

TEXAS DEPARTMENT OF INSURANCE

Engineering Services / MC 103-3A 333 Guadalupe Street P.O. Box 149104 Austin, Texas 78714-9104
Phone No. (512) 322-2212 Fax No. (512) 463-6693

PRODUCT EVALUATION FA-19

Effective October 1, 2010

*The following product has been evaluated for compliance with the wind loads specified in the **International Residential Code (IRC)** and the **International Building Code (IBC)**. This product shall be subject to reevaluation **October 2011**.*

This product evaluation is not an endorsement of this product or a recommendation that this product be used. The Texas Department of Insurance has not authorized the use of any information contained in the product evaluation for advertising, or other commercial or promotional purpose.

This product evaluation is intended for use by those individuals who are following the design wind load criteria in Chapter 3 of the IRC and Section 1609 of the IBC. The design loads determined for the building or structure shall not exceed the design load rating specified for the products shown in the limitations section of this product evaluation. This product evaluation does not relieve a Texas licensed engineer of his responsibilities as outlined in the Texas Insurance Code, the Texas Administrative Code, and the Texas Engineering Practice Act.

The **Quick-Tie™ System**, manufactured by

Quick Tie Products, Inc.
4141 Southpoint Drive East, Suite B
Jacksonville, FL 32216
(904) 281-0525
www.quicktieproducts.com

will be accepted in designated catastrophe areas along the Texas Gulf Coast when installed in accordance with the manufacturer's installation instructions and this product evaluation.

PRODUCT DESCRIPTION

The Quick Tie System is used to anchor wood framed walls to a concrete foundation system to resist wind uplift loads. The Quick Tie System consists of aircraft wire rope with threaded studs swaged to each end. The threaded stud at one end of the rope is embedded into cured, uncracked, normal-weight concrete (with a minimum compressive strength at the time of threaded stud installation of 2,500 psi and a maximum compressive strength of 8,500 psi) by inserting it into a predrilled hole and using epoxy adhesive to anchor it to the foundation. The threaded stud at the opposite end of the wire rope is extended vertically to the top of the stud wall, inserted through a hole drilled through the double top plate, and attached to a steel plate and hex nut that are placed on top of the double top plate. The hex nut is then tightened in accordance with Quick Tie System installation instructions providing the required uplift resistance for the wall. The Quick Tie System is ordered in specific lengths and is shipped pre-cut to the required specifications of each structure. Roof framing members (rafters or trusses), headers and bottom plates are connected with traditional metal framing connectors to provide distribution of load to the Quick Tie System. General application information for the Quick Tie System is provided in Figure 1. The Quick Tie System includes the following products: QTB(X), QTG(X), QTO(X), and QTR(X). The dimensions and details for each of these products are provided in Figures 2 – 5. The following components shall be used to install the Quick Tie System:

Aircraft Wire Rope: 7x19 galvanized steel wire per ASTM A1023/A1023M. Individual wires in the wire rope are galvanized with a minimum of 0.10 ounces per square foot of uncoated wire surface and are 0.030" diameter, or smaller, with minimum $F_u = 268,000$ psi (Note - the "X" in the following product designations indicates length in feet. Products are available in 1 in. increments from 2 ft. to 60 ft.).

Quick Tie Blue QTB(X): $\frac{3}{16}$ " diameter with a breaking strength of 4,200 lbs and an allowable tensile load of 1,909 lbs. (see Figure 2).

Quick Tie Green QTG(X): $\frac{1}{4}$ " diameter with a breaking strength of 7,000 lbs and an allowable tensile load of 3,182 lbs. (see Figure 3).

Quick Tie Orange QTO(X): $\frac{5}{16}$ " diameter with a breaking strength of 9,800 lbs and an allowable tensile load of 4,455 lbs. (see Figure 4).

Quick Tie Red QTR(X): $\frac{3}{8}$ " diameter with a breaking strength of 14,400 lbs and an allowable tensile load of 6,545 lbs. (See Figure 5).

Threaded Studs: Swaged onto each end of the wire rope.

