WALSH CONSTRUCTION CO.

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Submittal Sheet

112223- The Canopy Apartments at Powell

Project: 112223-
The Canopy Apartments at Powell

,

Spec Section: 06 19 50
Submittal: 061950-02
Revision: 1
Package:
Date: 4/29/2022 UTC

Submittal Title: Continuous Rod Tie Downs Bldg B
Submittal Detail:
Response Due By: 5/6/2022 UTC

Walsh Review:

Project Name: The Canopy Apartments at Powell
Submittal Package #:
Submittal ID #: 061950-02
Date Submitted: 4/29/2022 UTC
Spec Section: 06 19 50

The review by ("Walsh Construction Co") of the above Submittal is subject to the Contract Documents and Shall not relieve the Subcontractor/Supplier from any of its obligations under the agreement with Walsh nor give rise to any claim in favor of the Subcontractor/Supplier or third parties against Walsh or Owner.

By: Haki Woods

Architect Review:

Other Review:

- [x] NO EXCEPTIONS TAKEN
- [ ] REVISE AND RESUBMIT
- [ ] MAKE CORRECTIONS NOTED
- [ ] REVIEW NOT REQUIRED

This review is only for general conformance with the design concept and the information given in the Construction Documents. Corrections or comments made on the submittal during this review do not relieve the contractor from compliance with the requirements of the plans and specifications. Review of a specific item shall not include review of an assembly of which the item is a component. The Contractor is responsible for: dimensions to be confirmed and correlated at the jobsite; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences and procedures of construction; coordination of the Work with that of all other trades and performing all Work in a safe and satisfactory manner.

kpff

KPFF Consulting Engineers
Date 05/06/2022
By nkennedy

Notes:

AutoTight Tie-Down Systems™

Commins Manufacturing 360-378-9484

Submittal Cover Sheet with Latest Documents List

Cover Sheet Date:	04/29/22	**Rev 1**	Submittal Package
Project:	Canopy Bldg B		
Project Number:	21-2371		

Document File Name	Revision	Rev Date	Changed Today?
21-2371 Canopy Bldg B ATS10 Holdown Run Details 03-30 -22	0	3/30/2022	No
21-2371 Canopy Bldg B ATS11 Sh 1 Holdown Run Elevations 03-30-22	0	3/30/2022	No
21-2371 Canopy Bldg B ATS11 Sh 2 Holdown Run Elevations 03-30-22	0	3/30/2022	No
21-2371 Canopy Bldg B ATS12 Anchor Bolt Details 03-30-22	0	3/30/2022	No
21-2371 Canopy Bldg RL-1 Run Locator 3-30-22	1	4/28/2022	Yes
21-2371 Canopy Bldg RL-2 Run Locator 3-30-22	1	4/28/2022	Yes
21-2371 Canopy Bldg B Calcs Package 03-30-22 (incl: Compression Posts)	0	3/30/2022	No
21-2371 Canopy Bldg B Load Table	0	3/30/2022	No
Attachment to Submittal - Catalog Pages & ESR-1344	0	3/30/2022	No

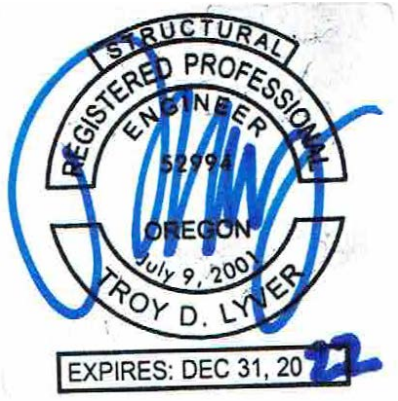
Takeoff: 21-2371 Canopy Bldg B Rev 3 Eng 03-30-22 SBS Threaded

AutoTight® Rod Holdown System

System Design for

The Canopy Apts Bldg B

LYVER ENGINEERING AND DESIGN
7950 SE 106th, Portland, Oregon 97266
Ph: 503.705.5283 Fax: 503.482.7449 TroyL@Lyver-EAD.com www.Lyver-EAD.com



