Commins AutoTight® Rod Holdown System

What is it?

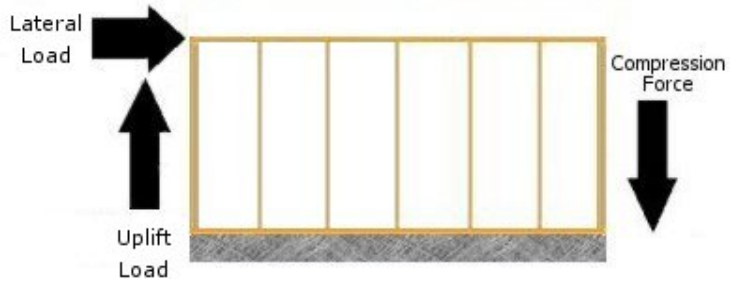
The AutoTight® Rod Holdown System is the premier low-cost structural holdown system. It uses threaded rod, steel plates and the AT Auto Take-Up™ to properly tie buildings down for lateral and uplift loading. The AT Auto Take-Up expands and keeps the building tight as the building shrinks, settles and moves. AutoTight™ installs faster than the competition.

To specify the AutoTight system the following steps are key:

- Gather the pertinent structural information.
- Organize and group the loads and runs in a table.
- Specify the rod size based on the loads
- Calculate the Differential Load for each level
- Specify the required components, rod, plates, take-up devices

Key Structural Information:

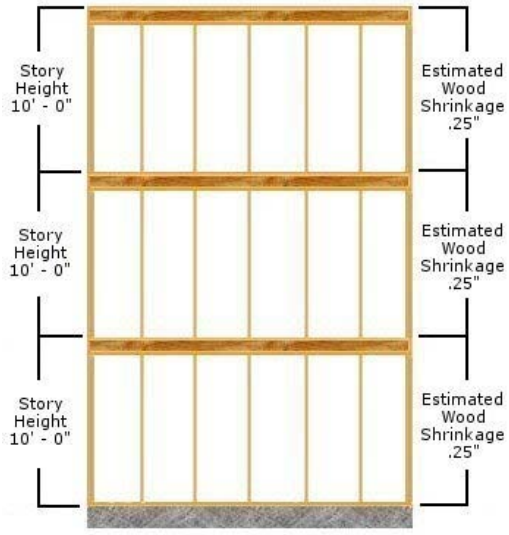
1. Uplift force-Cumulative and per floor. Determine the uplift force on a level-by-level basis. Add the loads together to determine the required rod size. This will is used for rod, take-up, and plate sizing.



2. Wood Material: Determine the wood species, grade and size to be used.

3. Building Standard: Specify the building standard to be used. Note any additional state, or local codes.

4. Wood Shrinkage: Specify the expected shrinkage per floor. Because of the many variables, (Species, Starting MC (Moisture Content), Ending MC, wood stack height) this can be difficult to do. Please see Appendix 1, Shrinkage Table for Wood Buildings, for guidance. Using this graph greatly simplifies shrinkage calculations. Call the factory for additional information.



5. Story Height: this is the ceiling height plus the floor height above, or the carpet-to-carpet distance.

6. Wall Width (4” or 6”) for each run, to help specify trimmers and bearing plates.

Organize the Runs and Specify the Threaded Rod

1. Group the runs by number of levels and similar uplift loading. (Stacked runs work best) Most walls use two identical runs, one at each end of the shear wall.
2. Identify and mark the runs. A number that correlates with the number of floors and a letter for each run type is typical. (Example 3A, 3B, 3C or 3.1, 3.2 etc.).
3. Create a Load Justification Table to show the runs, loads, rod, story heights and wood shrinkage. Table A shows a typical table.