QTB(X): $\frac{3}{8}$ " x $6\frac{1}{4}$ " with 4" of threads

QTG(X): $\frac{1}{2}$ " x $6\frac{1}{4}$ " with 4" of threads

QTO(X): $\frac{5}{8}$ " x $8\frac{3}{4}$ " with $6\frac{5}{8}$ " of threads at one end and $\frac{5}{8}$ " x $6\frac{3}{4}$ " with $3\frac{5}{8}$ " of threads at the other end

QTR(X): $\frac{3}{4}$ " x 9" with 6" of threads

The threaded stud is installed in a predrilled concrete hole to a specified diameter of:

QTB(X): $\frac{7}{16}$ " and an embedment depth of at least $3\frac{3}{8}$ " and a minimum edge distance of $2\frac{7}{8}$ "

QTG(X): $\frac{9}{16}$ " and an embedment depth of at least 4" and a minimum edge distance of $3\frac{1}{2}$ "

QTO(X): $\frac{3}{4}$ " and an embedment depth of at least 6" and a minimum edge distance of $3\frac{1}{2}$ "

QTR(X): $\frac{7}{8}$ " and an embedment depth of at least 7" and a minimum edge distance of $3\frac{3}{4}$ "

Washers: All washers are made from ASTM A36, A283/284 or A570 steel plate, with a minimum yield strength of 33 ksi and a minimum ultimate strength of 45 ksi:

QTB(X): $2\frac{1}{4}$ " x $2\frac{1}{4}$ " x 7 gauge (0.1793")

QTG(X): 3" x 3" x $\frac{3}{16}$ " and $1\frac{3}{8}$ " x $1\frac{3}{8}$ " 11 gauge (0.1196")

QTO(X): 3" x 3" x $\frac{1}{4}$ " and $1\frac{3}{8}$ " x $1\frac{3}{8}$ " 11 gauge (0.1196")

QTR(X): 3" x $4\frac{1}{2}$ " x $\frac{1}{2}$ "

Nuts: All hex nuts are made from low or medium carbon steel, SAE J995. Type = Grade 2.

QTB(X): $\frac{3}{8}$ "

QTG(X): $\frac{1}{2}$ "

QTO(X): $\frac{5}{8}$ "

QTR(X): $\frac{3}{4}$ "

Epoxy: ITW Red Head EPCON G5 Adhesive Anchoring System (ICC ESR-1137) shall be exclusively used to install all threaded studs into cured uncracked normal-weight concrete.

Product Identification: Each Quick Tie Anchor shall be labeled with the manufacturer's name and/or trademark cable type and reference to Quick Tie installation instructions.