NO EXCEPTIONS TAKEN ☐ REVISE AND RESUBMIT
☐ MAKE CORRECTIONS NOTED ☐ REVIEW NOT REQUIRED

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kpff
KPFF Consulting Engineers
Date 05/06/2022
By nkennedy

Prepared for

WMX Construction, LLC

prepared by William Haviland
Commins Project ID # 21-2371

Includes ICC ES 1344 Code Report,
http://www.icc-es.org/reports/pdf_files/ICC-ES/ESR-1344.pdf#view=fit

Plan Set: Construction Set Plan Set Date: 01/07/2022

Calculation Package Revision: 0 Take-Off Revision: Rev 3 Eng

Calcs Date 03/30/2022

(1) Key to Calculation Table

THIS PAGE SAMPLE RUN ONLY

AutoTight® System Run Design Calc. Sheet for: (2) **Project Name**
Engineering Calcs Revision: 1 **Plan Set: BID SET** **Plan Set Date: mm/dd/yyyy**

Project Number:	(6)		(3)	(4)	CAT ID #	##-####	(5)
Run Name:	**1**	Run Qty:	4		Tensile Strength	Calc'd	

(7) (8) (9) (10) (11) (12) (13) (14)

Run Specifications Required Loads:		Component Commins AutoTight	Description	Capacity (kips)	Demand (kips)	D/C Ratio	Elong. (in.)	
(15) Level = 2		Component	Description	Capacity	Demand	D/C	Elong.	
(16) Differential Load:	4.00 (kips)	AT 125	Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)	**1.10**	**0.50**	**45.5%**	-	(22)
(17) Tension Load:	20.00 (kips)	AT 125	Shrinkage Device (1-1/4" I.D.) - Allowable Load	34.50	4.00	11.6%	-	(23)
(18) Compression:	20.00 (kips)	-	Shrinkage Device - Deflection at Load	-	-	-	0.002	(24)
(19) Story Height:	12.50 (ft.)	-	Shrinkage Device - Travel and Seating Increment ΔR	-	-	-	0.002	(25)
(20) Plate Height:	11.33 (ft.)	S8L	Bearing Plate at Reaction Point	7.96	4.00	50.2%	0.020	(26)
(21) Floor Depth:	14.00 (in.)	R9	1-1/8"-A307 Tension Rod	22.37	20.00	89.4%	0.125	(27)
		-	No Stretch Rod	#N/A	20.00	0.0%	n/a	(28)
		-	Wood Beam Start Bearing Plate	n/a	n/a	0.00	n/a	(29)
		-	Steel Beam Start in Tension	n/a	n/a	0.00	n/a	(30)
	Limiting Component Tension Load Capacity, Load and D/C Ratio			**22.37**	**20.00**	**89.4%**	-	(31)
	Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation			**0.200**	-	**74.5%**	**0.149**	(32)
Compression Wood	Outer Posts (1) 4x8 (3) 2x6	(1) 4x8 (3) 2x6 Inner Posts	4x Wall Post per Side of Rod-Enter by Hand as Needed	32.08	20.00	62.3%	-	(33)
			6x Wall Post per Side of Rod-Enter by Hand as Needed	30.93	20.00	64.7%	-	(34)
Level = Footing		Component	Description	Capacity	Demand	D/C	Elong.	
Tension Load:	20.00 (kips)	R9	1-1/8"-A307 Anchor Rod	22.37	20.00	89.4%	n/a	(35) (36)

