Hazelwood School District

West High School Conduit Rack Repair 2019

Date:

October 16, 2019

Due:

November 7, 2019

Time:

3:30 p.m.

October 16, 2019

The Hazelwood School District is seeking bids for the repair of a conduit rack at West High School per the specifications below and as indicated in the diagrams and documentation.

Specifications – West High School – Conduit Rack Repair

BASE BID WORK:

- Lifting the existing conduit rack (conduit and wire to be re-used).
- Temporally supporting the rack (conduit and wire) while work is being done.
- Raise existing conduit rack and return to original location.
- Re-support conduit rack using galvanized plate washers (see diagram).
- Add horizontal legs across the ceiling attached to every 3rd leg of support.
- New Titen HD heavy duty screw anchors shall be used to fasten rack to ceiling and wall (see documentation).
- Price should include any temporary supports or other items needed to safely complete the work as indicated.
- Price should include all supplies, materials, and labor necessary to raise existing conduit rack and return to original location as indicated.
- Price should include all supplies, materials, and labor necessary to re-support conduit rack and add new vertical legs to front and rear of existing horizontal supports to evenly distribute weight on floor as indicated.
- Price should include all supplies, materials, and labor necessary to install new anchors to be used in existing concrete wall as indicated.
- Work to be completed during the Hazelwood School District winter break between 12/21/19-1/5/20

BIDS are due no later than 3:30pm on November 7, 2019 to:

Christopher Norman, CFO/Assistant Superintendent
Hazelwood School District
15955 New Halls Ferry Road
Florissant, MO 63031

Anticipated bid award – November 19, 2019

The Hazelwood School District reserves the right to reject any or all bids submitted based upon the cost factor and availability.

If your organization is interested in submitting a bid, return the bid in a sealed envelope marked **"West High School Conduit Rack Repair Bid 2019"** to reach the Hazelwood School District at the following address by November 7, 2019 at 3:30pm:

Hazelwood School District Business Office
"West High School Conduit Rack Repair Bid"
Attn: Christopher Norman
15955 New Halls Ferry Road
Florissant, MO 63031

All bids must comply with the policies of the Hazelwood School District Board of Education. The district has tax exempt status.

The Company must complete the following attachments:

A. HSD Form A and HSD Form B, Supplier Diversity Program
B. HSD Labor Affiliation - Bid Form
C. E-Verify Form

Bidders should consult with Mr. David Dudley, Director of Maintenance, 15975 New Halls Ferry Road, Florissant, MO 63031, (314) 953-5900, for any additional information or to view the site. Any deviation from the above specification must be noted on bid. A copy of this request must accompany the bid proposal form and then becomes a part of the bid proposal. All informalities are reserved by the Board of Education.

The Hazelwood School District is not responsible for late or incorrect deliveries from US Postal Service (USPS) or any other mail delivery service. All bids responses must be submitted to the address described herein. The Hazelwood School District reserves the right to accept or reject any and all bids.

Hazelwood School District
High Expectations For All!

BID RESPONSE SHEET

BASE BID $_____

_____
Company Name

_____
Address

_____
City/Zip

_____
Phone

_____
Fax

_____
Federal Tax ID

X_____ Date: _____
Signature: Authorized Company Official

_____
Print Name: Authorized Company Official

_____
E-mail Address

Hazelwood School District
High Expectations For All!

Mandatory Walk-through

There will be a mandatory walk-through of any potential bidders wishing to view the project needs on Friday, November 1, 2019 at 9:00am at Hazelwood West High School - 1 Wildcat Lane - Hazelwood, MO 63042. Potential bidders will need to sign in. Any bidders who do not participate in the walk-through will be disqualified from bidding on the project.

Please arrive at the lobby of Hazelwood West High School no later than 9:00am to check in. Hazelwood School District maintenance staff will conduct the walk-through.

I. Proposals

A. Each proposal shall be enclosed in a sealed envelope and addressed to the owner.
B. The proposal shall be complete and free from ambiguity as to its meaning and signed by the bidder.
C. Bids must be delivered to the Office of Christopher Norman, CFO, Hazelwood School District, 15955 New Halls Ferry Road, Florissant, MO 63031, no later than **November 7, 2019** at 3:30pm at which time bids will be opened. It is expected that the contract will be issued as soon as possible after the opening.
D. In awarding contract, Owner may take into consideration skill, facilities capacity, experience, ability, responsibility, previous work, financial standing of bidder, amount of other work being carried on by bidder; quality, efficiency, and construction of systems and equipment proposed to be furnished and delivered; and the necessity of prompt and efficient completion of all work herein described. Inability of any bidder to meet requirements mentioned above may be cause of rejection of bid.

II. Permits and Fees

A. The contractor shall secure and pay for all permits and governmental fees necessary for the proper execution and completion of the work.
B. The contractor shall comply fully with all laws, ordinances, rules, regulations, and orders of any public authority bearing on the performance of the work.

III. Sales Tax

A. The contractor is expected to pay all sales tax, which may be lawfully assessed against him in conjunction with his purchase of materials to be incorporated in the work under this proposal. The Hazelwood School District has tax exempt status.

IV. Liens

A. Upon request of the owner, the contractor will at his own expense, by bonding or otherwise, secure the prompt discharge of any lien or liens which may be filed against the property arising out of this contract.

V. Insurance

A. The contractor shall provide liability insurance and workers compensation in full until completion of the work. Fire, theft, and windstorm insurance during the work. Fire, theft, and windstorm insurance during the work period shall be provided by the contractor. All vandalism during construction is the responsibility of the contractor.

VI. Special Notice

A. Bidder shall inform themselves of the conditions under which the work is to be performed, concerning the site of the work, the structure of the ground, the obstacles which may be encountered, and all other relevant matters concerning the work to be performed, and no contractor shall be allowed any extra compensation for items on which he has failed to so inform himself prior to bidding.

B. The bidder is responsible for verification of all measurements.

C. The submission of a bid will be construed by the owner that the bidder has made sufficient examination and agrees to fulfill all requirements of the contract in full accordance with specifications and is entirely familiar with and thoroughly understands all such requirements.

D. The successful bidder is to notify **David Dudley, (314) 953-5930**, with a work schedule before work begins and of any change during construction.

E. The Hazelwood School District expressly rejects any terms and conditions not submitted with your bid and/or in variance to these specifications.

F. The Owner will require the successful bidder to furnish a Performance Bond and Labor and Materials Bond prior to the execution of the contract. The bonds shall be written in the amount of 100 percent of the total contract price.

G. All bidders will be required to furnish a bid bond in the amount of 5% of the bid at the time of submission of the bid.

H. Owner reserves the right to require financial statement from bidder. Statement shall be treated as confidential by Owner.

I. The successful contractor will be required to enter into a contract with the Owner in accordance with AIA Document A101 – Standard Form of Agreement between Owner and Contractor, 1997 Edition. A copy of this document ay be examined at the Hazelwood School District Business Office.

J. Bidder's proposal shall include costs of all permits, governmental fees, licenses, and inspection fees necessary to conduct the work. Proposals must be submitted in duplicate on copies of the Proposal Form provided. Do not remove and use the Proposal Form from specification. Insurance: Proposal must include cost of all insurance's required under the General Contract Conditions. Proposal shall include the cost of a separate Performance and Payment Bond.

VII. Execution of Contract

A. The Owner will prepare and forward to the successful bidder, the required copies of the contract. Bidders shall return properly executed prescribed copies of contract along with all required certificates of insurance, bonds, etc., required by these documents to the Owner within seven (7) working days after their receipt.

VIII. Change in the Work

A. The owner without invalidating the contract may order extra work or make changes by altering, adding, or deducting from the work with the contract sum being adjusted accordingly.