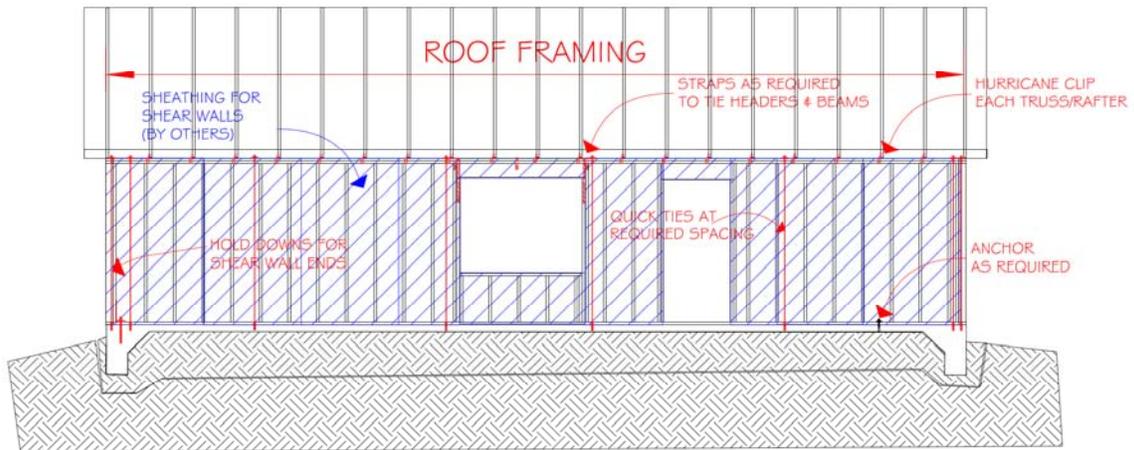


Figure 1: Application of the Quick Tie System

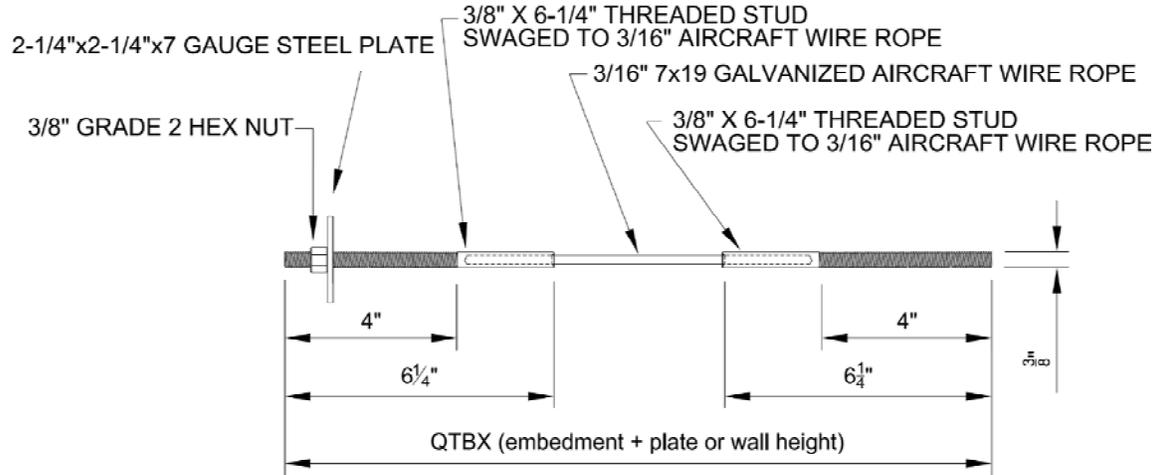


Figure 2: Typical Quick Tie Part Detail – QTBX)

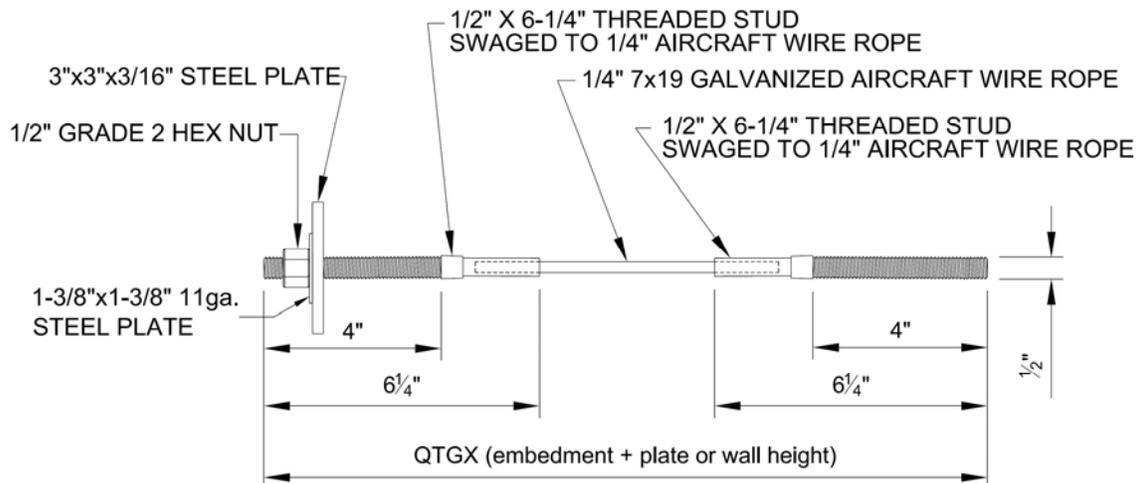


Figure 3: Typical Quick Tie Part Detail – QTG(X)