Notes:
(1) All these cells are filled with data from the AutoTight Run Designer spreadsheet's Project Info page and Load Justification Table page.
(2) The Builder's Name of the project.
(3) The revision level of the plan set.
(4) The Bid Date.
(5) The Commins Mfg. project number.
(6) The Builder's number for the project.
(7) The name of this run.
(8) Commins AutoTight part number.
(9) The quantity of this type of run.
(10) This column is the description of the component shown on each row
(11) This column of the table is the Load Capacities of the various components.
(12) This column of the table is the Load placed on the various components.
(13) This column of the table is the Demand / Capacity ratio for each component.
(14) This column is the contribution of each componenent to the total elongation for this level, and the total elongation for the level.
Elongation numbers are in blue text.
(15) The name of this level.
(16) Differential Load applied by this level.
(17) Total tension in rod at this level.
(18) Compression load on the compression posts at this level.
(19) Story Height carpet to carpet.
(20) Top of Sill Plate to Top of Sill Plate height of this level.
(21) Depth of floor beams.
(22) This row compares the total shrinkage at this level with the capacity of the AT's to take up this shrinkage.
(23) This row compares the load capacity of the AT device to the load applied to it. Per AC316 Sec. 1.4.5
(24) This row shows the deflection of the AT device(s) under the applied load. Per AC316 Sec. 1.4.8
(25) This row shows the ΔR=Travel and Seating increment of the AT Device(s). Per AC316 Sec. 1.4.7
(26) This row shows Bearing Plate Load Capacity and compares to its Load also its deflection's contribution to the total Elongation.
(unless the calcs call for rod stretch only.) (It sees only the differential load.) Per AF&PA NDS Tbl 4A, 4B incl Cf factor.
(27) This row shows Tension Rod Load Capacity and compares to its Load, also its deflection's contribution to the total Elongation. Per AISC 360-05
(28) This row shows Stretch Rod Load Capacity and compares to its Load, also its deflection's contribution to the total Elongation. Only if Stretch Rod is used.
(29) This row shows the Wood Beam Start's Bearing Plate Load Capacity and compares to its Load, also its deflection's contribution to the total Elongation.
(Only if a Wood Beam Start is used.) (It sees the tension load.) Per AF&PA-NDS Tbl 4A, 4B incl Cf factor.
(30) This row shows the Steel Beam Start's Load Capacity and compares to its Load, also its deflection's contribution to the total Elongation.
(Only if a Steel Beam Start is used.) (It sees the tension load.) The rod seats on the steel beam and the weld cross section is greater than the rod cross section so the Steel Beam Start elongation is included in rod elongation. Per ICC ES-1344 & 5889
(31) This row shows worst case component's Load and compares to its Load Capacity.
(32) This row shows the maximum allowed Elongation and the total Elongation calculated for this level.
(33) This row shows the inner and outer compression post required, their load capacities and loads if the wall is 4x.
It is used only if Commins Mfg specifies the Compression Posts and is filled in manually. If line is not shown posting is per structural drawing.
(34) This row shows the inner and outer compression post required, their load capacities and loads if the wall is 6x.
It is used only if Commins Mfg specifies the Compression Posts and is filled in manually. If line is not shown posting is per structural drawing.
(35) This row shows the load capacity of the Anchor Rod embedded in the concrete and compares to its load, if used. (Not the concrete strength)
(36) Anchor bolt elongation is included in the length of the tension rods.
(37) Nuts, Coupler Nuts and Reducing Coupler Nuts are not listed individually because they are grade compatible with the Tension Rod.
(38) Nuts, Coupler Nuts and Reducing Coupler Nuts calculated contribution to elongation is 0.0005 inch or less.
(39) Revision level of this document

AutoTight® System Run Design Calc. Sheet for: **The Canopy Apts Bldg B**

Engineering Calcs Revision: 0 **Plan Set: Construction Set** **Plan Set Date: 01/07/2022**

Permit #							CAT ID #	21-2371		
Run Name:	**A4**						Tensile Strength			Calc'd
Run Specifications			Component		Description		Capacity (kips)	Demand (kips)	D/C Ratio	Elong. (in.)
Demand Loads:			Commins AutoTight							
Level = Level 4			Component		Description		Capacity	Demand	D/C	Elong.
Differential Load:	2.00 (kips)		AT4A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)		**1.50"**	**1.00"**	**66.7%**	
Tension Load:	2.00 (kips)		AT4A-1.5		Shrinkage Device - 1.5" (1/2" I.D.) - Allowable Load		6.45	2.00	31.0%	-
Compression:	8.00 (kips)		-		Shrinkage Device - Deflection at Load		-	-	-	0.003
Story Height:	8.71 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR		-	-	-	0.000
Plate Height:	8.71 (ft.)		S5-3/4"		Bearing Plate at Reaction Point		5.96	2.00	33.5%	0.013
			R4G36		1/2"-G36 Tension Rod		4.27	2.00	46.8%	0.025
					Limiting Component Tension Load Capacity, Load and D/C Ratio		**4.27**	**2.00**	**46.8%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation		**0.200**	-	**21.0%**	**0.042**
Compression	Outer	(2) 2x4	(1) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet		9.84	8.00	81.3%	-
Wood	Posts	(1) 2x6	(1) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet		10.31	8.00	77.6%	-

