

# Concrete Anchors Designed to Conform to CSA A23.3-04



The latest edition of CSA A23.3-04 “Design of Concrete Structures” has been adopted by most jurisdictions in Canada. Engineers and designers are increasingly being required to specify anchors designed and tested to meet the new requirements of the code. CSA A23.3-04 Annex D (Informative) “Anchorage” addresses the additional requirements for anchorage design in Limit States Design format. This affects how and when post-installed concrete anchors are specified and what products will be suitable for use.

When designing concrete anchorages, designers are now being required to consider, among other things, whether conditions exist that may cause the concrete to crack. If it is determined such conditions do exist, anchors designed and tested for use in cracked concrete must be specified. If it is determined there is no risk of concrete cracking, the designer may choose to specify anchors approved for use in uncracked concrete.

Common conditions that cause cracking of concrete:

- Concrete in tension – such as in the underside of a slab
- Concrete elements located in areas prone to seismic activity
- Other forces that contribute to cracking which includes:
  - External short term loads (*such as high winds*)
  - Temperature variations
  - Shrinkage during curing



## DISTRIBUTION OF SIMPSON STRONG-TIE® ANCHORS

Simpson Strong-Tie Anchor Systems® products are available from leading Building & Construction Supply Houses across Canada.

Simpson Strong-Tie Anchors Systems supports the market with two distribution warehouses and field representatives in all provinces.

Call toll-free 1-800-999-5099

## Anchor Designer™ Software ACI 318



Anchor Designer™ software ACI 318 analyzes and suggests anchor solutions using the ACI 318, Appendix D: Ultimate Strength Design Methodology or CAN/CSA A23.3 Annex D Limit States Design Methodology. It provides cracked and uncracked concrete anchor solutions for numerous Simpson Strong-Tie Anchor Systems mechanical anchors. With its easy to use graphical interface, Anchor Designer software eliminates the need for tedious calculations by hand that would otherwise be necessary to determine cracked concrete anchor solutions.

### ANCHORS SUPPORTED:

- Strong-Bolt™ wedge anchor
- Titen HD® screw anchor
- Torq-Cut™ self undercutting anchor (*soon to be released*)

Free download from [www.simpsonanchors.com](http://www.simpsonanchors.com)



# Strong-Bolt™ Anchor Tested to meet CSA A23.3 Annex D

The Strong-Bolt™ wedge anchor is specifically designed for optimum performance in both cracked and uncracked concrete. Rigorously tested according to the latest industry-wide criteria, the Strong-Bolt anchor is proven to offer increased reliability in the most adverse conditions, including performance in cracked concrete under static and seismic loading. The proprietary tri-segmented clip has dual undercutting embossments on each segment which enable secondary or “follow-up” expansion if a crack forms and intersects the anchor location. This significantly increases the ability of the Strong-Bolt wedge anchor to carry load if the hole opened slightly due to a crack. The Strong-Bolt anchor sets like a standard wedge anchor and is available in standard (*non-metric*) fractional sizes.

## TEST CRITERIA:

The Strong-Bolt wedge anchor has been tested in accordance with ACI 355.2 “Qualification of Post-Installed Mechanical Anchors in Concrete” for the following:

- Static tension and shear loading in cracked and uncracked concrete
- Seismic and wind loading in cracked and uncracked concrete
- Performance in cracked concrete
- Performance in lightweight concrete over metal deck

## PRODUCT ATTRIBUTES:

- **Tri-segmented clip:** Each segment is able to adjust independently increasing follow-up expansion should the hole increase in size as a result of a crack.
- **Dual embossments on each clip segment:** Allows the clip to undercut into concrete increasing follow-up expansion should a crack occur.
- **316 stainless-steel clip:** In addition to superior corrosion resistance, a stainless-steel clip offers better “memory”. This memory contributes to the anchor’s performance should the hole size increase due to a crack.
- **Category 1 ( $\frac{1}{2}$ " and  $\frac{5}{8}$ " Diameter)**
- **Standard (ANSI) fractional size anchor:** Fit most fixtures and installs with common drill bit size and tools. No need to buy additional tools to install a metric anchor and no special couplers needed.
- **Installs like a standard wedge anchor:** No complicated installation procedure.



Strong-Bolt™  
wedge anchor



Tri-segmented clip



# Titen HD® Anchor Tested to meet CSA A23.3 Annex D



Titen HD®  
anchor

U.S. Patent  
5,674,035 and  
6,623,228

The Titen HD® anchor is a patented, high strength screw anchor for concrete and masonry. It is designed for optimum performance in both cracked and uncracked concrete. The high strength, easy-to-install Titen HD anchor has been tested and shown to provide outstanding performance in cracked and uncracked concrete under both static and seismic loading conditions. The self-undercutting, non-expansion characteristics of the Titen HD anchor make it ideal for structural applications, even at reduced edge distances and spacings. Recommended for permanent dry, interior non-corrosive environment or temporary outdoor applications.

## TEST CRITERIA:

The Titen HD anchor has been tested in accordance with ACI 355.2 “Qualification of Post-Installed Mechanical Anchors in Concrete” for the following:

- Static tension and shear loading in cracked and uncracked concrete
- Seismic and wind loading in cracked and uncracked concrete
- Performance in cracked concrete

## PRODUCT ATTRIBUTES:

- **Tested per ACI 355.2:** to ensure outstanding performance in both cracked and uncracked concrete
- **Higher load capacity and vibration resistance:** Threads along the length of the anchor undercut the concrete and efficiently transfer the load to the base material.
- **Vibration and shock resistance:** The mechanical interlock of the threads and the ratchet teeth on the underside of the head help prevent the anchor from loosening in vibratory conditions. The Titen HD anchor has been tested to 12.6 million vibratory cycles with no performance reductions.
- **Specialized heat-treating process:** Creates superior surface hardness at the tip to facilitate cutting, while at the same time not compromising ductility within the anchor body.
- **Less spacing and edge distance required:** The anchor does not exert expansion forces on the base material.
- **Easy post-installation inspections:** The head is stamped with the Simpson Strong-Tie® “≠” sign and the anchor length in inches.

*This flier is effective until December 31, 2009, and reflects information available as of December 1, 2008. This information is updated periodically and should not be relied upon after December 31, 2009; contact Simpson Strong-Tie for current information and limited warranty or see [www.simpsonanchors.com](http://www.simpsonanchors.com).*

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