TILTECO INC.
TILLIT TESTING & ENGINEERING COMPANY

WALTER A. TILLIT, JR., P.E.

tilteco@aol.com
FL P.E. License No. 44167
FL E.B. License No. 0006719

"PETITION FOR DECLARATORY STATEMENT BEFORE THE FLORIDA BUILDING COMMISSION"

QUALIFIED REPRESENTATIVE:
WALTER A. TILLIT Jr. S.E., P.E.

PETITIONER:
TILTECO, INC.
6355 N.W. 36th STREET
VIRGINIA GARDENS, FL 33166
TELEPHONE NUMBER: (305) 871-1530
FACSIMILE NUMBER: (305) 871-1531

AGENCY RULE: PRODUCT APPROVAL RULE 9B-72

07-DEC-085

FILING AND ACKNOWLEDGEMENT
FILED, on this date, with the designated Clerk, receipt of which is hereby acknowledged.

Paula P. Ford 4/27/07
Paula P. Ford Date
Commission Clerk

(CD is in Clerk's file)

DESCRIPTION ON HOW RULE AFFECTS PETITIONER.

Technical information included on Product Approvals should always be consistent and should never include or allow for discrepancies independently of which of the four methods outlined on Section 9B72.070 of Rule 9B-72 is used to attain the Product Approval. The reason for this consistency should be because any approval method includes at the end, the application of a variety of sections which belong to the same Building Code, i.e., the Florida Building Code, which imply the use of sound engineering principles that should protect the health, welfare and property of the public.

It has therefore come to our attention that fasteners (anchors) used on Product Approvals using Method 1B, where just testing is used for verifying the structural adequacy of product, would not have the minimum required 4.00 safety factor that would be required to be used in case product's connection to existing structure was verified thru structural calculations using the manufacturer's allowables issued on their anchor Product Approval.

As a result of this practice, fasteners in the specific case of concrete or concrete block substrates are being approved with safety factors lower than 4.0 , fully violating the minimum 4.00 value specified by the anchor manufacturer's Product Approval.

Minimum anchor manufacturers safety factor of 4.00 for concrete and masonry imply that anchors, when subjected to design wind/live loads, should still work at least at a stress corresponding to a 25% of their ultimate capacity, i.e., design load (wind/live loads) would need to be increased 4 times in order for anchors to reach failure.

However, when a uniform static wind load test is performed with a maximum test load = 1.5 x the design load, all what this testing passing criteria requires is for assembly to recover (after unloading) 80% from the 1.5 x design load = test load. And as long as this condition is complied with, then anchors and product will be considered to have passed the test, and, if method 1B was used, tested anchors (their brand, diameter, embedment, edge distance, spacing, etc) will be understood as complying with the Florida Building Code.

An example of the above testing situation follows:

Testing of a wall panel
Block wall as a substrate
Panel: 8'-0 long (supported top and bottom)
Design load: 60 psf

Fastener: ¼ Tapcons (ITW / Buildex) at 25" o.c.; with Miami Dade County or Florida Building Code Approval.

From this information:
Force per anchor at design load = ½ x 60 x 8' x 25/12 = 500# / anchor

Force per anchor at test load = 1.5 x design load = 1.5 x 500 = 750# / anchor

Based on anchor manufacturer's Product Approval, tensile (pull out) failure of a ¼ Tapcon in concrete block is 780# (4 times = safety factor x its allowable load of 195#).

If we see, at design load, F = 500# / anchor, is less than 780#, then no failure will occur at anchor, at test.

If we also see, at 1.5 design load = test load, F = 750#/anchor, less also than 780#, then no failure will occur at anchor, at test.

As a result, ¼ Tapcons spaced at 25" o.c. will be considered structurally adequate per test result. If method 1B was used, this will be included on the approval document as an allowable anchor diameter, embedment, edge distance and spacing. (25" o.c.)

However, the maximum allowable pull out load (tension) at design load for a ¼ Tapcon based on a 4.00 safety factor in respect to failure per Product Approval (copy enclosed) is
Ta (allowable tension) = 195# at design load
anchor

Since we know that force "F" per anchor at design load (60 psf) is 500# / anchor, then we can see that F force at anchor at design load would exceed Ta (maximum allowable load / anchor at design load) and it would not be at 25% of the anchor's failure load but (500/780) x 100 = 64% of it. To correct this and to comply with the minimum 4.00 safety factor required by the Product Approval, anchor spacing would have to be reduced to a spacing = 25" (tested) x (Ta/F) = 25" x (195# / 500#) = 9.75", say 9 ½ " o.c. so that new reduced force F' at anchor at design load will be F' = ½ x 60 x 8 x 9.5 /12 = 190 lb/anchor.

Then, F' = 190 lb/anchor, load would be satisfactorily less than maximum allowed per manufacturer's Product Approval (Ta), which is 195 lb/anchor.

Therefore, required maximum spacing would be 9 ½" o.c. and not 25" o.c. This maximum spacing would guarantee the 4.00 safety factor. However, approved anchor spacing per test, per Method 1B was 25" o.c. (2.63 times 9 ½"). This demonstrates that tests do not fully evaluate the safety factor of anchors because of the fact that safety factors for anchors are much higher than the test safety factors (1.5 vs 4.00). Tests closely evaluate the structural adequacy of the assembly itself (components, frame, etc) because assembly components have a much lower safety factor than anchors.

Conclusion and Petition for Declaratory Statement:

It is not enough to approve a product and its connection to the existing structure by just accepting the test results, due to the very high safety factors used on anchors (and this would also include anchorage to wood or even welded connections where safety factors are also higher). Therefore, even though testing acceptably evaluates the product's assembly structural adequacy, product's anchorage to existing structure must additionally be always verified by a Professional Engineer or Registered Architect in addition to performing the product test with the anchors by using the anchor's Product Approval or the corresponding technical literature from the anchor's manufacturer (safety factors, etc).

This situation only gets worse when anchor is subject to a combined tension and shear loads at the same time, which is typical of end retention roll up doors and roll up shutters. The violation of the anchor manufacturer's minimum safety factors indicated on their product approval or their catalog specs would be really significant.

Past evidence (history) regarding this issue

At the beginning of the adoption of the South Florida Building Code 1994 edition, after the 1992 experience with Hurricane Andrew, Miami Dade County created and adopted a rigorous testing to certify the structural adequacy of products to sustain wind and impact loads.

Even though this was diligently enforced, the anchors safety factor's issue was also left out for a short period of time (like its currently being done by Method 1B on Rule 9B-72).

This situation was however promptly corrected as a result of meetings with anchor manufacturers as well as engineers involved in the preparation of Product Approval Documents.

As a result of this, Miami Dade County Building Code Compliance Office sent a communiqué on 09/19/1994 (copy enclosed) to all manufacturers informing them that they had 90 days to re-submit their Product Approvals including a verification of the anchors safety factors per manufacturers specification or their Product Approvals. This procedure was therefore followed by all manufacturers that had Product Approvals as well as any new applicants for Product Approval. And this requirement continues to be enforced as of this date thru their Product Approval Check List (samples of Check Lists enclosed).

Consequences of not enforcing the verification of the anchor safety factors at any substrate.

As demonstrated above, it is crucial for this verification to be always requested as a condition for Product Approval if using Method 1B. In case it was not enforced, then

significant technical and other types of discrepancies or differences would occur between Product Approvals from manufacturers that used Method 1B, as opposed to the other 3 methods, where even though the same testing is required, products's connection to existing structure is further verified with the appropriate safety factor from the anchor's manufacturer based on their Product Approval or their catalog specifications.