Level = Level 3			Component		Description	Capacity	Demand	D/C	Elong.
Differential Load:	3.00 (kips)		AT6A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)	**1.50"**	**0.75"**	**50.0%**	-
Tension Load:	5.00 (kips)		AT6A-1.5		Shrinkage Device - 1.5" (3/4" I.D.) - Allowable Load	10.55	3.00	28.4%	-
Compression:	15.00 (kips)		-		Shrinkage Device - Deflection at Load	-	-	-	0.003
Story Height:	9.63 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR	-	-	-	0.000
Plate Height:	8.77 (ft.)		S5-3/4"		Bearing Plate at Reaction Point	5.96	3.00	50.3%	0.020
Floor Depth:	10.25 (in.)		R5G36		5/8"-G36 Tension Rod	6.67	5.00	75.0%	0.077
					Limiting Component Tension Load Capacity, Load and D/C Ratio	**6.67**	**5.00**	**75.0%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation	**0.200**	-	**50.0%**	**0.100**
Compression	Outer	(2) 2x4	(4) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet	17.16	15.00	87.4%	-
Wood	Posts	(2) 2x6	(1) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet	15.47	15.00	97.0%	-

Level = Level 2			Component		Description	Capacity	Demand	D/C	Elong.
Differential Load:	7.00 (kips)		AT8A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)	**1.75"**	**0.50"**	**28.6%**	-
Tension Load:	12.00 (kips)		AT8A-1.5		Shrinkage Device (1" I.D.) - 1.75" - Allowable Load	20.75	7.00	33.7%	-
Compression:	18.00 (kips)		-		Shrinkage Device - Deflection at Load	-	-	-	0.001
Story Height:	9.63 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR	-	-	-	0.000
Plate Height:	8.77 (ft.)		S7-1"		Bearing Plate at Reaction Point	7.86	7.00	89.0%	0.036
Floor Depth:	10.25 (in.)		R7G36		7/8"-G36 Tension Rod	13.08	12.00	91.7%	0.104
					Limiting Component Tension Load Capacity, Load and D/C Ratio	**13.08**	**12.00**	**91.7%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation	**0.200**	-	**70.0%**	**0.140**
Compression	Outer	(2) 2x4	(5) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet	20.02	18.00	89.9%	-
Wood	Posts	(2) 2x6	(2) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet	20.62	18.00	87.3%	-

Level = Level 1			Component		Description	Capacity	Demand	D/C	Elong.
Differential Load:	2.00 (kips)		AT8A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)	**1.75"**	**0.25"**	**14.3%**	-
Tension Load:	14.00 (kips)		AT8A-1.5		Shrinkage Device (1" I.D.) - 1.75" - Allowable Load	20.75	2.00	9.6%	-
Compression:	27.00 (kips)		-		Shrinkage Device - Deflection at Load	-	-	-	0.000
Story Height:	11.00 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR	-	-	-	0.000
Plate Height:	10.15 (ft.)		S7-1"		Bearing Plate at Reaction Point	7.86	2.00	25.4%	0.010
Floor Depth:	10.25 (in.)		R7G55		7/8"-G55 Tension Rod	16.91	14.00	82.8%	0.138
					Limiting Component Tension Load Capacity, Load and D/C Ratio	**16.91**	**14.00**	**82.8%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation	**0.200**	-	**74.5%**	**0.149**
Compression	Outer	(2) 2x4	(11) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet	28.35	27.00	95.2%	-
Wood	Posts	(2) 2x6	(4) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet	30.94	27.00	87.3%	-

Level = Footing		Component	Description	Capacity	Demand	D/C	Elong.
Tension Load:	14.00 (kips)	R7G36	7/8"-G36 Anchor Rod	13.08	14.00	107.0%	n/a