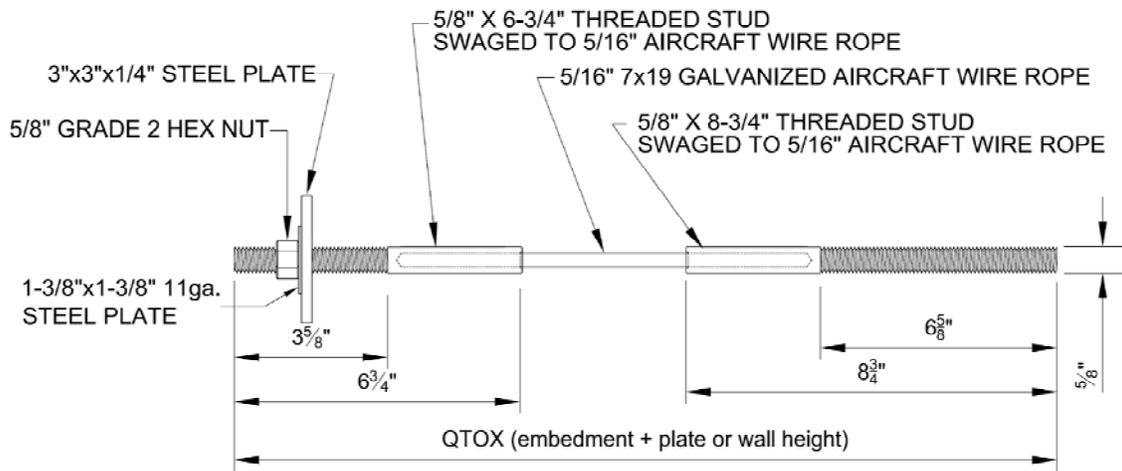


Figure 4: Typical Quick Tie Part Detail – QTO(X)

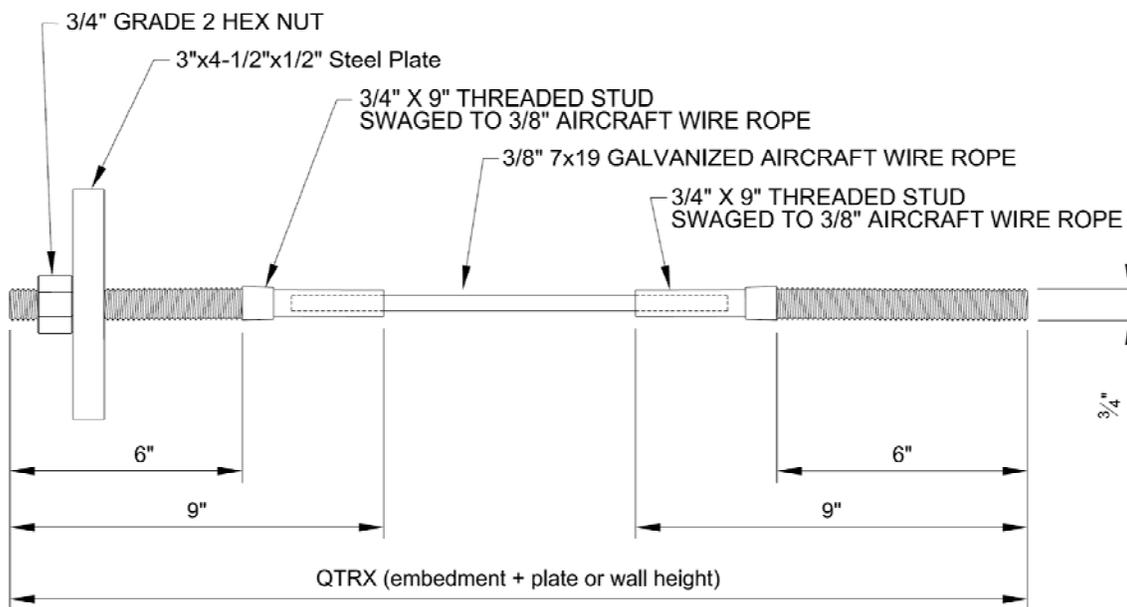


Figure 5: Typical Quick Tie Part Detail – QTR(X)

INSTALLATION REQUIREMENTS

General: The Quick Tie System shall be fabricated, identified and installed in strict accordance with the manufacturer's published installation instructions, this report, design documents prepared by a Texas licensed engineer, and the current building code specifications adopted by the Texas Department of Insurance. In the event of a conflict between the manufacturer's published installation instructions and this report, this report shall govern. Design documents prepared by a Texas licensed engineer shall be available at all times on the jobsite during installation. The Quick Tie System shall be installed by contractors trained and licensed by Quick Tie Products, Inc.