Additionally, anchors manufacturer will not back up or guarantee liability wise any use of their products with safety factors at design loads which are much lower that what they indicate on their catalogs or Product Approvals, including applications for wood connections per National Design Specifications and welding connections per AISC / AWS, which also have a higher safety factor (enclosed copy from ITW / Buildex, manufacturer of Tapcon anchors).

Finally, this situation also affects the way the Professional Engineers participate in these Product Approvals applications. Professional Engineer's hired by manufacturers to use methods 1A, 1C and 1D will indicate different technical results on the Product Approval documents in respect to manufacturers using method 1B. Because of Product Manufacturers learning that Rule 9B-72, method 1B is the best one (economically, because it allows less anchors at every installation) as opposed to the other methods, they will be inclined to only submit for Product Approvals using method 1B, even though fastener manufacturer will not back up those results liability wise. This situation must not be allowed to occur .

Walter A. Tillit Jr. S.E., P.E

April 26, 2007

MIAMI-DADE

BUILDING CODE COMPLIANCE OFFICE (BCCO)
PRODUCT CONTROL DIVISION

MIAMI-DADE COUNTY, FLORIDA
METRO-DADE FLAGLER BUILDING
140 WEST FLAGLER STREET, SUITE 1603
MIAMI, FLORIDA 33130-1563
(305) 375-2901 FAX (305) 375-2908

NOTICE OF ACCEPTANCE (NOA)

ITW, Inc. /Division of Buildex.
1349 West Bryn Mawr Ave.
Itasca, IL 60143

SCOPE: This NOA is being issued under the applicable rules and regulations governing the use of construction materials. The documentation submitted has been reviewed by Miami-Dade County Product Control Division and accepted by the Board of Rules and Appeals (BORA) to be used in Miami Dade County and other areas where allowed by the Authority Having Jurisdiction (AHJ).

This NOA shall not be valid after the expiration date stated below. The Miami-Dade County Product Control Division (In Miami Dade County) and/or the AHJ (in areas other than Miami Dade County) reserve the right to have this product or material tested for quality assurance purposes. If this product or material fails to perform in the accepted manner, the manufacturer will incur the expense of such testing and the AHJ may immediately revoke, modify, or suspend the use of such product or material within their jurisdiction. BORA reserves the right to revoke this acceptance, if it is determined by Miami-Dade County Product Control Division that this product or material fails to meet the requirements of the applicable building code.
This product is approved as described herein, and has been designed to comply with the High Velocity Hurricane Zone of the Florida Building Code.
DESCRIPTION: Tapcon Masonry Fasteners.
APPROVAL DOCUMENT: Drawing No.**03-308**, Sheets 1 of 1, titled "Tapcon Masonry Fasteners" dated 07/18/03with last revision on 07/17/03, prepared by Knezevich & Associates, Inc., signed and sealed by V. J. Knezevich, PE, bearing the Miami-Dade County Product Control Revision stamp with the Notice of Acceptance (NOA) number and expiration date by the Miami-Dade County Product Control Division.
MISSILE IMPACT RATING: None
LABELING: Each unit or box shall bear a permanent label with the manufacturer's name or logo, city, state and following statement: "Miami-Dade County Product Control Approved", unless otherwise noted herein.
RENEWAL of this NOA shall be considered after a renewal application has been filed and there has been no change in the applicable building code negatively affecting the performance of this product.
TERMINATION of this NOA will occur after the expiration date or if there has been a revision or change in the materials, use, and/or manufacture of the product or process. Misuse of this NOA as an endorsement of any product, for sales, advertising or any other purposes shall automatically terminate this NOA. Failure to comply with any section of this NOA shall be cause for termination and removal of NOA.
ADVERTISEMENT: The NOA number preceded by the words Miami-Dade County, Florida, and followed by the expiration date may be displayed in advertising literature. If any portion of the NOA is displayed, then it shall be done in its entirety.
INSPECTION: A copy of this entire NOA shall be provided to the user by the manufacturer or its distributors and shall be available for inspection at the job site at the request of the Building Official.
This NOA revises NOA # 03-0114.03 and consists of this page, evidence page as well as approval document mentioned above.
The submitted documentation was reviewed by **Candido E. Font PE.**

12/11/03

NOTICE OF ACCEPTANCE: EVIDENCE PAGE

A. DRAWINGS

1. Drawing No.03-308, Sheets 1 of 1, titled "Tapcon Masonry Fasteners," dated 07/18/03, with last revision 07/17/03,prepared by Knezevich & Associates, Inc., signed and sealed by V. J. Knezevich, P.E.

B. TESTS

	Laboratory	Test Report	Date	Signature
01.	Heti 00-4160	ASTM E488	10/25/00	H. M. Medina, PE.
02.	Heti 00-4092	ASTM E488	02/25/00	H. M. Medina, PE.
03.	Heti 00-4153	ASTM E488	10/25/00	H. M. Medina, PE
04.	Heti 00-4072	ASTM E 488	02/25/00	H. M. Medina, PE.
05.	Heti 01-5029	ASTM E.488	05/07/01	H. M. Medina, PE.
06.	Heti 01-5027	ASTM E 488	05/07/01	H. M. Medina, PE
07.	PRI 01078	Protocol PA 114	08/27/01	C. L. Thomas, PE
08.	PRI 01079	Protocol PA 114	08/27/01	C. L. Thomas, PE
09.	ARL 30291	ASTM E488	01/22/02	C. A. Hamon, PE
10.	ARL 30292	ASTM E488	01/29/02	C. A. Hamon, PE
11.	ARL 30299	ASTM E488	01/30/02	C. A. Hamon, PE
12.	ARL 30294	ASTM E488	01/30/02	C. A. Hamon, PE.
13.	Heti 01-C109	ASTM C39	01/16/01	H. M. Medina, PE
14.	MTS 25-7654-PS	Protocol PA 114	06/03/96	H. M. Medina, PE

C. CALCULATION

N/A

D. QUALITY ASSURANCE

1. Miami-Dade Product Control Division

E. MATERIAL CERTIFICATIONS

N/A

F. STATEMENTS

1. Code Compliance letter issued by Knezevich & Associates, Inc. on 06/21/01, signed and sealed by V.J. Knezevich, PE.
2. No change letter issued by ITW Buildex on 11/07/03 and signed by D. Kenny.

12/11/03

Candido F. Font PE.
Sr. Product Control Examiner
NOA No 03-0722.05
Expiration Date: February 20, 2008
Approval Date: December 11, 2003

ITW BUILDEX TAPCON

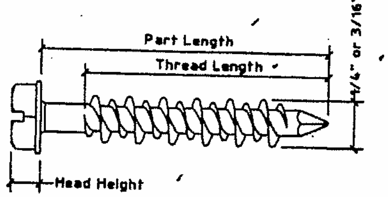
DESCRIPTION

ITW BUILDEX TAPCON ANCHORS ARE MANUFACTURED FROM HEAT TREATED STEEL AND HAVE AN ALTERNATING HIGH LOW THREAD FORM. THESE ANCHORS HAVE BEEN TESTED FOR CORROSION RESISTANCE IN ACCORDANCE WITH ASTM G85, ANNEX 5 AND MIAMI-DADE COUNTY PROTOCOL TAS 114, APPENDIX 'E'.

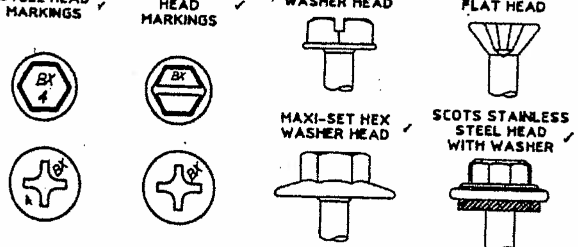
ITW BUILDEX TAPCON ANCHORS ARE ALSO MANUFACTURED WITH ULTRASHIELD OR WHITE ULTRASHIELD CORROSION RESISTANT COATINGS IN ACCORDANCE WITH ASTM G85, ANNEX 5 AND MIAMI-DADE COUNTY PROTOCOL TAS-114, APPENDIX 'E'.