Design Code: OSSC_2019 Main/State/Local
Loads per: S7.11 01/07/2022
Loads Type: ASD
Steel Stess Increase: No
Takeup Device at Each Level: Yes
Take Off Revision: Rev 3 Eng
Elongation Limit Required: Yes
Elongation Limit per Connection: 0.200 (inch) between load reaction points.
Elongation Components: System Stretch Includes sum of: Rod, Bearing Plate, Shrinkage Device ΔA & Shrinkage Device ΔR.
Shrinkage: 0.250 inch per floor
Shearwall Plates Wood Species: DFL Douglas Fir-Larch
Shearwall Plate Compression Capacity (Cross Grain): 625 psi (all grades)
Compression Post Wood Species: DFL Douglas Fir-Larch
Compression Post Wood Capacity (Parallel to Grain): 1350 psi
Compression Post Design: per AutoTight
Compression Post Species: per Structural Plans S0.03
Compression Post Nail Qty: Allowable per 16d Sinker in DFL = 189, Qty nails = 12, Allowable load = 2.27 kips, Total load = 2.00 kips, D/C = 88.3% .
Rod Alloys: G36 Rod is F1554 Grade 36, G55 Rod is F1554 Grade 55, G105 Rod is F1554 Grade 105

AutoTight® System Run Design Calc. Sheet for: **The Canopy Apts Bldg B**

Engineering Calcs Revision: 0 **Plan Set: Construction Set** **Plan Set Date: 01/07/2022**

Permit #							CAT ID #	21-2371		
Run Name:	**B4**						Tensile Strength			Calc'd
Run Specifications			Component		Description		Capacity (kips)	Demand (kips)	D/C Ratio	Elong. (in.)
Demand Loads:			Commins AutoTight							
Level = Level 4			Component		Description		Capacity	Demand	D/C	Elong.
Differential Load:	3.00 (kips)		AT4A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)		**1.50"**	**1.00"**	**66.7%**	
Tension Load:	3.00 (kips)		AT4A-1.5		Shrinkage Device - 1.5" (1/2" I.D.) - Allowable Load		6.45	3.00	46.5%	-
Compression:	10.00 (kips)		-		Shrinkage Device - Deflection at Load		-	-	-	0.005
Story Height:	8.71 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR		-	-	-	0.000
Plate Height:	8.71 (ft.)		S5-3/4"		Bearing Plate at Reaction Point		5.96	3.00	50.3%	0.020
			R4G36		1/2"-G36 Tension Rod		4.27	3.00	70.3%	0.033
					Limiting Component Tension Load Capacity, Load and D/C Ratio		**4.27**	**3.00**	**70.3%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation		**0.200**	-	**29.0%**	**0.058**
Compression	Outer	(2) 2x4	(2) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet		13.12	10.00	76.2%	-
Wood	Posts	(1) 2x6	(1) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet		10.31	10.00	97.0%	-

Level = Level 3			Component		Description	Capacity	Demand	D/C	Elong.
Differential Load:	4.00 (kips)		AT6A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)	**1.50"**	**0.75"**	**50.0%**	-
Tension Load:	7.00 (kips)		AT6A-1.5		Shrinkage Device - 1.5" (3/4" I.D.) - Allowable Load	10.55	4.00	37.9%	-
Compression:	20.00 (kips)		-		Shrinkage Device - Deflection at Load	-	-	-	0.004
Story Height:	9.63 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR	-	-	-	0.000
Plate Height:	8.77 (ft.)		S5-3/4"		Bearing Plate at Reaction Point	5.96	4.00	67.1%	0.027
Floor Depth:	10.25 (in.)		R6G36		3/4"-G36 Tension Rod	9.61	7.00	72.8%	0.078
					Limiting Component Tension Load Capacity, Load and D/C Ratio	**9.61**	**7.00**	**72.8%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation	**0.200**	-	**54.5%**	**0.109**
Compression	Outer	(2) 2x4	(5) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet	20.02	20.00	99.9%	-
Wood	Posts	(2) 2x6	(2) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet	20.62	20.00	97.0%	-