IX. Rejection of Bids

A. The owner reserves the right to waive informalities in bids and to reject any or all bids.

X. Storage of Materials

A. Storage of materials at the site will be permitted; however, the location of the storage facilities wil be subject to the owene's approval. The contractor shall be responsible for the protections of materials that might be damaged by weather. Vandalism of materials is the responsibility of the contractor.

XI. Completion

A. The contractor shall and does hereby agree that all work as called for in the specifications shall be compeleted on an agreed upon date with the District.

XII. Payment

A. Payment in full will be made to the contractor by the owner within thirty (30) days after completion of the work and/or submission of a written statement by the contractor.

B. Upon request and verification of need by the Hazelwood School District, the District will pay MBE/WBE contractors every two weeks for labor cost upon presentation of required documentation.

XIII. Wage Rates

A. Prevailing wage rates for the St. Louis area shall apply to this work project. Prevailing wage rates will be supplied to the successful bidder. The successful bidder will have to comply in full with all requirements of the Prevailing Wage Law.

B. Copies of the contractor's payroll may have to be furnished to the owner.

C. The contractor will have to supply the necessary affidavit of compliance prior to receiving payment.

D. The contractor will forfeit as a penalty to Hazelwood School District, ten dollars ($10) for each worker employed, for each calendar day, or portion thereof, such worker is paid less than the said stipulated rates for any work done under a said contract, by the contractor or by any subcontractor under them.

E. All contractor's bonds will include such provision as will guarantee the faithful performance of the prevailing wage clauses as provided by contract.

XIV. Special Notice

A. Board seeks to ensure that the highest quality workmanship will be performed on its projects and to do so encourages bidders to use workmen on the project, whenever possible, who have satisfactorily completed apprenticeship programs developed and operated in accordance with the policy recommendation, dated January 28, 1992, of the Federal Committee on Apprenticeship, U.S. Department of Labor, Employment and Training Administration, Office of Work-Based Learning, Bureau of Apprenticeship and Training ("Policy Recommendation"). All bidders are required to certify in their bids the percentage of ther workmen for the project, which have satisfactorily completed such a program for the type of work they will be performing. Bidders who do not indicate a percentage will be reported as zero percent.

B. The Board seeks to ensure a ready and adequate supply of highly trained and skilled craft persons, the establishment of reasonable working conditions for construction projects, the provision of negotiated commitments between employers and employees that are legally enforceable, and the assurance of labor stability and labor peace over the life of the project. Accordingly, bidders are encouraged to enter in collective bargaining agreement for the Project with the St. Louis Building and Construction Trades Council, AFL-CIO, and its affiliates in the construction of the project. All bidders are required to certify in their bids whether they are already bound by such an agreement or are willing to enter into such an agreement for this Project.

Hazelwood School District
15955 New Halls Ferry Road
Florissant, MO 63031

BID FORM

Name_____ Title_____
The undersigned hereby certifies to the Board that _____% of its workmen and _____% of the workmen of all of its contractors for the Project have satisfactorily completed an apprenticeship program developed and operated in accordance with the Policy Recommendation, as that term is defined in the Specifications. Inaccurate certifications shall constitute cause for termination of any contract; indemnifications for any costs incurred by the Board in connection with the termination.

The undersigned hereby certifies to the Board that it **(is) (is not)** already bound by a collective bargaining agreement with the St. Louis Building and Construction Trades Council, AFL-CIO, and its affiliated Local Unions. If not already bound, the undersigned hereby certifies that it **(will) (will not)** enter into such an agreement for this Project. Inaccurate certifications shall constitute cause for termination of any contract with the Board and the Board may then require, whether or not included in the contract, indemnification for any costs incurred by the Board in connection with the termination.
The undersigned hereby proposes to complete the work shown and specified and delivered to the Board no later than the agreed upon schedule. In addition to the information requested herein, attach a current and complete form, the American Institute of Architects, Contractor's Qualification Statement, AIA Document A305, and a copy of the bidding contractor's current Business License. The Board, in the interest of a standardization and ultimate economy reserves the right to require a substitution for Subcontractors, materials and equipment proposed by the bidder.
One of the following must be checked:
( ) The undersigned **is** bound by an agreement.
If bound, please indicate what union your agreement is with:
If **not** bound:
( ) The undersigned **will** enter into an agreement for this project.
( ) The undersigned **will not** enter into an agreement for this project.
Bidder Signature: _____ Date: _____

Bidder Name & Title: _____

Company Name: _____ _____Federal I.D. No.: _____

Official Address: _____City, State, Zip: _____

Phone: _____Corporate Seal:

SUPPLIER DIVERSITY

The Hazelwood School District has established a Supplier Diversity Program to provide opportunities for the meaningful participation of Minority Business Enterprises (MBEs) and Women Business Enterprises (WBEs) in purchases made by the District. To this end the District has set goals for participation on all construction projects of 25% for MBEs and 5% for WBEs. The Supplier Diversity Program also encourages its business partners to strive for a workforce goal of twenty-five percent (25%) minority and five percent (5%) women. The District may reject any and all bids that do not meet its program goals. Upon request and verification of need by the Hazelwood School District, the District will pay MBE/WBE contractors every two weeks for labor cost upon presentation of required documentation.

The Hazelwood School District Supplier Diversity Program can be downloaded from the district's website at www.hazelwoodschools.org; on the left side of the home page click on "Bids and Proposals," then go to the section labeled "Documentation." The entire program including **forms A and B** are located within the Supplier Diversity document.

A supplier of professional services or consultant, who has achieved the participation goals for MBE/WBES, as defined herein, will be in compliance with the requirements of the specification. A supplier of professional services or consultant who cannot achieve the goals for MBE/WBE participation must be able to demonstrate that the required positive efforts were initiated prior to submittal of the proposal. If the business partner cannot demonstrate the required positive efforts, the proposal will be rejected as non-responsive.

The District will accept, as prospective MBE/WBE participants for these projects, only those MBE/WBE firms which have been certified by one or more of the following agencies on or before the date of the bid opening:

1. City of St. Louis (St. Louis Development Corporation/Airport Authority)

2. St. Louis Minority Supplier Development Council (SLMSDC)

3. Missouri Regional Certification Committee (MRCC)

4. State Certifications, e.g., the State of Missouri and other states

5. National Minority Supplier Development Council (NMSDC)

6. Women Business Enterprise National Council (WBENC) and its affiliates

In the case of a manufacturer, the District will also accept MBE/WBE certification by any state division of purchasing or the National Minority Supplier Development Council and its affiliates.

The School District reserves the right to reject any and all Bids, to waive informalities therein to determine the lowest and best bid, and to approve the Bond. No Bid may be withdrawn for a period of 60 days subsequent to the specified time for receipt of bids. A Bid Bond or Certified Cashier's Check made payable to the Owner, in the amount of 5% of the Base Bid shall accompany the Bid Packages as a guarantee that the Bidder, if awarded Contract, will furnish a satisfactory Performance and Payment Bond; execute the Contract; and proceed with the Work. Upon failure to do so, the Contractor shall forfeit the deposit or amount of the Bid Bond as liquidated damages, and no mistakes or errors on the part of the Bidder shall excuse the Bidder or entitle him to a return of the deposit or Bid Bond.