Structures built using the Quick Tie System shall be designed and inspected by a Texas licensed professional engineer. Requirements for the design of the Quick Tie System shall be based on the tables and details specified in this evaluation report along with the manufacturer's published installation instructions. The tables presented in this evaluation report are for the allowable uplift reactions for roof framing.

Design Documents: A Texas licensed engineer shall prepare calculations, design drawings and details for each Quick Tie installation. The design drawings shall include complete instructions for the connection and installation of the Quick Tie System and other components as needed to provide a continuous load path and transfer of tension loads between portions of the structure. The design drawings shall be signed, sealed and dated by the engineer. The design drawings shall reference the appropriate edition of the wind load standard (ASCE 7) used based on the current building specifications adopted by the Texas Department of Insurance. The basic wind speed and the Exposure Category used for the design shall also be referenced.

A load path from the peak of the roof to the foundation shall be provided. Roof framing members (rafters or trusses), headers and bottom plates are connected with sheathing and traditional metal framing connectors to provide distribution of uplift loads to the Quick Tie System, which in turn transfers this load to the foundation. The maximum allowable uplift load for each Quick Tie product is specified in this report and may be further limited by the strength of concrete used for the foundation, the embedment depth of the threaded stud into the foundation, the minimum end, edge and spacing distances of the threaded studs in the foundation, the allowable load of the adhesive and the connection between the roof framing and the top of the wall. Refer to the manufacturer's published installation instructions for specific connection details. The QT(B)(X) and QT(G)(X) products may be placed at any location between the wall framing studs, if permitted by design; however, the QT(O)(X) and the QT(R)(X) products shall be placed within 2 inches of a wall framing stud for all installations. The Quick Tie System is not used to replace anchor bolts or framing anchors that are required to resist lateral loads.

The design of the wall framing anchorage system and associated connections is the responsibility of the engineer. The design shall be performed in accordance with the current building code specifications adopted by the Texas Department of Insurance, and the design shall consider appropriate load conditions, stress, deflection, wood shrinkage, bending and rotation of the plates and strength limit cases. The design of the wall top plates receiving uplift loads and distributing it to the Quick-Tie system shall consider both deflection and limit states, including combined axial and flexural stress for cases where the wood top plate(s) act as a drag strut or collector, and shall also consider geometric compatibility. A positive method to resist torsional rotation and cross-grain flexure of the top plates due to offsets between the point of load application (e.g., hurricane ties at the sides of the top plate) shall be provided where such conditions exist; and calculations in accordance with principles of mechanics shall be used to determine the demand connection used to resist top plate torsion.

Design Loads: Design wind loads for the Quick Tie System shall be determined using the wind load requirements for the structure as specified in the current building specifications adopted by the Texas Department of Insurance. All loads on the Quick Tie System shall not exceed the allowable loads specified in this report.

The allowable uplift reactions for roof framing installed at 12, 16, 19.2, and 24 inches on-center (o.c.), for various spacings of the QTB(X) and QTG(X) products are provided in Tables 1 and 2, respectively. Additional information regarding these tables is included in the notes following Table 2.

Foundation: The foundation is considered to be part of the structure and shall be considered part of the design for the structure. A Texas licensed engineer shall prepare plans and calculations for the installation of the Quick Tie System including anchorage into the foundation. The design drawings shall provide complete details on the installation and location of all components of the Quick Tie System including the attachment to the foundation.

ITW Red Head EPCON G5 adhesive anchoring system shall be used to anchor the Quick Tie System to the foundation and shall be installed in strict accordance with the epoxy manufacturer's instructions. The allowable values for the epoxy anchorage shall be calculated based on the strength design as specified in Appendix D of ACI 318-05 and Chapter 19 of the International Building Code. The maximum allowable tensile load that can be applied to each Quick Tie product is as follows:

QTB(X): 1,909 lbs.
QTG(X): 3,182 lbs.
QTO(X): 4,455 lbs.
QTR(X): 6,545 lbs.