NOTES:

1. ANCHOR INSTALLATION SHALL BE MADE IN ACCORDANCE WITH ITW BUILDEX PUBLISHED INSTALLATION INSTRUCTIONS IN THE PRODUCT & RESOURCE BOOK AND THIS MIAMI-DADE COUNTY, FLORIDA B.C.C.O. NOTICE OF ACCEPTANCE.
2. CONCRETE WILL CONFORM TO AMERICAN CONCRETE INSTITUTE MANUAL OF CONCRETE PRACTICE ACI 301.
3. HOLLOW AND GROUT FILLED CONCRETE BLOCKS SHALL CONFORM TO ASTM C-90.
4. REFERENCE HURRICANE ENGINEERING & TESTING INC. TEST REPORTS;
   HETI 00 4072 DATED 02/25/00
   HETI 00 4153 DATED 10/25/00
   HETI 00 4160 DATED 10/25/00
   HETI 00 4092 DATED 02/25/00
   HETI 01 5027 DATED 05/07/01
   HETI 01 5029 DATED 05/07/01
   AND PRI ASPHALT TECHNOLOGIES, INC. TEST REPORTS;
   PRI01079 DATED 08/27/01
   PRI01078 DATED 08/27/01
   AND APPLIED RESEARCH LABORATORIES TEST REPORTS;
   ARL-30291 DATED 01/22/02
   ARL-30292 DATED 01/29/02
   ARL-30299 DATED 01/30/02
   ARL-30294 DATED 01/30/02



3/16" OR 1/4" TAPCON HEAD STYLES



3/16" DIA. TAPCON

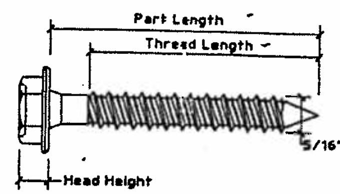
1. FOR 3/16" TAPCON, PILOT HOLE DIAMETER SHALL BE 0.171" AND DRILLED 1/4" LONGER THAN THE NECESSARY EMBEDMENT.
2. ALLOWABLE LOADS ARE BASED ON ULTIMATE TEST LOAD DIVIDED BY 4.
3. RECOMMENDED CENTER TO CENTER DISTANCE OF 2-1/4" IS REQUIRED FOR 100% EFFICIENCY AND 1-1/8" FOR 50% EFFICIENCY.

1/4" DIA. TAPCON

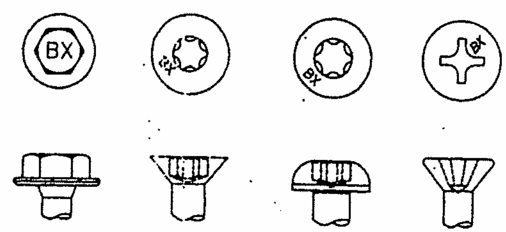
1. FOR ALL 1/4" TAPCON, PILOT HOLE DIAMETER SHALL BE 0.200" AND DRILLED 1/4" LONGER THAN THE NECESSARY EMBEDMENT.
2. ALLOWABLE LOADS ARE BASED ON ULTIMATE TEST LOAD DIVIDED BY 4.
3. RECOMMENDED CENTER TO CENTER DISTANCE OF 3" IS REQUIRED FOR 100% EFFICIENCY AND 1-1/2" FOR 50% EFFICIENCY.

5/16" (XL) TAPCON

1. PILOT HOLE DIAMETER SHALL BE 0.263" AND DRILLED 1/4" LONGER THAN THE NECESSARY EMBEDMENT.
2. ALLOWABLE LOADS ARE BASED ON ULTIMATE TEST LOAD DIVIDED BY 4.
3. RECOMMENDED CENTER TO CENTER DISTANCE OF 3-3/4" IS REQUIRED FOR 100% EFFICIENCY AND 1-7/8" FOR 50% EFFICIENCY.
4. EMBEDMENT IS THROUGH 1-1/4" FACE SHELL OF HOLLOW BLOCK.
5. WOOD BUCK IS LOCATED BETWEEN CONCRETE AND SIDE MEMBER.



5/16" (XL) TAPCON HEAD STYLES



1/4" DIAMETER
410 STAINLESS STEEL TAPCON ALLOWABLE LOADS (lbs.)

MIN. 3192 P.S.I. CONCRETE

EMBEDMENT	EDGE DISTANCE 1" TENSION	1" SHEAR	2-1/2" TENSION	2-1/2" SHEAR
1"	166	148	166	275
1-3/4"	466	189	547	472

HOLLOW BLOCK

EMBEDMENT	EDGE DISTANCE 1" TENSION	1" SHEAR	2-1/2" TENSION	2-1/2" SHEAR
1-1/4"	148	107	160	279

3/16" DIAMETER
CARBON STEEL TAPCON ALLOWABLE LOADS (lbs.)

MIN. 3192 P.S.I. CONCRETE

EMBEDMENT	EDGE DISTANCE 1-1/8" TENSION	1-1/8" SHEAR	2-5/8" TENSION	2-5/8" SHEAR
1"	128	147	128	157
1-3/4"	354	160	354	229

HOLLOW BLOCK

EMBEDMENT	EDGE DISTANCE 1-1/8" TENSION	1-1/8" SHEAR	2-5/8" TENSION	2-5/8" SHEAR
1-1/4"	94	112	99	197

5/16" DIAMETER (XL)
CARBON STEEL TAPCON ALLOWABLE LOADS (lbs.)

GROUT FILLED BLOCK

EMBEDMENT	EDGE DISTANCE 4" TENSION	4" SHEAR
1-3/4"	487	706
2-1/4"	942	785

HOLLOW BLOCK

EMBEDMENT	EDGE DISTANCE 4" TENSION	4" SHEAR
1-3/4"	261	570

SEE NOTE 4

1/4" DIAMETER
CARBON STEEL TAPCON ALLOWABLE LOADS (lbs.)

MIN. 3192 P.S.I. CONCRETE

EMBEDMENT	EDGE DISTANCE 1" TENSION	1" SHEAR	2-1/2" TENSION	2-1/2" SHEAR
1"	209	115	212	297
1-3/4"	510	115	575	384

HOLLOW BLOCK

EMBEDMENT	EDGE DISTANCE 1" TENSION	1" SHEAR	2-1/2" TENSION	2-1/2" SHEAR
1-1/4"	117	94	195	264

5/16" DIAMETER (XL)
CARBON STEEL TAPCON ALLOWABLE LOADS (lbs.)

MIN. 2899 P.S.I. CONCRETE

EMBEDMENT	EDGE DISTANCE 1-9/16" TENSION	1-9/16" SHEAR	2-3/16" TENSION	2-3/16" SHEAR	3-1/8" TENSION	3-1/8" SHEAR
1-1/4"	262	333	301	431	301	543
1-3/4"	505	382	563	626	583	627
2-1/4"	713	489	780	812	788	852

5/16" DIAMETER (XL)
CARBON STEEL TAPCON ALLOWABLE LOADS (lbs.)