HAZELWOOD SCHOOL DISTRICT

Supplier Diversity Program
HSD Form A
SUBCONTRACTOR UTILIZATION FORM

Project Name: _____

Prime Contractor: _____

If I am awarded this bid, I will subcontract with the following MBE/WBE firms:

Work or Trade to be Subcontracted	MBE/WBE Firm Name or Joint Venture	Subcontract Amount (MBE)	(WBE)
		$	$
		$	$
		$	$
		$	$
		$	$
		$	$
		$	$
		$	$
		$	$
		$	$
		$	$
		$	$
SUBTOTALS:		$	$
MBE/WBE SUBCONTRACTS TOTAL		$	

TOTAL BID: _____ **TOTAL MBE %** _____ **TOTAL WBE %** _____

HAZELWOOD SCHOOL DISTRICT

Supplier Diversity Program

HSD Form B

MBE/WBE SUBCONTRACTOR SOLICITATION REPORT

Project Name: _____

Prime Contractor: _____

I have contacted the following minority and women business enterprises and will not subcontract with them due to the reasons cited below: (Attach additional pages as necessary)

Firm Name and Contact Person	Mailing Address	Reason not Utilized

E-Verify Pursuant to Missouri Revised Statute 285.530, all Bidders awarded any contract in excess of five thousand dollars ($5,000) with a Missouri public school district must, as a condition to the award of any such contract, be enrolled and participate in a federal work authorization program with respect to the employees working in connection with the contracted services being provided, or to be provided, to the District (to the extent allowed by E-Verify). In addition, the Bidder must affirm the same through sworn affidavit and provisions of documentation, and sign an affidavit that it does not knowingly employ any person who is an unauthorized alien in connection with the services being provided, or to be provided, to the District.

Accordingly, your, company:

a) agrees to have an authorized person execute the attached "Federal Work Authorization Program Affidavit" attached hereto as Exhibit A and deliver the same to the District prior to or contemporaneously with the execution of its contract with the District;
b) affirms it is enrolled in the "E-Verify" work authorization program of the United States, and are participating in E-Verify with respect to you employees working in connection with the services being provided (to the extent allowed by E-Verify), or to be provided by your company to the District;
c) affirms that it is not knowingly employing any person who is an unauthorized alien in connection with the services being provided, or to be provided, by your company to the District;
d) affirms you will notify the District if you cease participation in E-Verify, or if there is any action, claim or compliant made against you alleging any violation of Missouri revised Statue 285.530, or any regulations issued thereto;
e) agrees to provide documentation of your participation in E-Verify to the District prior to or contemporaneously with the execution of its contract with the District (or at any time thereafter upon request by the District), by providing to the District an E-Verify screen print-out (or equivalent documentation) confirming your participation in E-Verify;
f) agrees to comply with any state or federal regulations or rules that may be issued subsequent to this addendum that relate to Missouri Revised Statute 285.530; and
g) agrees that any failure by your company to abide by the requirements a) through f) above will be considered a material breach of your contract with the District.

By: _____(Signature)

Printed Name and Title: _____

For and on behalf of: _____Company Name)

BIDDERS CHECKLIST

Bid Submittals

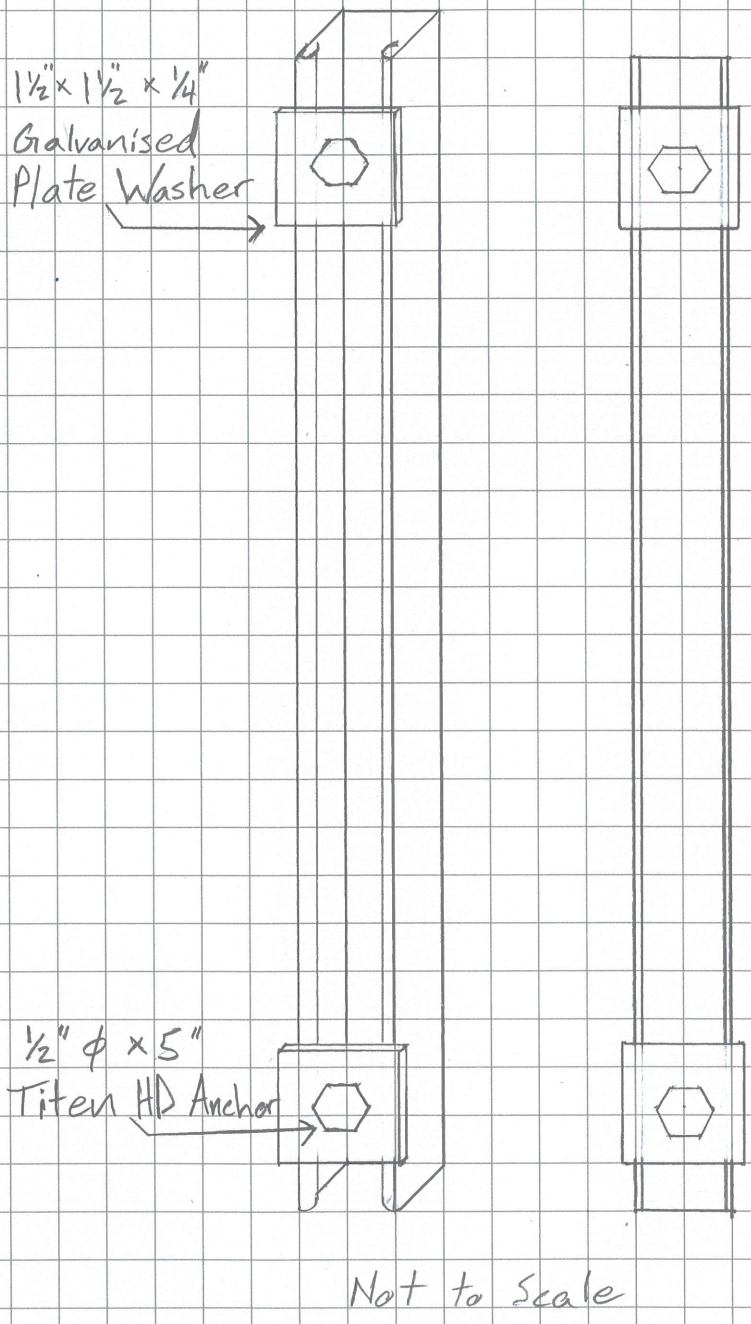
1. **Bid Form**
2. **Supplier Diversity Form A**
3. **Supplier Diversity Form B**
4. **E-Verify – Signed**
5. **Bid Response Sheet**

PROJECT #: _____ COMPUTED BY: _____

PROJECT TITLE: Utility Tunnel Racking CHECKED BY: _____

CLIENT: Hazelwood School District DATE: 9-16-19

Racking Anchor Repair



Not to Scale

- Dislodged racking support to be mounted in original position.
- Racking support in good condition to be reused.
- Follow anchor manufacturer's installation instructions.
- Contractor responsible for protecting conduits, racking support, and any other utility during installation.

Titen HD® Heavy-Duty Screw Anchor

The original high-strength screw anchor for use in cracked and uncracked concrete, as well as uncracked masonry. The Titen HD offers low installation torque and outstanding performance. Designed and tested in dry, interior, non-corrosive environments or temporary outdoor applications, the Titen HD demonstrates industry-leading performance even in seismic conditions.

Features

- Code listed under IBC/IRC in accordance with ICC-ES AC193 and ACI 355.2 for cracked and uncracked concrete per ICC-ES ESR-2713
- Code listed under IBC/IRC in accordance with ICC-ES AC106 for masonry per ICC-ES ESR-1056
- Qualified for static and seismic loading conditions
- Thread design undercuts to efficiently transfer the load to the base material
- Standard fractional sizes
- Specialized heat-treating process creates tip hardness for better cutting without compromising the ductility
- No special drill bit required — designed to install using standard-sized ANSI tolerance drill bits
- Testing shows the Titen HD installs in concrete with 50% less torque than competitor anchors
- Hex-washer head requires no separate washer, unless required by code, and provides a clean installed appearance
- Removable — ideal for temporary anchoring (e.g., formwork, bracing) or applications where fixtures may need to be moved
- Reuse of the anchor to achieve listed load values is not recommended

Codes: ICC-ES ESR-2713 (concrete); ICC-ES ESR-1056 (masonry); City of L.A. RR25741 (concrete), RR25560 (masonry); Florida FL-15730.6; FM 3017082, 3035761 and 3043442; Multiple DOT listings

Material: Carbon steel

Coating: Zinc plated or mechanically galvanized.
Not recommended for permanent exterior use or highly corrosive environments.