Allowable tensile loads may be further limited to values less than those listed here as determined by the strength of concrete used for the foundation, the embedment depth of the threaded stud into the foundation, the minimum end, edge and spacing distances of the threaded studs in the foundation, the allowable load of the adhesive and the connection between the roof framing and the top of the wall. A special inspection in accordance with Section 1704 of the IBC shall be provided for all anchor installations.

Wall Construction: Wood framed walls shall be constructed with double top and single bottom plates of Southern Pine, No. 2 or better lumber, minimum 2" nominal thickness using design values and specific gravity as defined by the grade stamp and the latest edition of the National Design Specification® For Wood Construction (NDS®). Studs shall be Spruce-Pine-Fir, Stud grade or better, minimum 2" nominal thickness using design values and specific gravity as defined by the grade stamp and the latest edition of the NDS spaced a maximum of 16" o.c.

Minimum 1/2" thick gypsum wall board is required on each side of the wall, fastened to studs with 1 1/2" long wallboard nails (or equivalent) spaced at 6" o.c. at edges and 12" o.c. in the field, for applications in which the Quick Tie System is used to resist uplift reactions from evenly spaced roof framing members.

When used in braced wall or shearwall applications, structural sheathing (e.g., plywood or OSB) is required on at least one side of the wall in lieu of gypsum wall board of that side.

Note: A set of sealed design drawings, Quick Tie System installation instructions, and this product evaluation report shall be available to the builder and inspector at the job site at all times. All fasteners shall be corrosion resistant as specified in the International Residential Code (IRC), the International Building Code (IBC), and the Texas Revisions.

Table 1 ¹⁻⁶

Allowable Uplift Reactions (lbs.) for Roof Framing with $\frac{3}{16}$ " diameter QTB(X) Blue based on ITW Red Head EPCON G5 Adhesive Anchoring System with min. $3\frac{3}{8}$ in. Embedment and $2\frac{7}{8}$ in. Edge Distance.

QTB(X) Spacing (ft-in)	Uplift Reactions (lbs.) per Truss/Rafter @ 12" o.c.	Uplift Reactions (lbs.) per Truss/Rafter @ 16" o.c.	Uplift Reactions (lbs.) per Truss/Rafter @ 19.2" o.c.	Uplift Reactions (lbs.) per Truss/Rafter @ 24" o.c.
2'-0"	720	960	1,152	1,440
2'-1"	691	922	1,106	1,382
2'-2"	665	886	1,063	1,329
2'-3"	640	853	1,024	1,280
2'-4"	617	823	987	1,234
2'-5"	596	794	953	1,192
2'-6"	576	768	922	1,152
2'-7"	557	743	892	1,115
2'-8"	540	720	864	1,080
2'-9"	524	698	838	1,047
2'-10"	508	678	813	1,016
2'-11"	494	658	790	987
3'-0"	480	640	768	960
3'-1"	467	623	747	934
3'-2"	455	606	728	909
3'-3"	443	591	709	886
3'-4"	432	576	691	864
3'-5"	421	562	674	843
3'-6"	411	549	658	823
3'-7"	402	536	643	804
3'-8"	393	524	628	785
3'-9"	384	512	614	768
3'-10"	376	501	601	751
3'-11"	368	490	588	735
4'-0"	360	480	576	720
4'-1"	353	470	564	705
4'-2"	346	461	553	691
4'-3"	339	452	542	678
4'-4"	332	443	532	665
4'-5"	326	435	522	652
4'-6"	320	427	512	640
4'-7"	314	419	503	628
4'-8"	309	411	494	617
4'-9"	303	404	485	606
4'-10"	298	397	477	596
4'-11"	293	391	469	586

Table 1 (Continued)¹⁻⁶

Allowable Uplift Reactions (lbs.) for Roof Framing with $\frac{3}{16}$ " diameter QTB(X) Blue based on ITW Red Head EPCON G5 Adhesive Anchoring System with min. $3\frac{3}{8}$ in. Embedment and $2\frac{7}{8}$ in. Edge Distance

