. Values with a welded connection may increase.
10. Guide holes are in place for fastener installation efficiency. All guide holes may not require fasteners. Fastener amount determined by the designer. Screw fastener should be symmetrically placed in guide holes. Refer to screw pattern diagrams below for placement.
11. Fasten within 3/4" from the angle heel (centerline of the 1-1/2" leg) to minimize eccentric load transfer.
12. Center guide hole is 9/16" in diameter for 1/2" anchors. Middle guide holes are 5/16" in diameter for 3/8" anchors. Outer guide holes and guide holes in 3" leg are 0.141" in diameter.
13. For LRFD strengths contact TSN technical services.

Screw Patterns



Nomenclature

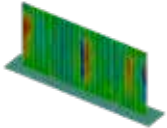
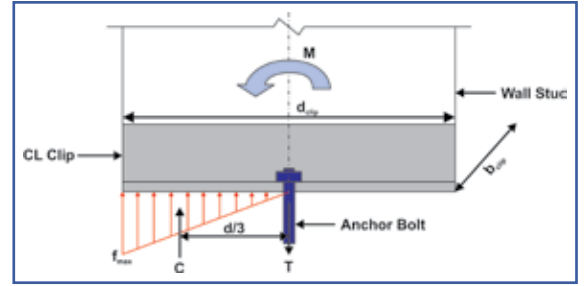
To specify StiffClip CL on drawings, multiply stud depth by 100, followed by the appropriate material thickness, based on strength required (see load tables). The StiffClip CL118(H) utilizes a plate in the 1 1/2" leg (shown on page 1).

Example: 6" stud, uplift load of 650lbs
Designate: StiffClip® CL600-68

Anchor Bolt Design

The following equation for tension force in the anchor is derived using the assumed bearing stress distribution shown in the figure to the right. This assumed stress distribution provides a conservative anchor force approximation.

$$T = \frac{M}{\left(\frac{2}{3}\right)\left(d_{clip}/2\right)} = \frac{3M}{d_{clip}}$$



StiffClip CL Series
 Blast and Seismic Design Data
www.steelnetwork.com

**** For more information or to review a copy of this report, please visit our website at <http://www.steelnetwork.com/light-steel-framing-design-resources>**