2 x WOOD BUCK (G=0.36)

EMBEDMENT INTO 3000 P.S.I. CONCRETE	EDGE DISTANCE 1-3/4" SHEAR
1-3/4"	312

SEE NOTE 5

PRODUCT REVISED as complying with the Florida Building Code
Acceptance No 03-0722.05
Expiration Date 02/20/08
By
Miami Dade Product Control Division

KNEZEVICH & ASSOCIATES, INC
CONSULTING ENGINEERS • PRODUCT TESTING
1280 N. UNIVERSITY DRIVE, SUITE 100 • FORT LAUDERDALE, FL 33322
WEBSITE: WWW.KNEZEVICH.COM

TAPCON MASONRY FASTENERS

ITW Buildex
Buildex Division of Illinois Tool Works Inc.

V.J. KNEZEVICH
PROFESSIONAL ENGINEER

date 07/18/20
scale AS NOTED
design by DLG
drawing no. 03-308
sheet 1 of

Product Approval

USER: Public User

FL #	FL6582
Application Type	New
Code Version	2004
Application Status	Approved
Comments	
Archived	☐
Product Manufacturer	ITW Red Head
Address/Phone/Email	1300 N. Michael Drive Wood Dale, IL 60191 (800) 899-7890 ext 4728 christy.johnson@itw-redhead.com
Authorized Signature	CHRISTY JOHNSON christy.johnson@itw-redhead.com
Technical Representative Address/Phone/Email	Mark Timmerman 1300 N. Michael Dr Wood Dale, IL 60191 (800) 899-7890 ext 4720 mark.timmerman@itw-redhead.com
Quality Assurance Representative Address/Phone/Email	Ron Reindl 2402 Daniels Street Madison, WI 53718 (608) 221-3361 rreindl@pfscorporation.com
Category	Structural Components
Subcategory	Anchors
Compliance Method	Certification Mark or Listing
Certification Agency	Miami-Dade BCCO - CER

Referenced Standard and Year (of Standard)	**Standard**	**Year**
	ACI 301	1992
	ASTM C 881	1998
	TAS 114 E	1994

Equivalence of Product Standards Certified By	Approved Certification Agency FL6582_R0_Equiv_C881 Results (A7).pdf FL6582_R0_Equiv_C881 Results (New G5).pdf

Product Approval Method	Method 1 Option A
Date Submitted	04/04/2006
Date Validated	04/25/2006
Date Pending FBC Approval	04/27/2006
Date Approved	05/02/2006

Summary of Products

FL #	Model, Number or Name	Description
6582.1	A7	ACRYLIC 7 ADHESIVE ANCHORING SYSTEM
Limits of Use **Approved for use in HVHZ:** Yes **Approved for use outside HVHZ:** Yes **Impact Resistant:** No **Design Pressure:** N/A **Other:**		**Certification Agency Certificate** FL6582_R0_C_CAC_01050101 MIAMIDADE A7.pdf **Installation Instructions** FL6582_R0_II_01050101 MIAMIDADE A7.pdf Verified By: Miami-Dade BCCO - CER
6582.2	G5	G5 EPOXY ANCHORING SYSTEM
Limits of Use **Approved for use in HVHZ:** Yes **Approved for use outside HVHZ:** Yes **Impact Resistant:** No **Design Pressure:** N/A **Other:**		**Certification Agency Certificate** FL6582_R0_C_CAC_04040501 MIAMIDADE G5.pdf **Installation Instructions** FL6582_R0_II_04040501 MIAMIDADE G5.pdf Verified By: Miami-Dade BCCO - CER

Back Next

Tapper® *Concrete Screw Anchor*

PRODUCT DESCRIPTION

The Tapper fastening system is a complete family of screw anchors for light to medium duty applications in concrete, masonry block and brick base materials. The Tapper is fast and easy to install and provides a neat, finished appearance. The Tapper screw anchor is engineered with matched tolerance drill bits and installation tools designed to meet the needs of the user and also provide optimum performance.

For every project, it is important to consider several things before making a selection: The proper head style, the color or finish that is desired, and the required level of corrosion resistance. The Tapper screw anchor is available in carbon steel with a zinc plated finish, carbon steel with a Perma-Seal dimate coating in several colors, and also in 410 and 304 stainless steels. Head styles include a slotted hex washer head, Phillips flat head, trim head and flange head.

GENERAL APPLICATIONS AND USES

Zinc Plated Tappers
- Metal Door Frames
- Interior Electrical Applications
- Thresholds
- Joint Flashings

Perma-Seal Tappers
- Window Installations
- Interior Hand Rails
- Storm Shutters
- Interior Lighting Fixtures

410 Stainless Steel Tappers
- Screen Enclosures
- Exterior Metal Lighting or Fixtures
- Storm Shutters
- Light Duty Industrial Applications

304 Stainless Steel Tappers
- Exterior Applications
- Marine Applications
- Food and Beverage Facilities
- Waste and Water Treatment Plants

FEATURES AND BENEFITS

- Tested in accordance with ASTM E488 and AC106 criteria
- Available in several head styles
- Several colors and finishes to match application
- Removable and reusable
- High-low threaded design for greater stability and grip
- Does not exert expansion forces
- No hole spotting required
- Good corrosion protection with Perma-Seal coating
- Available in 410 and 304 stainless steel

APPROVALS AND LISTINGS

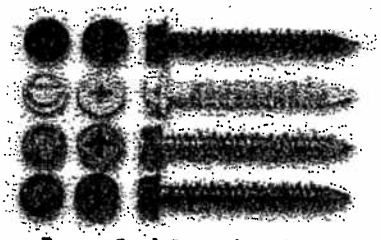
International Code Council, Evaluation Service (ICC-ES) ER-5878
Southern Building Code Conference International (SBCCI) #9944A
City of Los Angeles (COLA) Research Report LARR – 25548
Florida Building Code Approval – FL2209.9
Miami-Dade County Notice of Acceptance (NOA) 03-0303.14
Various North American Departments of Transportation (DOT) – See www.powers.com

GUIDE SPECIFICATIONS

CSI Divisions: ***03151-Concrete Anchoring, 04081-Masonry Anchorage*** **and** ***05090-Metal Fastenings.*** Concrete Screw Anchors shall be Tapper anchors as supplied by Powers Fasteners, Inc., New Rochelle, NY.

SECTION CONTENTS

Zinc Plated Carbon Steel Tapper



Perma-Seal Coated Carbon Steel Tapper

410 Stainless Steel Tapper

304 Stainless Steel Tapper

ANCHOR MATERIALS

Zinc Plated Carbon Steel
Perma-Seal Carbon Steel
Type 410 Stainless Steel
Type 304 Stainless Steel

ANCHOR SIZE RANGE (TYP.)

3/16" diameter x 1 1/4" length to
3/8" diameter x 6" length

SUITABLE BASE MATERIALS

Normal-weight Concrete
Structural Lightweight Concrete
Grouted Concrete Masonry
Hollow Concrete Masonry
Solid Brick Masonry

INSTALLATION SPECIFICATIONS

Perma-Seal Carbon Steel Hex Head Tapper

Dimension	Anchor Diameter, d	
	3/16"	1/4"
Tapper Drill Bit Size, d_{bit} (in.)	5/32	3/16
Fixture Clearance Hole, d_h (in.)	1/4	5/16
Thread Size (UNC)	11-16	1/4-15
Head Height (in.)	7/64	9/64
Head Width (in.)	1/4	5/16
Washer O.D., d_w (in.)	11/32	13/32
Washer Thickness, (in.)	1/32	1/32
Hex Driver (in.)	1/4	5/16

Perma-Seal Carbon Steel Flat Head Tapper

Dimension	Anchor Diameter, d	
	3/16"	1/4"
Tapper Drill Bit Size, d_{bit} (in.)	5/32	3/16
Fixture Clearance Hole, d_h (in.)	1/4	5/16
Thread Size (UNC)	11-16	1/4-15
Phillips Head O.D., (in.)	3/8	1/2
Phillips Head Height, (in.)	9/64	3/16
Phillips Bit Size	2	3
Phillips Driver	#2	#3

