Tie-Down Systems an Overview

Shear walls perform to the code only when the tie-downs have both the required strength and tightness. ICC ES recently determined that tie-downs systems must limit deflection to 0.200" at the design load and some engineers require deflection as low as 0.125" (⅛").

This catalog defines the new tie-down requirement and helps specify required components to meet those design requirements.

If you are new to self-adjusting tie-down systems begin with "Tie-Down Systems-Designing to the Code" (pg 20). This section covers the IBC, expected movement and wood shrinkage. Follow up with the section on Tie-Down Specifications starting on page 4. If you start with clear and precise specifications a turn key system can be designed by AutoTight in as little as 2 days.

Thank you for considering AutoTight.

Alfred Commins, President

Commins Manufacturing Inc.

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ICC ES 2013 Requirements

Effective April 1, 2013 per (ICC ES AC316) Tie-Down systems must meet a maximum elongation limit of 0.200". AutoTight designs systems to 0.200" or less every day. We make it look easy.

AutoTight is up to 61% Tighter!

When identical systems were compared, AutoTight was 61% tighter compared to a system using a leading ratchet. These systems used identical rod and identical bearing plates, the only difference is the Shrinkage Compensator. This comparison was made at a design elongation limit of 0.125". A similar comparison at the ICC ES 0.200" limit demonstrated the AutoTight system was 36% tighter. To view a side-by-side comparison of AutoTight versus a leading ratchet. Go to www.youtube.com/ Search for AutoTight

TIe-Down Design Per the IBC

As of April 1, 2013 Tie-Down Systems complying with the IBC must be designed for system strength and must limit system elongation to 0.200". Many designers believe even tighter design limit limits should be used and routinely require an elongation limit of 0.125". Tight elongation limits can be a design challenge. Using the AutoTight system with a screw type shrinkage compensator solves the problem.

We routinely design multistory systems using a proprietary algorithm. The following paragraph provides an overview of how to design a tie-down system that meets code strength and elongation limits using ICC AC 316, AC 391 and the IBC. The table below describes each component to be considered and shows how to determine both system strength and elongation.

Tie-Down Components: Strength and Elongation Summary

Component	Model #	Description	Length	Strength Limit	Elongation		Comment
Rod	Rod ID	Diameter/Material/Length		AISC 360	From Table	Adjusted	Follow AISC 360 13th ed!
Bearing Plate	Bearing or HD	Size: Width X Length X Thickness		AISC 360 and AF&PA 2005	0.040"	Per Actual Load	Double HD Elongation across a floor
Shrinkage Compensator	Model Number	Diameter, Expansion etc		Per ES Report	Per ES Report	Δ_A	Adjusted per Actual Load
				Per ES Report	Per ES Report	Δ_R	Full Value (No Adjustment)
Shrinkage	1/4" or ?	Calculate per code		Est. Cat. Pg 26		Estimated	Elongation is Cumulative
			Lowest of above	**Strength Limit**	**Elongation**	**SUM**	