QTB(X) Spacing (ft-in)	Uplift Reactions (lbs.) per Truss/Rafter @ 12" o.c.	Uplift Reactions (lbs.) per Truss/Rafter @ 16" o.c.	Uplift Reactions (lbs.) per Truss/Rafter @ 19.2" o.c.	Uplift Reactions (lbs.) per Truss/Rafter @ 24" o.c.
5'-0"	288	384	461	576
5'-1"	283	378	453	567
5'-2"	279	372	446	557
5'-3"	274	366	439	549
5'-4"	270	360	432	540
5'-5"	266	354	425	532
5'-6"	262	349	419	524
5'-7"	258	344	413	516
5'-8"	254	339	407	508
5'-9"	250	334	401	501
5'-10"	247	329	395	494
5'-11"	243	325	389	487
6'-0"	240	320	384	480
6'-1"	237	316	379	473
6'-2"	234	311	374	467
6'-3"	230	307	369	461
6'-4"	227	303	364	455
6'-5"	224	299	359	449
6'-6"	222	295	354	443
6'-7"	219	292	350	437
6'-8"	216	288	346	432
6'-9"	213	284	341	427
6'-10"	211	281	337	421
6'-11"	208	278	333	416
7'-0"	206	274	329	411
7'-1"	203	271	325	407
7'-2"	201	268	321	402
7'-3"	199	265	318	397
7'-4"	196	262	314	393
7'-5"	194	259	311	388
7'-6"	192	256	307	384
7'-7"	190	253	304	380
7'-8"	188	250	301	376
7'-9"	186	248	297	372
7'-10"	184	245	294	368
7'-11"	182	243	291	364
8'-0"	180	240	288	360

Table 2 ¹⁻⁶

Allowable Uplift Reactions (lbs.) for Roof Framing with ¼" diameter QTG(X) Green based on ITW Red Head EPCON G5 Adhesive Anchoring System with min. 4 in. Embedment and 3½ in. Edge Distance.

QTG(X) Spacing (ft-in)	Uplift Reactions (lbs.) per Truss/Rafter @ 12" o.c.	Uplift Reactions (lbs.) per Truss/Rafter @ 16" o.c.	Uplift Reactions (lbs.) per Truss/Rafter @ 19.2" o.c.	Uplift Reactions (lbs.) per Truss/Rafter @ 24" o.c.
2'-0"	1,591	2,121	2,546	3,182
2'-1"	1,527	2,036	2,444	3,055
2'-2"	1,469	1,958	2,350	2,937
2'-3"	1,414	1,886	2,263	2,828
2'-4"	1,364	1,818	2,182	2,727
2'-5"	1,317	1,756	2,107	2,633
2'-6"	1,273	1,697	2,036	2,546
2'-7"	1,232	1,642	1,971	2,463
2'-8"	1,193	1,591	1,909	2,387
2'-9"	1,157	1,543	1,851	2,314
2'-10"	1,123	1,497	1,797	2,246
2'-11"	1,091	1,455	1,746	2,182
3'-0"	1,061	1,414	1,697	2,121
3'-1"	1,032	1,376	1,651	2,064
3'-2"	1,005	1,340	1,608	2,010
3'-3"	979	1,305	1,567	1,958
3'-4"	955	1,273	1,527	1,909
3'-5"	931	1,242	1,490	1,863
3'-6"	909	1,212	1,455	1,818
3'-7"	888	1,184	1,421	1,776
3'-8"	868	1,157	1,389	1,736
3'-9"	849	1,131	1,358	1,697
3'-10"	830	1,107	1,328	1,660
3'-11"	812	1,083	1,300	1,625
4'-0"	796	1,061	1,273	1,591
4'-1"	768	1,024	1,228	1,535
4'-2"	737	983	1,180	1,475
4'-3"	709	945	1,134	1,417
4'-4"	682	909	1,091	1,363
4'-5"	656	875	1,050	1,312
4'-6"	632	843	1,011	1,264
4'-7"	609	812	975	1,219
4'-8"	588	784	940	1,176
4'-9"	567	756	908	1,135
4'-10"	548	731	877	1,096
4'-11"	530	706	847	1,059

Table 2 (Continued)¹⁻⁶

Allowable Uplift Reactions (lbs.) for Roof Framing with 1/4" diameter QTG(X) Green based on ITW Red Head EPCON G5 Adhesive Anchoring System with min. 4 in. Embedment and 3 1/2 in. Edge Distance.