1/4" Zinc Plated Carbon Steel Tapper

Dimension	Anchor Diameter, d	
	1/4" HEX	1/4" PFH
Tapper Drill Bit Size, d_{bit} (in.)	3/16	3/16
Fixture Clearance Hole, d_h (in.)	5/16	5/16
Thread Size (UNC)	5/16-18	1/4-15
Head Height (in.)	1/4	9/64
Head Width (in.)	3/8	5/16
Washer O.D., d_w (in.)	39/64	13/32
Hex Driver (in.) / Phillips Driver	3/8	#3

3/8" Zinc Plated Carbon Steel Tapper

Dimension	Anchor Diameter, d	
	3/8" HEX	3/8" PFH
Tapper Drill Bit Size, d_{bit} (in.)	1/4	1/4
Fixture Clearance Hole, d_h (in.)	5/16	5/16
Thread Size (UNC)	5/16-18	5/16-18
Head Height (in.)	1/4	19/64
Head Width (in.)	3/8	3/4 O.D.
Washer O.D., d_h (in.)	39/64	N/A
Hex Driver (in.) / Phillips Driver	3/8	#3

304 Stainless Steel Tapper

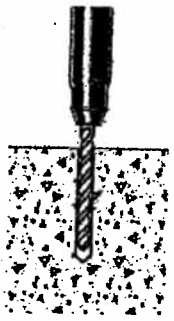
Dimension	Anchor Diameter, d	
	1/4" HEX	1/4" PFH
Tapper Drill Bit Size, d_{bit} (in.)	3/16	3/16
Fixture Clearance Hole, d_h (in.)	5/16	5/16
Thread Size (UNC)	1/4-14	1/4-14
Head Height (in.)	9/64	3/16
Head Width (in.)	5/16	1/2 O.D.
Washer O.D., d_w (in.)	13/32	N/A
Washer Thickness, (in.)	1/32	N/A
Hex Driver (in.) / Phillips Driver	3/8	#3

410 Stainless Steel Tapper

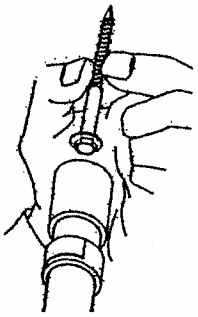
Dimension	Anchor Diameter, d	
	1/4" HEX	1/4" PFH
Tapper Drill Bit Size, d_{bit} (in.)	3/16	3/16
Fixture Clearance Hole, d_h (in.)	5/16	5/16
Thread Size (UNC)	1/4-14	1/4-14
Head Height (in.)	9/64	3/16
Head Width (in.)	5/16	1/2 O.D.
Washer O.D., d_w (in.)	13/32	N/A
Washer Thickness, (in.)	1/32	N/A
Hex Driver (in.) / Phillips Driver	3/8	#3

Installation Procedure

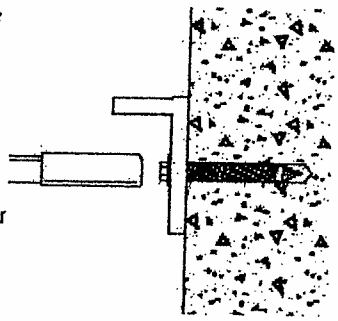
Using the proper diameter bit, drill a hole into the base material to a depth of at least 1/4" deeper than the embedment required. A Tapper drill bit must be used. Blow the hole clean of dust and other material.



Select the Tapper installation tool and drive socket to be used. Insert the head of the Tapper into the hex head socket or Phillips head driver. For softer concrete or masonry, set the drill motor to the "rotation only" mode.



Place the point of the Tapper through the fixture into the pre-drilled hole and drive the anchor in one steady continuous motion until it is fully seated at the proper embedment. The driver will automatically disengage from the head of the Tapper.



MATERIAL SPECIFICATIONS

Anchor Component	Perma-Seal Tapper	Zinc Plated*	410 Stainless Steel	304 Stainless Steel
Anchor Body	Case Hardened AISI 1022	Case Hardened AISI 1022	Type 410 Stainless Steel	Type 304 Stainless Steel
Coating/Plating/Finish	Perma-Seal Fluoropolymer	ASTM B 633, SC1, Type III (Fe/Zn5)	Class 4 Sealcoat	Passivated

*These hardened carbon steel fasteners meet or exceed industry standards. They are not recommended for use in direct contact with aluminum when moisture may be present. Efforts to prevent corrosion due to dissimilar metal contact should be made.

PERFORMANCE DATA

Ultimate Load Capacities for Carbon Steel Tapper Screw Anchors in Normal-weight Concrete[1,2]

Anchor Diameter *d* in. (mm)	Anchor Material and Plating/ Coating	Min. Embed. Depth h_v in. (mm)	Minimum Concrete Compressive Strength (f'_c)							
			2,000 psi (13.8 MPa)		3,000 psi (20.7 MPa)		4,000 psi (27.6 MPa)		6,000 psi (41.4 MPa)	
			Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
3/16 (4.8)	Carbon Steel, Perma-Seal	1 (25.4)	360 (1.6)	700 (3.2)	360 (1.6)	700 (3.2)	360 (1.6)	700 (3.2)	710 (3.2)	980 (4.4)
		1 1/4 (31.8)	520 (2.3)	840 (3.8)	610 (2.7)	880 (4.0)	695 (3.1)	920 (4.1)	840 (3.8)	1,090 (4.9)
		1 3/8 (34.9)	700 (3.2)	910 (4.1)	780 (3.5)	900 (4.1)	855 (3.8)	920 (4.1)	1,060 (4.8)	1,135 (5.1)
		1 1/2 (38.1)	720 (3.2)	920 (4.1)	860 (3.9)	920 (4.1)	1,020 (4.6)	920 (4.1)	1,275 (5.7)	1,180 (5.3)
		1 3/4 (31.8)	1,180 (2.3)	940 (4.2)	1,340 (6.0)	940 (4.2)	1,500 (6.8)	940 (4.2)	1,570 (7.1)	1,290 (5.8)
1/4 (6.4)	Carbon Steel, Perma-Seal and Zinc Plated	1 (25.4)	620 (2.8)	820 (3.7)	840 (3.8)	820 (3.7)	1,060 (4.8)	820 (3.7)	1,140 (7.1)	1,320 (5.9)
		1 1/4 (31.8)	810 (3.6)	1,130 (5.1)	1,080 (4.9)	1,275 (5.7)	1,345 (6.1)	1,420 (6.4)	1,445 (6.5)	1,630 (7.3)
		1 3/8 (34.9)	905 (4.1)	1,280 (5.8)	1,195 (5.4)	1,350 (6.1)	1,485 (6.7)	1,420 (6.4)	1,615 (7.3)	1,805 (8.1)
		1 1/2 (38.1)	1,000 (4.5)	1,420 (6.4)	1,300 (5.9)	1,420 (6.4)	1,620 (7.3)	1,420 (6.4)	1,770 (8.0)	1,980 (8.9)
		1 3/4 (44.5)	1,620 (7.3)	1,480 (6.7)	1,680 (7.6)	1,480 (6.7)	1,740 (7.8)	1,480 (6.7)	2,195 (9.9)	2,260 (10.2)
	Carbon Steel, Zinc Plated	1 1/2 (38.1)	–	–	2,080 (9.4)	1,940 (8.7)	2,080 (9.4)	1,940 (8.7)	2,080 (9.4)	1,940 (8.7)
3/8 (9.5)	Carbon Steel, Zinc Plated	1 (25.4)	700 (3.2)	960 (4.3)	720 (3.2)	960 (4.3)	760 (3.4)	960 (4.3)	1,055 (4.7)	1,200 (5.4)
		1 1/4 (31.8)	905 (4.1)	1,475 (6.6)	1030 (4.6)	1,715 (7.7)	1,150 (5.2)	1,950 (8.8)	1,570 (7.1)	2,000 (9.0)
		1 1/2 (38.1)	1,110 (5.0)	1,980 (8.9)	1,320 (5.9)	1,980 (8.9)	1,540 (6.9)	1,980 (8.9)	2,120 (9.5)	2,700 (12.2)
		1 3/4 (44.5)	1,360 (6.1)	2,320 (10.4)	1,660 (7.5)	2,320 (10.4)	1,960 (8.8)	2,320 (10.4)	2,590 (11.7)	2,950 (13.3)