Sample Load Justification (Table A)

	3A			4A			5A				
Level	Reqd Load lbs	Tension Load Rod	Diff. Load Plate	Reqd Load lbs	Tension Load Rod	Diff. Load Plate	Reqd Load lbs	Tension Load Rod	Diff. Load Plate	Story Heights	Estimated Wood Shrinkage
5							3,500	6,136 R5		10" - 0"	0.25"
4				3,500	6,136 R5		6,500	6,136 R5		10' - 0"	0.25"
3	3,000	6,136 R5		6,500	6,136 R5		10,000	15,708 R8		10" - 0"	0.25"
2	5,500	6,136 R5		11,500	15,708 R8		16,000	15,708 R8		10' - 0"	0.25"
1	8,000	8,836 R6		17,500	15,708 R8		25,000	24,544 R10		10" - 0"	0.25"

Sample Load Justification (Table A) lists three runs, Run 3A, 4A and 5A The table includes the following required information:

Required Loads = Cumulative uplift force for each level
Story Heights = 10'-0" for each level
Estimate wood Shrinkage = ¼" / level
Building Code = 2003 IBC
Take-Up devices may skip floors
Wood Type = Douglas Fir-Larch
Walls = Six (6) inches

4. Select the threaded rod for the required load on each level. Use Commins Autotight Table 1a for the 2003 IBC and Table 2a for the 1997 UBC. (Note the rod diameter is designated in $1/8^{th}$ of an inch. R6 is $6/8^{th}$ inch or ¾").

Table explanation: The table is divided into three sections. The rod is specified on the left side. The plates are specified in the center and the take-up devices are on the right.
Select the rod to carry the uplift load on all floors above each load transfer point.
Select the plate based on the differential load at each load transfer point.
Select the AT Auto Take-Up based on the differential load and the rod diameter over which it fits.

Example run 3A (level 1) requires 8,000 lbs. capacity. Select an R6 rod from ICC Table 1a with the allowable load of 8,826 lbs. Levels 2 and 3 require 5,500 lbs. and 3,000 lbs

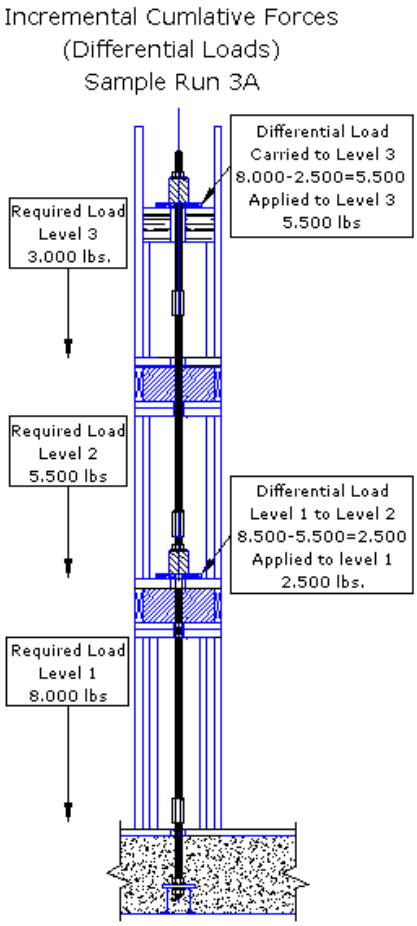
respectively. Select an R5 rod from ICC Table 1a. The allowable load is 6,136 lbs. R5 rod will be used for the balance of the run to simplify the installation and design.

Calculate the Differential Load (incremental uplift force). The differential load is the difference between the uplift load at each level vs. the level above. This load transfer point is where the uplift load is transferred into the structure. This may happen on every level or may skip levels.

(Note: if a load transfer point is used on every level, fewer trimmers will be used and plate sizes can be smaller. However, more take-up devices and plates will be needed. If floors are skipped then fewer take-up devices are required but rod size and trimmers may be increased.)

Sample: Run 3A uses R6 rod (3/4") on level 1 and R5 rod (5/8") on levels 2 and 3. Take-Up devices are always installed at levels where the threaded rod size changes.