QTG(X) Spacing (ft-in)	Uplift Reactions (lbs.) per Truss/Rafter @ 12" o.c.	Uplift Reactions (lbs.) per Truss/Rafter @ 16" o.c.	Uplift Reactions (lbs.) per Truss/Rafter @ 19.2" o.c.	Uplift Reactions (lbs.) per Truss/Rafter @ 24" o.c.
5'-0"	512	683	819	1,024
5'-1"	495	660	793	991
5'-2"	480	639	767	959
5'-3"	464	619	743	929
5'-4"	450	600	720	900
5'-5"	436	582	698	873
5'-6"	423	564	677	846
5'-7"	411	547	657	821
5'-8"	399	531	638	797
5'-9"	387	516	619	774
5'-10"	376	502	602	752
5'-11"	366	488	585	731
6'-0"	356	474	569	711
6'-1"	346	461	553	692
6'-2"	337	449	539	673
6'-3"	328	437	524	655
6'-4"	319	425	511	638
6'-5"	311	415	497	622
6'-6"	303	404	485	606
6'-7"	295	394	473	591
6'-8"	288	384	461	576
6'-9"	281	375	449	562
6'-10"	274	365	439	548
6'-11"	268	357	428	535
7'-0"	261	348	418	522
7'-1"	255	340	408	510
7'-2"	249	332	399	498
7'-3"	244	325	390	487
7'-4"	238	317	381	476
7'-5"	233	310	372	465
7'-6"	228	303	364	455
7'-7"	223	297	356	445
7'-8"	218	290	348	436
7'-9"	213	284	341	426
7'-10"	209	278	334	417
7'-11"	204	272	327	408
8'-0"	200	267	320	400

General Notes for Tables 1 & 2:

1. The allowable uplift reactions provided in these tables assume that the wall is constructed with: a) a double top plate and a single bottom plate of Southern Pine No. 2 or better lumber, of minimum 2 inch nominal thickness, using design values and specific gravity as defined by the grade stamp and the latest edition of NDS; b) Spruce-Pine-Fir Stud grade or better studs of minimum 2 inch nominal thickness, using design values and specific gravity as defined by the grade stamp and the latest edition of NDS, spaced no greater than 16 inches o.c.; and c) with minimum $\frac{1}{2}$ " thick gypsum wall board on each side of the wall fastened to studs with minimum $1\frac{1}{2}$ " long wallboard nails (or equivalent) spaced at 6" o.c. at the edges and 12" o.c. in the field.
2. The allowable uplift reactions provided in Tables 1 and 2 are based on an allowable load of 1,440 lbs. for the $\frac{3}{16}$ " diameter QTB(X) Blue product and an allowable load of 3,182 lbs. for the $\frac{1}{4}$ " diameter QTG(X) Green product. These loads may be further limited by the strength of concrete used for the foundation, the embedment depth of the threaded stud into the foundation, the minimum end, edge and spacing distances of the threaded studs in the foundation, the allowable load of the adhesive and the connection between the roof framing and the top of the wall.
3. The location of the Quick Tie products can change slightly as long as the maximum spacing between any two Quick Ties does not exceed $8' \pm 3"$ on either side. Therefore, an absolute maximum spacing of $8' - 6"$ is acceptable.
4. The epoxy adhesive used to anchor the Quick Tie System to the foundation shall be installed in strict accordance with the adhesive manufacturer's instructions. The allowable values for the epoxy anchorage shall be calculated based on the strength design as specified in ACI 318-05 Appendix D and Chapter 19 of the International Building Code.
5. All Quick Ties shall be installed according to these specifications.
6. Use only Quick Tie System materials as specified and supplied by Quick Tie Products, Inc.