Level = Level 2			Component		Description	Capacity	Demand	D/C	Elong.
Differential Load:	8.00 (kips)		AT8A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)	**1.75"**	**0.50"**	**28.6%**	-
Tension Load:	15.00 (kips)		AT8A-1.5		Shrinkage Device (1" I.D.) - 1.75" - Allowable Load	20.75	8.00	38.6%	-
Compression:	33.00 (kips)		-		Shrinkage Device - Deflection at Load	-	-	-	0.002
Story Height:	9.63 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR	-	-	-	0.000
Plate Height:	8.77 (ft.)		S11-1-1/4"		Bearing Plate at Reaction Point	11.95	8.00	67.0%	0.027
Floor Depth:	10.25 (in.)		R7G55		7/8"-G55 Tension Rod	16.91	15.00	88.7%	0.123
					Limiting Component Tension Load Capacity, Load and D/C Ratio	**16.91**	**15.00**	**88.7%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation	**0.200**	-	**75.5%**	**0.151**
Compression	Outer	(2) 2x4	(10) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet	34.32	33.00	96.2%	-
Wood	Posts	(2) 2x6	(5) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet	36.09	33.00	91.4%	-

Level = Level 1			Component		Description	Capacity	Demand	D/C	Elong.
Differential Load:	2.00 (kips)		AT8A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)	**1.75"**	**0.25"**	**14.3%**	-
Tension Load:	17.00 (kips)		AT8A-1.5		Shrinkage Device (1" I.D.) - 1.75" - Allowable Load	20.75	2.00	9.6%	-
Compression:	39.00 (kips)		-		Shrinkage Device - Deflection at Load	-	-	-	0.000
Story Height:	11.00 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR	-	-	-	0.000
Plate Height:	10.15 (ft.)		S7-1"		Bearing Plate at Reaction Point	7.86	2.00	25.4%	0.010
Floor Depth:	10.25 (in.)		R8G36		1"-G36 Tension Rod	17.08	17.00	99.5%	0.128
					Limiting Component Tension Load Capacity, Load and D/C Ratio	**17.08**	**17.00**	**99.5%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation	**0.200**	-	**69.0%**	**0.138**
Compression	Outer	(2) 2x4	(16) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet	39.26	39.00	99.3%	-
Wood	Posts	(2) 2x6	(6) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet	41.25	39.00	94.5%	-

Level = Footing		Component	Description	Capacity	Demand	D/C	Elong.
Tension Load:	17.00 (kips)	R8G36	1"-G36 Anchor Rod	17.08	17.00	99.5%	n/a

Design Code: OSSC_2019 Main/State/Local
Loads per: S7.11 01/07/2022
Loads Type: ASD
Steel Stess Increase: No
Takeup Device at Each Level: Yes
Take Off Revision: Rev 3 Eng
Elongation Limit Required: Yes
Elongation Limit per Connection: 0.200 (inch) between load reaction points.
Elongation Components: System Stretch Includes sum of: Rod, Bearing Plate, Shrinkage Device ΔA & Shrinkage Device ΔR.
Shrinkage: 0.250 inch per floor
Shearwall Plates Wood Species: DFL Douglas Fir-Larch
Shearwall Plate Compression Capacity (Cross Grain): 625 psi (all grades)
Compression Post Wood Species: DFL Douglas Fir-Larch
Compression Post Wood Capacity (Parallel to Grain): 1350 psi
Compression Post Design: per AutoTight
Compression Post Species: per Structural Plans S0.03
Compression Post Nail Qty: Allowable per 16d Sinker in DFL = 189, Qty nails = 16, Allowable load = 3.02 kips, Total load = 3.00 kips, D/C = 99.3% .
Rod Alloys: G36 Rod is F1554 Grade 36, G55 Rod is F1554 Grade 55, G105 Rod is F1554 Grade 105

AutoTight® System Run Design Calc. Sheet for: **The Canopy Apts Bldg B**

Engineering Calcs Revision: 0 **Plan Set: Construction Set** **Plan Set Date: 01/07/2022**