Titen HD Screw Anchor
U.S. Patent 6,623,228

Cracked Concrete CODE LISTED

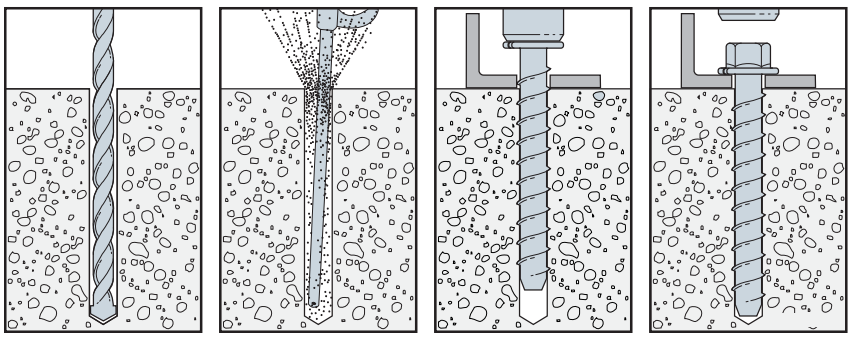
Serrated teeth on the tip of the Titen HD® screw anchor facilitate cutting and reduce installation torque.

Installation

Holes in metal fixtures to be mounted should match the diameter specified in the table below.
Use a Titen HD screw anchor one time only — installing the anchor multiple times may result in excessive thread wear and reduce load capacity.
Do not use impact wrenches to install into hollow CMU.
Caution: Oversized holes in base material will reduce or eliminate the mechanical interlock of the threads with the base material and reduce the anchor's load capacity.

1. Drill a hole in the base material using a carbide drill bit the same diameter as the nominal diameter of the anchor to be installed. Drill the hole to the specified embedment depth plus minimum hole depth overall (see table below right) to allow the thread tapping dust to settle, and blow it clean using compressed air. (Overhead installations need not be blown clean.) Alternatively, drill the hole deep enough to accommodate embedment depth and the dust from drilling and tapping.
2. Insert the anchor through the fixture and into the hole.
3. Tighten the anchor into the base material until the hex-washer head contacts the fixture.

Installation Sequence



Additional Installation Information for Structural Steel

Titen HD® Diameter (in.)	Wrench Size (in.)	Recommended Steel Fixture Hole Size (in.)	Minimum Hole Depth Overdrill (in.)
¼	⅜	⅜ to 7⁄16	⅛
⅜	9⁄16	½ to 9⁄16	¼
½	¾	5⁄8 to 11⁄16	½
5⁄8	15⁄16	¾ to 13⁄16	½
¾	1 ⅛	7⁄8 to 15⁄16	½

Suggested fixture hole sizes are for structural steel thicker than 12 gauge only. Larger holes are not required for wood or cold-formed steel members.

Titen HD® Heavy-Duty Screw Anchor

Titen HD Anchor Product Data — Zinc Plated

Size (in.)	Model No.	Drill Bit Dia. (in.)	Wrench Size (in.)	Quantity	
				Box	Carton
¼ x 1⅞	THDB25178H	¼	⅜	100	500
¼ x 2¾	THDB25234H	¼	⅜	50	250
¼ x 3	THDB25300H	¼	⅜	50	250
¼ x 3½	THDB25312H	¼	⅜	50	250
¼ x 4	THDB25400H	¼	⅜	50	250
⅜ x 1¾	THD37134H†	⅜	9⁄16	50	250
⅜ x 2½	THD37212H†	⅜	9⁄16	50	200
⅜ x 3	THD37300H	⅜	9⁄16	50	200
⅜ x 4	THD37400H	⅜	9⁄16	50	200
⅜ x 5	THD37500H	⅜	9⁄16	50	100
⅜ x 6	THD37600H	⅜	9⁄16	50	100
½ x 3	THD50300H	½	¾	25	100
½ x 4	THD50400H	½	¾	20	80
½ x 5	THD50500H	½	¾	20	80
½ x 6	THD50600H	½	¾	20	80
½ x 6½	THD50612H	½	¾	20	40
½ x 8	THD50800H	½	¾	20	40
½ x 12	THD501200H	½	¾	5	25
½ x 13	THD501300H	½	¾	5	25
½ x 14	THD501400H	½	¾	5	25
½ x 15	THD501500H	½	¾	5	25
⅝ x 4	THDB62400H	⅝	15⁄16	10	40
⅝ x 5	THDB62500H	⅝	15⁄16	10	40
⅝ x 6	THDB62600H	⅝	15⁄16	10	40
⅝ x 6½	THDB62612H	⅝	15⁄16	10	40
⅝ x 8	THDB62800H	⅝	15⁄16	10	20
⅝ x 10	THDB62100H	⅝	15⁄16	10	20
¾ x 4	THD75400H	¾	1⅛	10	40
¾ x 5	THD75500H	¾	1⅛	5	20
¾ x 6	THDT75600H	¾	1⅛	5	20
¾ x 7	THD75700H	¾	1⅛	5	10
¾ x 8½	THD75812H	¾	1⅛	5	10
¾ x 10	THD75100H	¾	1⅛	5	10

† These models do not meet minimum embedment depth requirements for strength design and require maximum installation torque of 25 ft. – lb. using a torque wrench, driver drill or cordless ¼" impact driver with a maximum permitted torque rating of 100 ft. – lb.

Titen HD Anchor Product Data — Mechanically Galvanized

Size (in.)	Model No.	Drill Bit Dia. (in.)	Wrench Size (in.)	Quantity	
				Box	Carton
⅜ x 3	THD37300HMG	⅜	9⁄16	50	200
⅜ x 4	THD37400HMG			50	200
⅜ x 5	THD37500HMG			50	100
⅜ x 6	THD37600HMG			50	100
½ x 4	THD50400HMG	½	¾	20	80
½ x 5	THD50500HMG			20	80
½ x 6	THD50600HMG			20	80
½ x 6½	THD50612HMG			20	40
½ x 8	THD50800HMG			20	40
⅝ x 5	THDB62500HMG	⅝	15⁄16	10	40
⅝ x 6	THDB62600HMG			10	40
⅝ x 6½	THDB62612HMG			10	40
⅝ x 8	THDB62800HMG			10	20
¾ x 6	THDT75600HMG	¾	1⅛	5	20
¾ x 8½	THD75812HMG			5	10
¾ x 10	THD75100HMG			5	10

Mechanical galvanizing meets ASTM B695, Class 65, Type 1. Intended for some pressure-treated wood sill plate applications. Not for use in other corrosive or outdoor environments. See p. 248 or visit **strongtie.com/info** for more corrosion information.

