Titen Turbo™ Design Information — Concrete

SIMPSON Strong-Tie®

- Titen Turbo has been qualified per ACI 355.2 and AC193. In order to design Titen Turbo in accordance with ACI 318 Chapter 17, the design information is published in IAPMO UES ER-712.

- In an attempt to provide the designer quick reference tables, Simpson Strong-Tie has provided the tables contained within this Technical Engineering Bulletin. These tables provide Tension and Shear Capacities. The tables provide either a Design Strength level capacity or an Allowable Load capacity. The footnotes of each table further explain how the Design Strength capacities were calculated and what factors were used to calculate the Allowable Load capacities.

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Icons and Nomenclature

In order to facilitate easier identification of performance data, the following icon system has been incorporated into the sections of the technical bulletin with multiple load tables. These icons will appear in the heading of the table to promote easier visual identification of the type of load, insert type and substrate addressed in the table. Icons are intended for quick identification. All specific information regarding suitability should be read from the table itself.
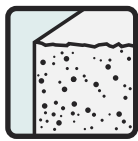
Normal-Weight Concrete
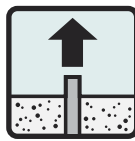
Tension Load
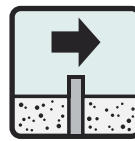
Shear Load

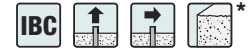**Valid for International Building Code**

c_{ac}	Critical Edge Distance
c_{min}	Minimum Edge Distance
f'_c	Concrete Compressive Strength
h_{nom}	Nominal Embedment Depth
h_{min}	Minimum Concrete Thickness

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Tension and Shear Design Strength in Normal-Weight Concrete (f'$_c$ = 2,500 psi)

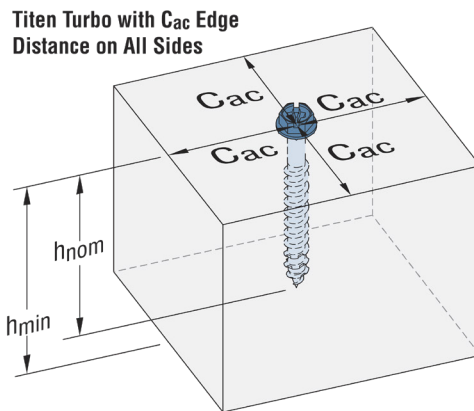| Nominal Anchor Dia. (in.)	Nominal Embed. Depth (in.)	Min. Concrete Thickness h_{min} (in.)	Critical Edge Distance c_{ac} (in.)	Min. Edge Distance c_{min} (in.)	Tension Design Strength (lbs.)		Shear Design Strength (lbs.)	
					Edge Distance = c_{ac} on all sides	Edge Distance = c_{min} on one sides and c_{ac} on three sides	Edge Distance = c_{ac} on all sides	Edge Distance = c_{min} on one sides and c_{ac} on three sides
³⁄₁₆	1.75	3.25	3	1.75	985	645	285	285
¼	1.75	3.25	3	1.75	985	600	430	415

1. Tension and shear design strengths (SD level) are based on the strength design provisions of ACI 318-14 Chapter 17.
2. Tabulated values are for a single anchor with no infuence of another anchor.
3. Strength reduction factor, ϕ, is based on using a load combination from ACI 318-14 Section 5.3

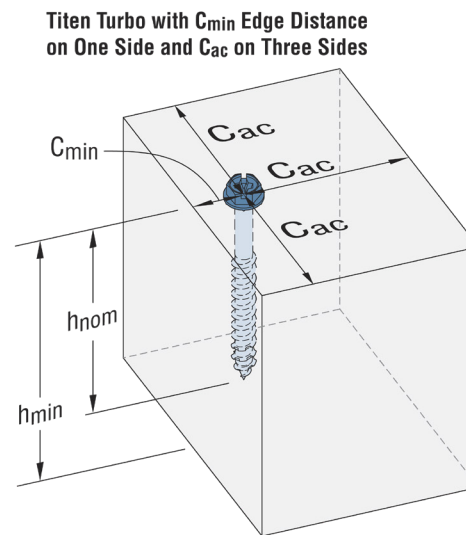## Allowable Tension and Shear Loads in Normal-Weight Concrete (f'$_c$ = 2,500 psi) — Static Load and Wind Load

Allowable Load Case	Nominal Anchor Dia. (in.)	Nominal Embed. Depth (in.)	Min. Concrete Thickness h_{min} (in.)	Critical Edge Distance c_{ac} (in.)	Min. Edge Distance c_{min} (in.)	Allowable Tension Load (lbs.)		Allowable Shear Load (lbs.)	
						Edge Distance = c_{ac} on all sides	Edge Distance = c_{min} on one sides and c_{ac} on three sides	Edge Distance = c_{ac} on all sides	Edge Distance = c_{min} on one sides and c_{ac} on three sides
Static Load	³⁄₁₆	1.75	3.25	3	1.75	705	460	205	205
	¼	1.75	3.25	3	1.75	705	430	310	295
Wind Load	³⁄₁₆	1.75	3.25	3	1.75	590	385	170	170
	¼	1.75	3.25	3	1.75	590	360	260	250

1. Static allowable tension loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of α = 1.4.
   The conversion factor α is based on the load combination 1.2D + 1.6L assuming 50% dead load and 50% live load: 1.2(0.5) + 1.6(0.5) = 1.4.
2. Wind allowable tension loads are calculated based on the strength design provision of ACI 318-14 Chapter 17 using a conversion factor of
   α = 1/0.6 = 1.67. The conversion factor α is based on the load combination assuming 100% wind load.
3. Tabulated values are for a single anchor with no infuence of another anchor.

Titen Turbo with C$_{min}$ Edge Distance on One Side and C$_{ac}$ on Three Sides

Titen Turbo with C$_{ac}$ Edge Distance on All Sides

Flat Slab

Flat Slab

* See page 2 for an explanation of the load table icons.

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