Permit #							CAT ID #	21-2371		
Run Name:	**B4-elv**						Tensile Strength			Calc'd
Run Specifications			Component		Description		Capacity (kips)	Demand (kips)	D/C Ratio	Elong. (in.)
Demand Loads:			Commins AutoTight							
Level = Level 4			Component		Description		Capacity	Demand	D/C	Elong.
Differential Load:	3.00 (kips)		AT4A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)		**1.50"**	**1.00"**	**66.7%**	
Tension Load:	3.00 (kips)		AT4A-1.5		Shrinkage Device - 1.5" (1/2" I.D.) - Allowable Load		6.45	3.00	46.5%	-
Compression:	10.00 (kips)		-		Shrinkage Device - Deflection at Load		-	-	-	0.005
Story Height:	8.71 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR		-	-	-	0.000
Plate Height:	8.71 (ft.)		S5-3/4"		Bearing Plate at Reaction Point		5.96	3.00	50.3%	0.020
			R4G36		1/2"-G36 Tension Rod		4.27	3.00	70.3%	0.033
					Limiting Component Tension Load Capacity, Load and D/C Ratio		**4.27**	**3.00**	**70.3%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation		**0.200**	-	**29.0%**	**0.058**
Compression	Outer	(2) 2x4	(2) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet		13.12	10.00	76.2%	-
Wood	Posts	(1) 2x6	(1) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet		10.31	10.00	97.0%	-

Level = Level 3			Component		Description	Capacity	Demand	D/C	Elong.
Differential Load:	4.00 (kips)		AT6A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)	**1.50"**	**0.75"**	**50.0%**	-
Tension Load:	7.00 (kips)		AT6A-1.5		Shrinkage Device - 1.5" (3/4" I.D.) - Allowable Load	10.55	4.00	37.9%	-
Compression:	20.00 (kips)		-		Shrinkage Device - Deflection at Load	-	-	-	0.004
Story Height:	9.63 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR	-	-	-	0.000
Plate Height:	8.77 (ft.)		S5-3/4"		Bearing Plate at Reaction Point	5.96	4.00	67.1%	0.027
Floor Depth:	10.25 (in.)		R6G36		3/4"-G36 Tension Rod	9.61	7.00	72.8%	0.078
					Limiting Component Tension Load Capacity, Load and D/C Ratio	**9.61**	**7.00**	**72.8%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation	**0.200**	-	**54.5%**	**0.109**
Compression	Outer	(2) 2x4	(5) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet	20.02	20.00	99.9%	-
Wood	Posts	(2) 2x6	(2) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet	20.62	20.00	97.0%	-

Level = Level 2			Component		Description	Capacity	Demand	D/C	Elong.
Differential Load:	8.00 (kips)		AT8A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)	**1.75"**	**0.50"**	**28.6%**	-
Tension Load:	15.00 (kips)		AT8A-1.5		Shrinkage Device (1" I.D.) - 1.75" - Allowable Load	20.75	8.00	38.6%	-
Compression:	33.00 (kips)		-		Shrinkage Device - Deflection at Load	-	-	-	0.002
Story Height:	9.63 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR	-	-	-	0.000
Plate Height:	8.77 (ft.)		S11-1-1/4"		Bearing Plate at Reaction Point	11.95	8.00	67.0%	0.027
Floor Depth:	10.25 (in.)		R7G55		7/8"-G55 Tension Rod	16.91	15.00	88.7%	0.123
					Limiting Component Tension Load Capacity, Load and D/C Ratio	**16.91**	**15.00**	**88.7%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation	**0.200**	-	**75.5%**	**0.151**
Compression	Outer	(2) 2x4	(10) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet	34.32	33.00	96.2%	-
Wood	Posts	(2) 2x6	(5) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet	36.09	33.00	91.4%	-