1. The values listed above are ultimate load capacities which should be reduced by a minimum safety factor of 4 or greater to determine the allowable working load.
2. Linear interpolation may be used to determine allowable loads for intermediate embedments and compressive strengths.

safety factors

PERFORMANCE DATA

Allowable Load Capacities for Carbon Steel Tapper Screw Anchors in Normal-weight Concrete[1,2,3]

Anchor Diameter d in. (mm)	Anchor Material and Plating/ Coating	Min. Embed. Depth h_v in. (mm)	Minimum Concrete Compressive Strength (f'_c)							
			2,000 psi (13.8 MPa)		3,000 psi (20.7 MPa)		4,000 psi (27.6 MPa)		6,000 psi (41.4 MPa)	
			Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
3/16 (4.8)	Carbon Steel, Perma-Seal	1 (25.4)	90 (0.4)	175 (0.8)	90 (0.4)	175 (0.8)	90 (0.4)	175 (0.8)	180 (0.8)	245 (1.1)
		1 1/4 (31.8)	130 (0.6)	210 (0.9)	155 (0.7)	220 (1.0)	175 (0.8)	230 (1.0)	210 (0.9)	275 (1.2)
		1 3/8 (34.9)	175 (0.8)	230 (1.0)	195 (0.9)	225 (1.0)	215 (1.0)	230 (1.0)	265 (1.2)	285 (1.3)
		1 1/2 (38.1)	180 (0.8)	230 (1.0)	215 (1.0)	230 (1.0)	255 (1.1)	230 (1.0)	320 (1.4)	295 (1.3)
		1 3/4 (31.8)	295 (1.3)	235 (1.1)	335 (1.5)	235 (1.1)	375 (1.7)	235 (1.1)	395 (1.8)	325 (1.5)
1/4 (6.4)	Carbon Steel, Perma-Seal and Zinc Plated	1 (25.4)	155 (0.7)	205 (0.9)	210 (0.9)	205 (0.9)	265 (1.2)	205 (0.9)	285 (1.3)	330 (1.5)
		1 1/4 (31.8)	205 (0.9)	285 (1.3)	270 (1.2)	320 (1.4)	335 (1.5)	355 (1.6)	360 (1.6)	410 (1.8)
		1 3/8 (34.9)	225 (1.0)	320 (1.4)	300 (1.4)	340 (1.5)	370 (1.7)	355 (1.6)	405 (1.8)	450 (2.0)
		1 1/2 (38.1)	250 (1.1)	355 (1.6)	325 (1.5)	355 (1.6)	405 (1.8)	355 (1.6)	445 (2.0)	495 (2.2)
		1 3/4 (44.5)	405 (1.8)	370 (1.7)	420 (1.9)	370 (1.7)	435 (2.0)	370 (1.7)	550 (2.5)	565 (2.5)
	Carbon Steel, Zinc Plated	1 1/2 (38.1)	–	–	520 (2.3)	485 (2.2)	520 (2.3)	485 (2.2)	520 (2.3)	485 (2.2)
3/8 (9.5)	Carbon Steel, Zinc Plated	1 (25.4)	175 (0.8)	240 (1.1)	180 (0.8)	240 (1.1)	190 (0.9)	240 (1.1)	265 (1.2)	300 (1.4)
		1 1/4 (31.8)	225 (1.0)	370 (1.7)	260 (1.2)	430 (1.9)	290 (1.3)	490 (2.2)	395 (1.8)	500 (2.3)
		1 1/2 (38.1)	275 (1.2)	495 (2.2)	330 (1.5)	495 (2.2)	385 (1.7)	495 (2.2)	530 (2.4)	675 (3.0)
		1 3/4 (44.5)	340 (1.5)	580 (2.6)	415 (1.9)	580 (2.6)	490 (2.2)	580 (2.6)	650 (2.9)	740 (3.3)

1. Allowable load capacities listed are calculated using an applied safety factor of 4.0.
2. Linear interpolation may be used to determine allowable loads for intermediate embedments and compressive strengths.
3. Critical and minimum spacing and edge distances as well as reduction factors for intermediate spacing and edge distances are listed in the Design Criteria section.

SAFETY FACTORS

Listings/Approvals

ICC-ES (International Code Council)
Evaluation Report No. 5259
Metro-Dade County
Approval 01-0727.01

4.3.10.1 Product Description

The Hilti KWIK-CON II+ Fastening System for concrete and masonry consists of the KWIK-CON II+ fastener, the KWIK-CON II+ drive tool, and a Hilti matched tolerance carbide-tipped drill bit.

Product Features

- Choice of head styles—Torx Hex Washer Head for fast, secure driving; Torx or Phillips Flat Head for countersinking applications
- Matched tolerance carbide-tipped drill bit supplied with each box of 100 KWIK-CON II+ fasteners
- Exclusive internal TORX drive
- Choice of 1/4" or 3/16" diameter fasteners
- Fasteners protected by corrosive resistant coating; stainless steel fasteners available in select sizes
- High quality Hilti SDS and straight shank drill bits (Refer to section 4.3.10.5)

Guide Specifications

Concrete Screw Anchors Concrete or masonry screw anchors shall be manufactured from AISI 1021 cold rolled steel case hardened to a minimum Rockwell Hardness C 45 or stainless steel conforming to AISI 410. The concrete or masonry screw anchors shall have a trilobular, cold formed thread design and 8 threads per inch. Screw anchors shall have one of the following head design: Tapered flat head with T-25 TORX recess, Tapered flat head with T-27 TORX recess or 5/16" hex washer with internal T-25 TORX recess. Anchor plating shall be in accordance with ASTM B 633 SC 2 Type II to a minimum thickness of 8 mm. Anchors shall be Hilti KWIK-CON II anchors as supplied by Hilti.

Installation Concrete or masonry screw anchors shall be installed in holes drilled with matched tolerance Hilti carbide-tipped drill bits supplied with each box of KWIK-CON II anchors. Installations shall be in accordance with manufacturer's installation instructions.