Titen HD Installation Information and Additional Data[1]

Characteristic	Symbol	Units	Nominal Anchor Diameter, d_a (in.)									
			¼		⅜		½		⅝		¾	
Installation Information												
Drill Bit Diameter	d_{bit}	in.	¼		⅜		½		⅝		¾	
Baseplate Clearance Hole Diameter	d_c	in.	⅜		½		⅝		¾		⅞	
Maximum Installation Torque	$T_{inst,max}$	ft.-lbf	24[2]		50[2]		65[2]		100[2]		150[2]	
Maximum Impact Wrench Torque Rating	$T_{impact,max}$	ft.-lbf	125[3]		150[3]		340[3]		340[3]		385[3]	
Minimum Hole Depth	h_{hole}	in.	1¾	2⅝	2¾	3½	3¾	4½	4½	6	6	6¾
Nominal Embedment Depth	h_{nom}	in.	1⅝	2½	2½	3¼	3¼	4	4	5½	5½	6¼
Critical Edge Distance	c_{ac}	in.	3	6	2 11⁄16	3⅝	3 9⁄16	4½	4½	6⅜	6⅜	7 5⁄16
Minimum Edge Distance	c_{min}	in.	1½		1¾							
Minimum Spacing	s_{min}	in.	3									
Minimum Concrete Thickness	h_{min}	in.	3¼	3½	4	5	5	6¼	6	8½	8¾	10
Additional Data												
Anchor Category	Category	—	1									
Yield Strength	f_{ya}	psi	100,000		97,000							
Tensile Strength	f_{uta}	psi	125,000		110,000							
Minimum Tensile and Shear Stress Area	A_{se}	in²	0.042		0.099		0.183		0.276		0.414	
Axial Stiffness in Service Load Range – Uncracked Concrete	β_{uncr}	lb./in.	202,000		715,000							
Axial Stiffness in Service Load Range – Cracked Concrete	β_{cr}	lb./in.	173,000		345,000							

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-14 Chapter 17 and ACI 318 Appendix D.
2. $T_{inst,max}$ is the maximum permitted installation torque for the embedment depth range covered by this table using a torque wrench.
3. $T_{impact,max}$ is the maximum permitted torque rating for impact wrenches for the embedment depth range covered by this table.

* See p. 13 for an explanation of the load table icons.

Titen HD® Design Information — Concrete

Titen HD Tension Strength Design Data[1]

Characteristic	Symbol	Units	Nominal Anchor Diameter, d_a (in.)									
			¼		⅜		½		⅝		¾	
Nominal Embedment Depth	h_{nom}	in.	1⅝	2½	2½	3¼	3¼	4	4	5½	5½	6¼
Steel Strength in Tension												
Tension Resistance of Steel	N_{sa}	lb.	5,195		10,890		20,130		30,360		45,540	
Strength Reduction Factor — Steel Failure	ϕ_{sa}	—	0.65[2]									
Concrete Breakout Strength in Tension[6,8]												
Effective Embedment Depth	h_{ef}	in.	1.19	1.94	1.77	2.40	2.35	2.99	2.97	4.24	4.22	4.86
Critical Edge Distance[6]	c_{ac}	in.	3	6	2 11/16	3⅝	3 9/16	4½	4½	6 ⅜	6⅜	7 5/16
Effectiveness Factor — Uncracked Concrete	k_{uncr}	—	30				24					
Effectiveness Factor — Cracked Concrete	k_{cr}	—	17									
Modification Factor	$\Psi_{c,N}$	—	1.0									
Strength Reduction Factor — Concrete Breakout Failure	ϕ_{cb}	—	0.65[7]									
Pullout Strength in Tension[8]												
Pullout Resistance, Uncracked Concrete (f'_c = 2,500 psi)	$N_{p,uncr}$	lb.	—[3]	—[3]	2,700[4]	—[3]	—[3]	—[3]	—[3]	9,810[4]	—[3]	—[3]
Pullout Resistance, Cracked Concrete (f'_c = 2,500 psi)	$N_{p,cr}$	lb.	—[3]	1,905[4]	1,235[4]	2,700[4]	—[3]	—[3]	3,040[4]	5,570[4]	6,070[4]	7,195[4]
Strength Reduction Factor — Concrete Pullout Failure	ϕ_p	—	0.65[5]									
Breakout or Pullout Strength in Tension for Seismic Applications[8]												
Nominal Pullout Strength for Seismic Loads (f'_c = 2,500 psi)	$N_{p,eq}$	lb.	—[3]	1,905[4]	1,235[4]	2,700[4]	—[3]	—[3]	3,040[4]	5,570[4]	6,070[4]	7,195[4]
Strength Reduction Factor — Breakout or Pullout Failure	ϕ_{eq}	—	0.65[5]									

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-14 Chapter 17 and ACI 318-11 Appendix D, except as modified below.
2. The tabulated value of ϕ_{sa} applies when the load combinations of Section 1605.2.1 of the IBC, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2 are used. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ_{sa} must be determined in accordance with ACI 318-11 D.4.4. Anchors are considered brittle steel elements.
3. Pullout strength is not reported since concrete breakout controls.
4. Adjust the characteristic pullout resistance for other concrete compressive strengths by multiplying the tabular value by $(f'_{c,specified} / 2{,}500)^{0.5}$.
5. The tabulated value of ϕ_p or ϕ_{eq} applies when the load combinations of Section 1605.2.1 of the IBC, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 17.3.3.(c) or ACI 318-11 D.4.3(c) for Condition B are met. If the load combinations of ACI 318-11 Appendix C are used, appropriate value of ϕ must be determined in accordance with ACI 318-11 Section D.4.4(c).
6. The modification factor $\Psi_{cp,N}$ = 1.0 for cracked concrete. Otherwise, the modification factor for uncracked concrete without supplementary reinforcement to control splitting is either:
   (1) $\Psi_{cp,N}$ = 1.0 if $c_{a,min} \geq c_{ac}$ or (2) $\Psi_{cp,N} = \frac{c_{a,min}}{c_{ac}} \geq \frac{1.5h_{ef}}{c_{ac}}$ if $c_{a,min} < c_{ac}$
   The modification factor, $\Psi_{cp,N}$ is applied to the nominal concrete breakout strength, N_{cb} or N_{cbg}.
7. The tabulated value of ϕ_{cb} applies when both the load combinations of Section 1605.2.1 of the IBC, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c) for Condition B are met. Condition B applies where supplementary reinforcement is not provided. For installations where complying supplementary reinforcement can be verified, the ϕ_{cb} factors described in ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c) for Condition A are allowed. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ_{cb} must be determined in accordance with ACI 318-11 D.4.4(c).

* See p. 13 for an explanation of the load table icons.

Titen HD® Design Information — Concrete

Titen HD Shear Strength Design Data[1]

Characteristic	Symbol	Units	Nominal Anchor Diameter, d_a (in.)									
			¼[5]		⅜		½		⅝[5]		¾	
Nominal Embedment Depth	h_{nom}	in.	1⅝	2½	2½	3¼	3¼	4	4	5½	5½	6¼
Steel Strength in Shear												
Shear Resistance of Steel	V_{sa}	lb.	2,020		4,460		7,455		10,000		16,840	
Strength Reduction Factor — Steel Failure	ϕ_{sa}	—	0.60[2]									
Concrete Breakout Strength in Shear[6]												
Outside Diameter	d_a	in.	0.25		0.375		0.500		0.625		0.750	
Load Bearing Length of Anchor in Shear	ℓ_e	in.	1.19	1.94	1.77	2.40	2.35	2.99	2.97	4.24	4.22	4.86
Strength Reduction Factor — Concrete Breakout Failure	ϕ_{cb}	—	0.70[4]									
Concrete Pryout Strength in Shear												
Coefficient for Pryout Strength	k_{cp}	lb.	1.0				2.0					
Strength Reduction Factor — Concrete Pryout Failure	ϕ_{cp}	—	0.70[4]									
Steel Strength in Shear for Seismic Applications												
Shear Resistance for Seismic Loads	V_{eq}	lb.	1,695		2,855		4,790		8,000		9,350	
Strength Reduction Factor — Steel Failure	ϕ_{eq}	—	0.60[2]									

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-14 Chapter 17 and ACI 318-11 Appendix D, except as modified below.
2. The tabulated value of ϕ_{sa} applies when the load combinations of Section 1605.2.1 of the IBC, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2 are used. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ_{sa} must be determined in accordance with ACI 318 D.4.4.
3. The tabulated value of ϕ_{cb} applies when both the load combinations of Section 1605.2.1 of the IBC, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c) for Condition B are met. Condition B applies where supplementary reinforcement is not provided. For installations where complying supplementary reinforcement can be verified, the ϕ_{cb} factors described in ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c) for Condition A are allowed. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ_{cb} must be determined in accordance with ACI 318-11 D.4.4(c).
4. The tabulated value of ϕ_{cp} applies when both the load combinations of IBC Section 1605.2, ACI 318-14 5.3 or ACI 318-11 Section 9.2 are used and the requirements of ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c) for Condition B are met. If the load combinations of ACI 318-11 Appendix C are used, appropriate value of ϕ_{cp} must be determined in accordance with ACI 318-11 Section D.4.4(c).