1. In sample Run 3A, the differential load transfer will occur at level 1 and level 3.
2. The differential load at level 1 is the difference between level 1and 2. (8,000-5,500 = 2,500 lbs.)
3. The differential load at level 3 is the remaining run load. (8,000 – 2,500 = 5,500 lbs.)



Note: Load transfer points are always on the floor of the story above. Loads are carried through the floor and into the story below. (Exception: when a header is used with short trimmers in a wall, usually at the top floor)

Sample Load Justification (Table B)

	3A			4A			5A				
Level	Reqd Load lbs	Tension Load Rod	Diff. Load Plate	Reqd Load lbs	Tension Load Rod	Diff. Load Plate	Reqd Load lbs	Tension Load Rod	Diff. Load Plate	Story Heights	Estimated Wood Shrinkage
5							3,500	6,136 R5	6,000	10" - 0"	0.25"
4				3,500	6,136 R5	6,000	6,000	6,136 R5		10' - 0"	0.25"
3	3,000	6,136 R5	5,500	6,000	6,136 R5		10,000	15,708 R8	9,500	10" - 0"	0.25"
2	5,500	6,136 R5		11,000	15,708 R8	9,500	15,500	15,708 R8		10' - 0"	0.25"
1	8,000	8,836 R6	2,500	15,500	15,708 R8		24,500	24,544 R10	9,000	10" - 0"	0.25"

After the differential load information is put into the table the balance of the runs can be determined.

Specifying the AutoTight components.

1. Rod diameter will determine which AT Take-Up device will be used. (ICC Tables 1a or UBC Table 2a can be used). The AT 75 fits up to ¾" rod, the AT 100 fits up to 1" and the AT 125 fits up to 1-1/4" rod. Verify that the AT compression capacity is not exceeded.

2. In runs 4A and 5A some of the levels have been combined by extending the larger rod to the floor above. This is done when a take-up device is not required at every level (per the structural plans.)

3. A bearing plate is required with each take-up device. Bearing plates are selected based on the required loads at each floor. Example: Run 4A level 2 requires 9,500 lbs. Select an S10 plate with 10,156 lbs capacity in Df-L. (See ICC Table 1a).

4 The table is self-explanatory. Consult factory for special conditions.

Sample Load Justification (Table C)

	3A			4A			5A				
Level	Reqd Load lbs	Tension Load Rod	Diff. Load Plate	Reqd Load lbs	Tension Load Rod	Diff. Load Plate	Reqd Load lbs	Tension Load Rod	Diff. Load Plate	Story Heights	Estimated Wood Shrinkage
5							3,500	6,136 R5	6,000 S8	10" - 0"	0.25"
4				3,500	6,136 R5	6,000 S8	6,000	6,136 R5		10' - 0"	0.25"
3	3,000	6,136 R5	5,500 S8	6,000	6,136 R5		10,000	15,708 R8	9,500 S10	10" - 0"	0.25"
2	5,500	6,136 R5		11,000	15,708 R8	9,500 S10	15,500	15,708 R8		10' - 0"	0.25"
1	8,000	8,836 R6	2,500 S8	15,500	15,708 R8		24,500	24,544 R10	9,000 S10	10" - 0"	0.25"

5. The threaded rod length is determined by the story height and the height of the termination header at the top level.

6. Trimmers (Compression Studs) are determined by the differential loading on a floor by floor level. Some framers prefer a single trimmer while others prefer laminated trimmers (a 4 x 6 vs. 2 ea 2 x 6's). Optional combinations can often be used depending on framer preferences.

7 The embedded anchor rod is normally the same as the level 1 threaded rod. The embedment plate and depth are determined by using the embedment table along with the concrete strength. Hint: It may be more cost effective to specify only one or two embedment diameters. This makes placement much easier for the contractor. Reducer couplers transition the rod to the required size.