4.3.10.2 Material Specifications

		Mechanical Properties[1] f_y ksi (MPa)	min. f_u ksi (MPa)
Material Composition			
1018 to 1022 cold rolled steel (case hardened to HRC 45 minimum)	3/16"	137	138
	1/4"	157	163
or 410 Stainless Steel	3/16"	157	184
	1/4"	170	194

Head Styles
Tapered flat head with #3 Phillips recess (3/16" and 1/4" diameter anchors)
Tapered flat head with T-25 TORX recess (3/16" diameter anchor)
Tapered flat head with T-27 TORX recess (1/4" diameter anchor)
5/16" hex washer with internal T-25 TORX recess (3/16" and 1/4" diameter anchors)

Head Diameters
0.507" maximum (3/16" and 1/4" tapered Phillips flat head and 1/4" tapered T-27 TORX flat head anchors
0.385" maximum (3/16" tapered T-25 TORX flat head anchor)
0.432" maximum (3/16" and 1/4" T-25 TORX hex washer head anchors

Thread Diameter
Nominal 3/16"; Major: 0.217"; Minor[2]: 0.145"
Nominal 1/4"; Major: 0.283"; Minor[2]: 0.190"

Shank Diameter
3/16" – 0.170"
1/4" – 0.224"

Lengths
1-1/4", 1-3/4", 2-1/4", 2-3/4", 3-1/4", 3-3/4", 4" (See Ordering Information Section 4.3.10.5)

Thread Design
Trilobular, cold formed

Threads per inch
3/16" anchor = 8 T.P.I.
1/4" anchor = 8 T.P.I.

Inches of Thread per fastener
1.875" maximum

Plating
8 µm zinc/chromate plating in accordance with ASTM B 633, Sc 2, Type II, on carbon steel anchors

Bending Capacity
Ductility at 10° minimum

1 *Mechanical properties based on limited (30 samples) testing of actual KWIK-CON II samples (i.e. not based on minimum steel properties).*

2 Minor diameter based on average root diamter of 30 KWIK-CON II samples (i.e. not a controlled dimension).

Visit Hilti Online
www.us.hilti.com US
www.ca.hilti.com Canada

4.3.10.3 Technical Data

Tension and Shear Ultimate Loads in Concrete[1]

Anchor Dia. in.	Embedment Depth in. (mm)	2000 psi (13.8 MPa)		4000 psi (27.6 MPa)		6000 psi (41.4 MPa)	
		Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
3/16	1 (25)	400 (1.78)	1050 (4.67)	500 (2.22)	1050 (4.67)	750 (3.34)	1150 (5.12)
3/16	1-3/4 (44)	1100 (4.89)	1050 (4.67)	1180 (5.25)	1070 (4.76)	1300 (5.78)	1200 (5.34)
1/4	1 (25)	760 (3.38)	1300 (5.78)	970 (4.31)	1575 (7.01)	1100 (4.89)	2175 (9.68)
1/4	1-3/4 (44)	1700 (7.56)	2250 (10.0)	2500 (11.1)	2550 (11.3)	2600 (11.6)	2400 (10.7)

Tension and Shear Allowable Loads in Concrete [1, 2]

Anchor Dia. in.	Embedment Depth in. (mm)	2000 psi (13.8 MPa)		4000 psi (27.6 MPa)		6000 psi (41.4 MPa)	
		Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
3/16	1 (25)	100 (0.44)	260 (1.16)	125 (0.56)	260 (1.16)	185 (0.82)	280 (1.25)
3/16	13/4 (44)	275 (1.22)	260 (1.16)	295 (1.31)	265 (1.18)	325 (1.45)	300 (1.33)
1/4	1 (25)	190 (0.85)	325 (1.45)	240 (1.07)	390 (1.73)	275 (1.22)	540 (2.40)
1/4	13/4 (44)	425 (1.89)	560 (2.49)	625 (2.78)	635 (2.82)	650 (2.89)	600 (2.67)

1 Published load values represent the average test results of testing conducted in local base materials using Hilti matched-tolerance drill bits. Because of variations in materials, on-site testing is necessary to determine actual performance at any specific site.

2 Allowable working loads are based on a safety factor of 4.0.

Tension and Shear Allowable Loads in Hollow Block[1,2]

Anchor Dia. in.	Embed. Depth in. (mm)	Tension lb (kN)	Shear lb (kN)
3/16	1 (25)	150 (0.67)	225 (1.00)
3/16	1-3/4 (44)	290 (1.29)	300 (1.33)
1/4	1 (25)	165 (0.73)	275 (1.22)
1/4	1-3/4 (44)	310 (1.38)	400 (1.78)

1 ASTM Specification C90 Grade N, Type II pilot holes drilled with TKB matched tolerance bits for concrete blocks.

2 Allowable working loads are based on a safety factor of 4.0.

Tension and Shear Allowable Loads in Red Brick[1,2]

Anchor Dia. in.	Embed. Depth in. (mm)	Tension lb (kN)	Shear lb (kN)
3/16	1 (25)	125 (0.56)	235 (1.05)
3/16	1-3/4 (44)	350 (1.56)	300 (1.33)
1/4	1 (25)	205 (0.91)	415 (1.85)
1/4	1-3/4 (44)	350 (1.56)	500 (2.22)

1 This test was performed on individual specimens of ASTM C 62 common red brick. Due to the wide variations encountered in the compressive strength of brick, these values should be considered Guide Values.

2 Allowable working loads are based on a safety factor of 4.0.

Combined Shear and Tension Loading

$$\left(\frac{N_d}{N_{rec}}\right) + \left(\frac{V_d}{V_{rec}}\right) \leq 1.0 \quad \textit{(Ref. Section 4.1.2.7)}$$

METRO-DADE

METROPOLITAN DADE COUNTY, FLORIDA
METRO-DADE FLAGLER BUILDING

BUILDING CODE COMPLIANCE DEPARTMENT
SUITE 1603
METRO-DADE FLAGLER BUILDING
140 WEST FLAGLER STREET
MIAMI, FLORIDA 33130-1563
(305) 375-2901
FAX (305) 375-2908

September 19, 1994

To Engineers

Please be advised that you will be contacted by the shutter manufacturers to provide the necessary anchor analyses and calculations resulting in the revision of those drawings submitted accordingly.

Gil Diamond

Gil Diamond, P.E.
Product Control Supervisor

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METRO-DADE

METROPOLITAN DADE COUNTY, FLORIDA
METRO-DADE FLAGLER BUILDING

BUILDING CODE COMPLIANCE DEPARTMENT
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140 WEST FLAGLER STREET
MIAMI, FLORIDA 33130-1563
(305) 375-2901
FAX (305) 375-2908

September 19, 1994

To All Shutter Manufacturers

In order to be in line with good engineering principles, you are requested to provide us with anchor calculations based on rational analysis to justify the minimum embedment, anchor spacing and minimum edge distance using a safety factor of 4 for all anchors tested and shown on drawings.

Please contact your consulting engineers to provide us with anchor analysis, calculations and revised drawings.

This requirement is for products that have current approval or are in the process of being reviewed.

We are allowing ninety (90) days grace period to comply with this request so that your current Product Control Notice of Acceptance continues to be valid. There is no need to re-test and there will be no charge for re-submittal.

Gil Diamond

Gil Diamond, P.E.
Product Control Supervisor

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CHECKLIST #0270 FOR THE APPROVAL OF: SHUTTERS

- ☐ Basic Requirements Checklist.

- ☐ One set of the manufacturer's 'approval document' including:
  - a) All components indicating: dimensions, material grade, thickness, etc.,
  - b) Installation details indicating: panel layouts and all mounting arrangements,
  - c) Anchors and fasteners used to secure the unit to each substrate indicating: type, size, spacing and minimum embedment, and
  - d) Maximum shutter span, minimum distance from glass and location of marking.

- ☐ Calculations for anchoring method of shutter assembly to the structure.

- ☐ Certified inspection report from mill supplying the shutter material indicating:
  - a) Chemical composition, and
  - b) Structural properties. (I.e. Fu, Fy, E & Elongation.)

- ☐ One set of manufacturer's design drawings marked and verified by the testing laboratory.

The following current laboratory tests and test reports in compliance with protocol TAS 301.

- ☐ Uniform Static Air test per TAS202. Report deflection & recovery.

- ☐ Impact test per TAS201. Report deflection, penetration & rupture.