Titen HD Tension and Shear Strength Design Data for the Soffit of Normal-Weight or Sand-Lightweight Concrete over Metal Deck[1,6,8]

Characteristic	Symbol	Units	Nominal Anchor Diameter, d_a (in.)									
			Lower Flute						Upper Flute			
			Figure 2		Figure 1				Figure 2		Figure 1	
			¼[8]		⅜		½		¼[8]		⅜	½
Nominal Embedment Depth	h_{nom}	in.	1⅝	2½	1⅞	2½	2	3½	1⅝	2½	1⅞	2
Effective Embedment Depth	h_{ef}	in.	1.19	1.94	1.23	1.77	1.29	2.56	1.19	1.94	1.23	1.29
Pullout Resistance, concrete on metal deck (cracked)[2,3,4]	$N_{p,deck,cr}$	lb.	420	535	375	870	905	2,040	655	1,195	500	1,700
Pullout Resistance, concrete on metal deck (uncracked)[2,3,4]	$N_{p,deck,uncr}$	lb.	995	1,275	825	1,905	1,295	2,910	1,555	2,850	1,095	2,430
Steel Strength in Shear, concrete on metal deck[5]	$V_{sa,\ deck}$	lb.	1,335	1,745	2,240	2,395	2,435	4,430	2,010	2,420	4,180	7,145
Steel Strength in Shear, Seismic	$V_{sa,\ deck,eq}$	lb.	870	1,135	1,434	1,533	1,565	2,846	1,305	1,575	2,676	4,591

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-14 Chapter 17 and ACI 318-11 Appendix D, except as modified below.
2. Concrete compressive strength shall be 3,000 psi minimum. The characteristic pullout resistance for greater compressive strengths shall be increased by multiplying the tabular value by $(f'_{c,specified}/3{,}000)^{0.5}$.
3. For anchors installed in the soffit of sand-lightweight or normal-weight concrete over metal deck floor and roof assemblies, as shown in Figure 1 and Figure 2, calculation of the concrete breakout strength may be omitted.
4. In accordance with ACI 318-14 Section 17.4.3.2 or ACI 318-11 Section D.5.3.2, the nominal pullout strength in cracked concrete for anchors installed in the soffit of sand-lightweight or normal-weight concrete over metal deck floor and roof assemblies $N_{p,deck,cr}$ shall be substituted for $N_{p,cr}$. Where analysis indicates no cracking at service loads, the normal pullout strength in uncracked concrete $N_{p,deck,uncr}$ shall be substituted for $N_{p,uncr}$.
5. In accordance with ACI 318-14 Section 17.5.1.2(C) or ACI 318-11 Section D.6.1.2(c), the shear strength for anchors installed in the soffit of sand-lightweight or normal-weight concrete over metal deck floor and roof assemblies $V_{sa,deck}$ and $V_{sa,deck,eq}$ shall be substituted for V_{sa}.
6. Minimum edge distance to edge of panel is $2h_{ef}$.
7. The minimum anchor spacing along the flute must be the greater of $3h_{ef}$, or 1.5 times the flute width.

* See p. 13 for an explanation of the load table icons.

Titen HD Anchor Tension and Shear Strength Design Data in the Topside of Normal-Weight Concrete or Sand-Lightweight Concrete over Metal Deck

IBC *

Design Information	Symbol	Units	Nominal Anchor Diameter, d_a (in.)	
			Figure 3	Figure 3
			¼	⅜
Nominal Embedment Depth	h_{nom}	in.	1⅝	2½
Effective Embedment Depth	h_{ef}	in.	1.19	1.77
Minimum Concrete Thickness	$h_{min,deck}$	in.	2½	3¼
Critical Edge Distance	$c_{ac,deck,top}$	in.	3¾	7¼
Minimum Edge Distance	$c_{min,deck,top}$	in.	3½	3
Minimum Spacing	$s_{min,deck,top}$	in.	3½	3

1. For anchors installed in the topside of concrete-filled deck assemblies, as shown in Figures 2 and 3, the nominal concrete breakout strength of a single anchor or group of anchors in shear, V_{cb} or V_{cbg}, respectively, must be calculated in accordance with ACI 318-14 Section 17.5.2 or ACI 318-11 Section D.6.2, using the actual member thickness, $h_{min,deck}$, in the determination of A_{vc}.
2. Design capacity shall be based on calculations according to values in the tables featured on pp. 116–118.
3. Minimum flute depth (distance from top of flute to bottom of flute) is 1½" (see Figures 2 and 3).
4. Steel deck thickness shall be minimum 20 gauge.
5. Minimum concrete thickness ($h_{min,deck}$) refers to concrete thickness above upper flute (see Figures 2 and 3).

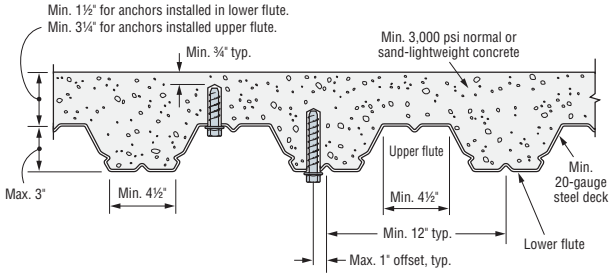


Figure 1. Installation of ⅜"- and ½"-Diameter Anchors in the Soffit of Concrete over Metal Deck

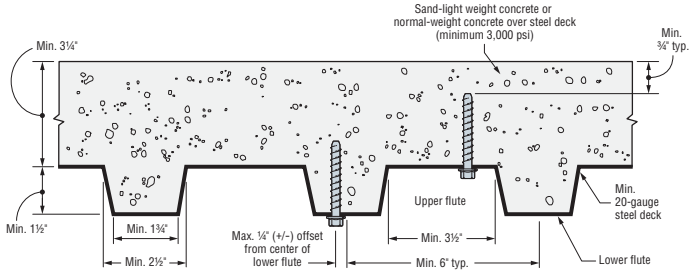


Figure 2. Installation of ¼"-Diameter Anchors in the Soffit of Concrete over Metal Deck

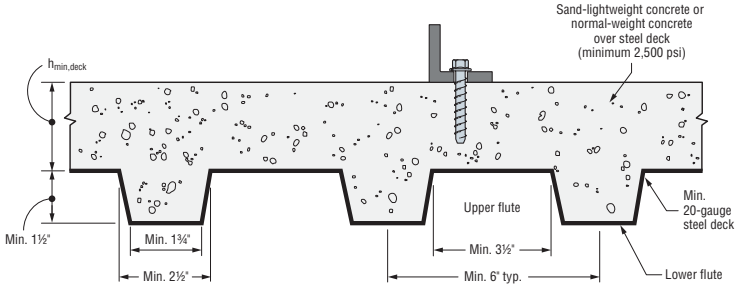


Figure 3. Installation of ¼"- and ⅜"-Diameter Anchors in the Topside of Concrete over Metal Deck

* See p. 13 for an explanation of the load table icons.

Titen HD Allowable Tension and Shear Loads in 8" Lightweight, Medium-Weight and Normal-Weight Grout-Filled CMU

IBC *

Size in. (mm)	Drill Bit Dia. in.	Min. Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical End Dist. in. (mm)	Critical Spacing Dist. in. (mm)	Values for 8" Lightweight, Medium-Weight or Normal-Weight Grout-Filled CMU			
						Tension Load		Shear Load	
						Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)
Anchor Installed in the Face of the CMU Wall (See Figure 4)									
⅜ (9.5)	⅜	2¾ (70)	12 (305)	12 (305)	6 (152)	2,390 (10.6)	480 (2.1)	4,340 (19.3)	870 (3.9)
½ (12.7)	½	3½ (89)	12 (305)	12 (305)	8 (203)	3,440 (15.3)	690 (3.1)	6,920 (30.8)	1,385 (6.2)
⅝ (15.9)	⅝	4½ (114)	12 (305)	12 (305)	10 (254)	5,300 (23.6)	1,060 (4.7)	10,420 (46.4)	2,085 (9.3)
¾ (19.1)	¾	5½ (140)	12 (305)	12 (305)	12 (305)	7,990 (35.5)	1,600 (7.1)	15,000 (66.7)	3,000 (13.3)

1. The tabulated allowable loads are based on a safety factor of 5.0 for installations under the IBC and IRC.
2. Values for 8"-wide, lightweight, medium-weight and normal-weight concrete masonry units.
3. The masonry units must be fully grouted.
4. The minimum specified compressive strength of masonry, f'_m, at 28 days is 1,500 psi.
5. Embedment depth is measured from the outside face of the concrete masonry unit.
6. Allowable loads may be increased 33⅓% for short-term loading due to wind or seismic forces where permitted by code.
7. Grout-filled CMU wall design must satisfy applicable design standards and be capable of withstanding applied loads.
8. Refer to allowable load-adjustment factors for spacing and edge distance on p. 123.

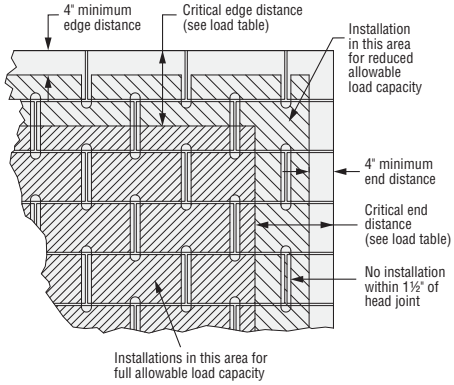


Figure 4. Shaded Area = Placement for Full **and Reduce**d Allowable Load Capacity in Grout-Filled CMU

Titen HD Allowable Tension and Shear Loads in 8" Lightweight, Medium-Weight and Normal-Weight Hollow CMU

IBC *

Size in. (mm)	Drill Bit Dia. in.	Embed. Depth[4] in. (mm)	Min. Edge Dist. in. (mm)	Min. End Dist. in. (mm)	8" Hollow CMU Loads Based on CMU Strength			
					Tension Load		Shear Load	
					Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)
Anchor Installed in Face Shell (See Figure 5)								
⅜ (9.5)	⅜	1¾ (45)	4 (102)	4⅝ (117)	720 (3.2)	145 (0.6)	1,240 (5.5)	250 (1.1)
½ (12.7)	½	1¾ (45)	4 (102)	4⅝ (117)	760 (3.4)	150 (0.7)	1,240 (5.5)	250 (1.1)
⅝ (15.9)	⅝	1¾ (45)	4 (102)	4⅝ (117)	800 (3.6)	160 (0.7)	1,240 (5.5)	250 (1.1)
¾ (19.1)	¾	1¾ (45)	4 (102)	4⅝ (117)	880 (3.9)	175 (0.8)	1,240 (5.5)	250 (1.1)

1. The tabulated allowable loads are based on a safety factor of 5.0 for installations under the IBC and IRC.
2. Values for 8"-wide, lightweight, medium-weight and normal-weight concrete masonry units.
3. The minimum specified compressive strength of masonry, f'_m, at 28 days is 1,500 psi.
4. Embedment depth is measured from the outside face of the concrete masonry unit and is based on the anchor being embedded an additional ½"- through 1¼"-thick face shell.
5. Allowable loads may not be increased for short-term loading due to wind or seismic forces. CMU wall design must satisfy applicable design standards and be capable of withstanding applied loads.
6. Do not use impact wrenches to install in hollow CMU.
7. Set drill to rotation-only mode when drilling into hollow CMU.

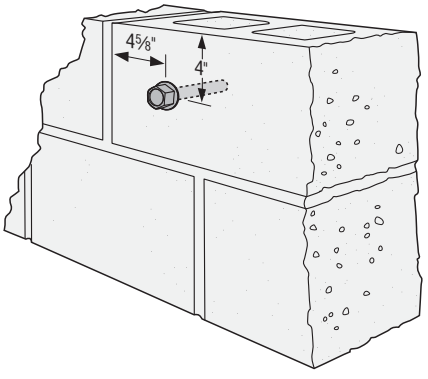


Figure 5

* See p. 13 for an explanation of the load table icons.

Titen HD® Allowable Tension and Shear Loads in 8" Lightweight, Medium-Weight and Normal-Weight Grout-Filled CMU Stemwall

IBC *

Size in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Min. Edge Dist. in. (mm)	Min. End Dist. in. (mm)	Critical Spacing Dist. in. (mm)	8" Grout-Filled CMU Allowable Loads Based on CMU Strength					
						Tension		Shear Perp. to Edge		Shear Parallel to Edge	
						Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)
Anchor Installed in Cell Opening or Web (Top of Wall) (See Figure 6)											
½ (12.7)	½	4½ (114)	1¾ (45)	8 (203)	8 (203)	2,860 (12.7)	570 (2.5)	800 (3.6)	160 (0.7)	2,920 (13.0)	585 (2.6)
⅝ (15.9)	⅝	4½ (114)	1¾ (45)	10 (254)	10 (254)	2,860 (12.7)	570 (2.5)	800 (3.6)	160 (0.7)	3,380 (15.0)	675 (3.0)

1. The tabulated allowable loads are based on a safety factor of 5.0 for installations under the IBC and IRC.
2. Values are for 8"-wide, lightweight, medium-weight and normal-weight concrete masonry units.
3. The masonry units must be fully grouted.
4. The minimum specified compressive strength of masonry, f'_m, at 28 days is 1,500 psi.
5. Allowable loads may be increased 33⅓% for short-term loading due to wind or seismic forces where permitted by code.
6. Grout-filled CMU wall design must satisfy applicable design standards and be capable of withstanding applied design loads.
7. Loads are based on anchor installed in either the web or grout-filled cell opening in the top of wall.

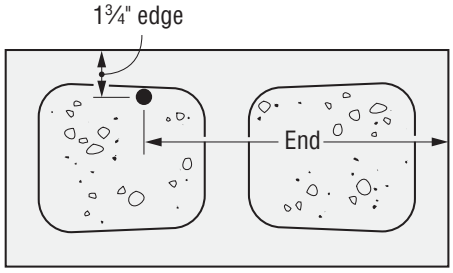


Figure 6. Anchor Installed in Top of Wall

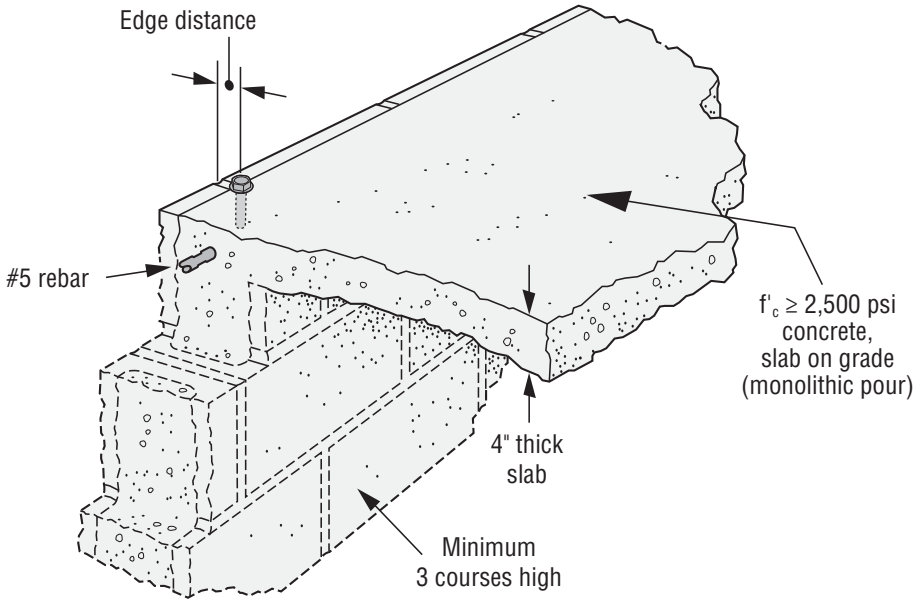
* See p. 13 for an explanation of the load table icons.