- ☐ Cyclic test per TAS203. Report deflection & recovery.

- ☐ Test verifying structural properties of materials used.

CHECKLIST #0210 FOR THE APPROVAL OF: ENTRY DOORS

- ❑ Basic Requirements Checklist.
- ❑ One set of the manufacturer's 'approval document' including:

  a. Extrusion or cross section with details, properties and all dimensions,
  b. Assembly details including reinforcements,
  c. Details of all connections including size and location, corresponding with tests, and
  d. Hardware descriptions with manufacturer's brand name, grade and their corresponding strike plate.

- ❑ Calculations verifying anchoring method used in the test.
- ❑ One set of manufacturer's design drawings marked and verified by the testing laboratory.

The following current laboratory tests and test reports in compliance with protocol TAS 301.

- ❑ Impact & cyclic test per TAS 201 & 203. (If impact resistant)
- ❑ Air infiltration test per TAS 202.
- ❑ Uniform static air test per TAS 202.
- ❑ Water resistance test per TAS 202. (Optional if used in non-habitable areas designed to allow for water intrusion.)
- ❑ Force entry resistance test for sliding glass doors per ASTM F 842-83 (Grade 10) or AAMA 1303.5; for other doors in accordance with chapter 17 of the FBC.
- ❑ Tensile test per ASTM E 8-93. (For metal doors.) (See note #1)

Notes:
1. Tensile test – 3 specimens taken from tested door panel samples.
2. If door has plastic as a component, add plastic checklist to these requirements.
3. The following equation may be used to calculate the allowable cycle time for specimens larger than 75 ft^2 and with a width of more than 20 ft. and/or height of more than 8 ft.
   Maximum allowable cycle time for
   specimens over 75 ft^2 = (area of specimen – 75) x (0.06) +3 seconds
   Maximum allowable cycle time for this equation is not to exceed 10 seconds.

CHECKLIST #0295 FOR THE APPROVAL OF: WINDOWS AND PASS-THROUGH DEVICES

- ❑ Basic Requirements Checklist.

- ❑ One set of the manufacturer's 'approval document' including:
  a. Typical cross-section of mullions, extrusions, etc. including dimensions,
  b. Assembly drawing indicating reinforcements,
  c. Fastener diagram indicating type, size, embedment & location corresponding with type used during testing,
  d. Hardware description, manufacturer brand name, grade and their corresponding strike plate,
  e. Installation details,
  f. Elevation details, and
  g. Listing from approved agency. (Required for electrical components if used.)

- ❑ Calculations verifying the anchoring method used in the test.

- ❑ One set of manufacturer's design drawings marked and verified by the testing laboratory.

The following current laboratory tests and test reports in compliance with protocol TAS 301.

- ❑ Impact & Cyclic tests per TAS201 & TAS203. (if impact resistant)

- ❑ Air infiltration test per TAS202.

- ❑ Uniform static air test per TAS202.

- ❑ Water resistance test per TAS202.

- ❑ Force entry resistance test, required on operable windows per AAMA 1302.05 and chapter 17 of FBC.

Notes:
1. If window has plastic as a component, add plastic checklist to this requirement.
2. The following equation may be used to calculate the allowable cycle time for specimens larger than 75 ft^2 and with a width of more than 20 ft. and/or height of more than 8 ft.
   Maximum allowable cycle time for
   specimens over 75 ft^2 = (area of specimen – 75) x (0.06) +3 seconds
   Maximum allowable cycle time for this equation is not to exceed 10 seconds.

CHECKLIST #0220 FOR THE APPROVAL OF: GARAGE DOORS

- ❑ Basic Requirements Checklist.
- ❑ One set of the manufacturer's 'approval document' including:
  - a. Door details with all dimensions including width and height,
  - b. Section of all structural components with dimensions, ASTM A446 grade and yield strength of panel or slats,
  - c. Details of installation, corresponding with test specimen and calculations,
  - d. Forces acting on supporting frame, and
  - e. Required slip and wind-lock frequency for roll-up doors.
- ❑ Calculations verifying the tested anchoring method of door assembly to the structure.
- ❑ One set of manufacturer's design drawings marked and verified by the testing laboratory.

The following current laboratory tests and test reports in compliance with protocol TAS 301.

- ❑ Impact test per TAS 201. (Report penetration and rupture).
- ❑ Cyclic test per TAS 203 (Report status of anchorage & operability of door).
- ❑ Uniform static air test per TAS 202. (Report recovery after half test load (100% required), full test load (80% minimum required), and operability of door before and after testing).
- ❑ Tensile test of Door panel or slat per ASTM E-8.
- ❑ If metal is not galvanized with a coating of minimum G-90 per ASTM A-525, then test for evaluation of painted panels on a minimum of 3 samples per ASTM D1654 (ASTM B117) for 1000 hrs. A control set of galvanized specimens shall also be simultaneously tested under the exact conditions for comparison purposes.

Notes:
1. If product has a plastic component, add the requirements of the plastic checklist.
2. Maximum allowable cycle time for doors over 75 ft^2 = (Area of Specimen - 75) x (F) + 3. For sectional doors F = .06, for rolling door F = .35.

CHECKLIST #0205 FOR THE APPROVAL OF: CURTAIN WALLS & STOREFRONTS

- ❑ Basic Requirements Checklist.
- ❑ One set of the manufacturer's 'approval document'.
- ❑ Calculations verifying structural results of the tested structure including:
  - a. Aluminum stresses according to the Aluminum Association Specification,
  - b. Steel stresses according to the AISC Manual,
  - c. Deflection for load carrying members not to exceed L/180, and
  - d. Fasteners and connectors.
- ❑ One set of manufacturer's design drawings marked and verified by the testing laboratory.
- ❑ Letter from adhesive manufacturer certifying the compatibility of glazing components. (See note 2.)

The following current laboratory tests and test reports in compliance with protocol TAS 301.

- ❑ Impact test per TAS 201 & 203. (Applicable if product is impact resistant.)
- ❑ Air infiltration test, per TAS 202.
- ❑ Uniform static air test, per TAS 202.
- ❑ Water resistance test per TAS 202.
- ❑ Minimum sample of 1% of the glazed system tested. (See note 2.)

Notes:
1. If curtain wall and/or storefront have plastic as a component, add the plastic checklist to these requirements.
2. This applies to structural glazed curtain walls and storefronts only. Installation of these structural glazed systems requires a special inspector, per FBC.
3. The following equation may be used to calculate the allowable cycle time for specimens larger than 75 ft^2 and with a width of more than 20 ft. and/or height of more than 8 ft.
   Maximum allowable cycle time for
   specimens over 75 ft^2 = (area of specimen – 75) x (0.06) +3 seconds
   Maximum allowable cycle time for this equation is not to exceed 10 seconds.

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ITW Buildex
BUILDING IDEAS THAT WORK™

March 15, 2007

Mr. Walter Tillit
Fax 305 871 1531
Ph. 305 871 1533

Subject: Tapcon Fastener Safety Factors

Dear Walter,

As we discussed yesterday, a proper selection of the value of the safety factor for a connection that includes concrete fasteners depends on several factors related to the configuration of the whole system, loads that will be resisted by the system and other specific features.

However, our experience shows that a safety factor of 4:1 (per UBC, and ICC acceptance criteria) or greater is most frequently used in such applications that involve concrete fasteners. Lower values of the safety factor may be risky in this kind of connections.

The safety factor determination is the sole responsibility of the Engineer of Record or other professional responsible for design of the connection. ITW Buildex only provides certain average ultimate mechanical performance values.

Should you have any questions, please feel free to call me at 800 323 0720.

Sincerely,

Horea Ilea
Technical Services Manager