Titen HD Allowable Tension Loads for 8" Lightweight, Medium-Weight and Normal-Weight CMU Chair Blocks Filled with Normal-Weight Concrete

IBC *

Size in. (mm)	Drill Bit Dia. (in.)	Min. Embed. Depth in. (mm)	Min. Edge Dist. in. (mm)	Critical Spacing in. (mm)	8" Concrete-Filled CMU Chair Block Allowable Tension Loads Based on CMU Strength	
					Ultimate lb. (kN)	Allowable lb. (kN)
⅜ (9.5)	⅜	2⅜ (60)	1¾ (44)	9½ (241)	3,175 (14.1)	635 (2.8)
		3⅜ (86)	1¾ (44)	13½ (343)	5,175 (23.0)	1,035 (4.6)
		5 (127)	2¼ (57)	20 (508)	10,584 (47.1)	2,115 (9.4)
½ (12.7)	½	8 (203)	2¼ (57)	32 (813)	13,722 (61.0)	2,754 (12.2)
		10 (254)	2¼ (57)	40 (1016)	16,630 (74.0)	3,325 (14.8)
⅝ (15.9)	⅝	5½ (140)	1¾ (44)	22 (559)	9,025 (40.1)	1,805 (8.1)

1. The tabulated allowable loads are based on a safety factor of 5.0.
2. Values are for 8"-wide concrete masonry units (CMU) filled with concrete, with minimum compressive strength of 2,500 psi and poured monolithically with the floor slab.
3. Center #5 rebar in CMU cell and concrete slab as shown in the illustration below.



* See p. 13 for an explanation of the load table icons.

Titen HD® Design Information — Masonry

Load-Adjustment Factors for Titen HD Anchors in Face-of-Wall Installation in 8" Grout-Filled CMU: Edge Distance and Spacing, Tension and Shear Loads

How to use these charts:

1. The following tables are for reduced edge distance and spacing.
2. Locate the anchor size to be used for either a tension and/or shear load application.
3. Locate the embedment (E) at which the anchor is to be installed.
4. Locate the edge distance (c_{act}) or spacing (s_{act}) at which the anchor is to be installed.
5. The load adjustment factor (f_c or f_s) is the intersection of the row and column.
6. Multiply the allowable load by the applicable load adjustment factor.
7. Reduction factors for multiple edges or spacings are multiplied together.

Edge or End Distance Tension (f_c)

c_{act} (in.)	Dia.	⅜	½	⅝	¾
	E	2¾	3½	4½	5½
	c_{cr}	12	12	12	12
	c_{min}	4	4	4	4
	f_{cmin}	**1.00**	**1.00**	**0.83**	**0.66**
4		1.00	1.00	0.83	0.66
6		1.00	1.00	0.87	0.75
8		1.00	1.00	0.92	0.83
10		1.00	1.00	0.96	0.92
12		1.00	1.00	1.00	1.00

See notes below.

Edge or End Distance Shear (f_c) Shear Load Parallel to Edge or End

c_{act} (in.)	Dia.	⅜	½	⅝	¾
	E	2¾	3½	4½	5½
	c_{cr}	12	12	12	12
	c_{min}	4	4	4	4
	f_{cmin}	**0.77**	**0.48**	**0.46**	**0.44**
4		0.77	0.48	0.46	0.44
6		0.83	0.61	0.60	0.58
8		0.89	0.74	0.73	0.72
10		0.94	0.87	0.87	0.86
12		1.00	1.00	1.00	1.00

See notes below.

Edge or End Distance Shear (f_c) Shear Load Perpendicular to Edge or End (Directed Towards Edge or End)

c_{act} (in.)	Dia.	⅜	½	⅝	¾
	E	2¾	3½	4½	5½
	c_{cr}	12	12	12	12
	c_{min}	4	4	4	4
	f_{cmin}	**0.58**	**0.38**	**0.30**	**0.21**
4		0.58	0.38	0.30	0.21
6		0.69	0.54	0.48	0.41
8		0.79	0.69	0.65	0.61
10		0.90	0.85	0.83	0.80
12		1.00	1.00	1.00	1.00

Edge or End Distance Shear (f_c) Shear Load Perpendicular to Edge or End (Directed Away From Edge or End)

c_{act} (in.)	Dia.	⅜	½	⅝	¾
	E	2¾	3½	4½	5½
	c_{cr}	12	12	12	12
	c_{min}	4	4	4	4
	f_{cmin}	**0.89**	**0.79**	**0.58**	**0.38**
4		0.89	0.79	0.58	0.38
6		0.92	0.84	0.69	0.54
8		0.95	0.90	0.79	0.69
10		0.97	0.95	0.90	0.85
12		1.00	1.00	1.00	1.00

1. E = Embedment depth (inches).
2. c_{act} = actual end or edge distance at which anchor is installed (inches).
3. c_{cr} = critical end or edge distance for 100% load (inches).
4. c_{min} = minimum end or edge distance for reduced load (inches).
5. f_c = adjustment factor for allowable load at actual end or edge distance.
6. f_{ccr} = adjustment factor for allowable load at critical end or edge distance. f_{ccr} is always = 1.00.
7. f_{cmin} = adjustment factor for allowable load at minimum end or edge distance.
8. $f_c = f_{cmin} + [(1 - f_{cmin})\ (c_{act} - c_{min}) / (c_{cr} - c_{min})]$.

Spacing Tension (f_s)

s_{act} (in.)	Dia.	⅜	½	⅝	¾
	E	2¾	3½	4½	5½
	s_{cr}	6	8	10	12
	s_{min}	3	4	5	6
	f_{smin}	**0.87**	**0.69**	**0.59**	**0.50**
3		0.87			
4		0.91	0.69		
5		0.96	0.77	0.59	
6		1.00	0.85	0.67	0.50
8			1.00	0.84	0.67
10				1.00	0.83
12					1.00

Spacing Shear (f_s)

s_{act} (in.)	Dia.	⅜	½	⅝	¾
	E	2¾	3½	4½	5½
	s_{cr}	6	8	10	12
	s_{min}	3	4	5	6
	f_{smin}	**0.62**	**0.62**	**0.62**	**0.62**
3		0.62			
4		0.75	0.62		
5		0.87	0.72	0.62	
6		1.00	0.81	0.70	0.62
8			1.00	0.85	0.75
10				1.00	0.87
12					1.00

1. E = Embedment depth (inches).
2. s_{act} = actual spacing distance at which anchors are installed (inches).
3. s_{cr} = critical spacing distance for 100% load (inches).
4. s_{min} = minimum spacing distance for reduced load (inches).
5. f_s = adjustment factor for allowable load at actual spacing distance.
6. f_{scr} = adjustment factor for allowable load at critical spacing distance. f_{scr} is always = 1.00.
7. f_{smin} = adjustment factor for allowable load at minimum spacing distance.
8. $f_s = f_{smin} + [(1 - f_{smin})\ (s_{act} - s_{min}) / (s_{cr} - s_{min})]$.

* See p. 13 for an explanation of the load table icons.