Level = Level 1			Component		Description	Capacity	Demand	D/C	Elong.
Differential Load:	2.00 (kips)		AT8A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)	**1.75"**	**0.25"**	**14.3%**	-
Tension Load:	17.00 (kips)		AT8A-1.5		Shrinkage Device (1" I.D.) - 1.75" - Allowable Load	20.75	2.00	9.6%	-
Compression:	39.00 (kips)		-		Shrinkage Device - Deflection at Load	-	-	-	0.000
Story Height:	11.00 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR	-	-	-	0.000
Plate Height:	10.15 (ft.)		S7-1"		Bearing Plate at Reaction Point	7.86	2.00	25.4%	0.010
Floor Depth:	10.25 (in.)		R8G36		1"-G36 Tension Rod	17.08	17.00	99.5%	0.128
					Limiting Component Tension Load Capacity, Load and D/C Ratio	**17.08**	**17.00**	**99.5%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation	**0.200**	-	**69.0%**	**0.138**
Compression	Outer	(2) 2x4	(16) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet	39.26	39.00	99.3%	-
Wood	Posts	(2) 2x6	(6) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet	41.25	39.00	94.5%	-

Level = Footing		Component	Description	Capacity	Demand	D/C	Elong.
Tension Load:	17.00 (kips)	R8G36	1"-G36 Anchor Rod	17.08	17.00	99.5%	n/a

Design Code: OSSC_2019 Main/State/Local
Loads per: S7.11 01/07/2022
Loads Type: ASD
Steel Stess Increase: No
Takeup Device at Each Level: Yes
Take Off Revision: Rev 3 Eng
Elongation Limit Required: Yes
Elongation Limit per Connection: 0.200 (inch) between load reaction points.
Elongation Components: System Stretch Includes sum of: Rod, Bearing Plate, Shrinkage Device ΔA & Shrinkage Device ΔR.
Shrinkage: 0.250 inch per floor
Shearwall Plates Wood Species: DFL Douglas Fir-Larch
Shearwall Plate Compression Capacity (Cross Grain): 625 psi (all grades)
Compression Post Wood Species: DFL Douglas Fir-Larch
Compression Post Wood Capacity (Parallel to Grain): 1350 psi
Compression Post Design: per AutoTight
Compression Post Species: per Structural Plans S0.03
Compression Post Nail Qty: Allowable per 16d Sinker in DFL = 189, Qty nails = 16, Allowable load = 3.02 kips, Total load = 3.00 kips, D/C = 99.3% .
Rod Alloys: G36 Rod is F1554 Grade 36, G55 Rod is F1554 Grade 55, G105 Rod is F1554 Grade 105

AutoTight® Holdown System

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AutoTight® System Run Design Calc. Sheet for: **The Canopy Apts Bldg B**
Engineering Calcs Revision: 0 **Plan Set: Construction Set** **Plan Set Date: 01/07/2022**

Permit #							CAT ID #	21-2371	
Run Name:	**C4**						Tensile Strength		Calc'd
Run Specifications		Component			Description		Capacity (kips)	Demand (kips)	D/C Ratio	Elong. (in.)
Demand Loads:		Commins AutoTight								
Level = Level 4		Component			Description		Capacity	Demand	D/C	Elong.
Differential Load:	5.00 (kips)	AT6A-1.5			Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)		**1.50"**	**1.00"**	**66.7%**	
Tension Load:	5.00 (kips)	AT6A-1.5			Shrinkage Device - 1.5" (3/4" I.D.) - Allowable Load		10.55	5.00	47.4%	-
Compression:	11.00 (kips)	-			Shrinkage Device - Deflection at Load		-	-	-	0.005
Story Height:	8.71 (ft.)	-			Shrinkage Device - Travel and Seating Increment ΔR		-	-	-	0.000
Plate Height:	8.71 (ft.)	S5-3/4"			Bearing Plate at Reaction Point		5.96	5.00	83.8%	0.034
		R5G36			5/8"-G36 Tension Rod		6.67	5.00	75.0%	0.036
					Limiting Component Tension Load Capacity, Load and D/C Ratio		**5.96**	**5.00**	**83.8%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation		**0.200**	-	**37.5%**	**0.075**
Compression	Outer (2) 2x4	(2) 2x4	Inner		4x Wall Compression Post per Comp Post Calc Sheet		13.12	11.00	83.8%	-
Wood	Posts (2) 2x6	(1) 2x6	Posts		6x Wall Compression Post per Comp Post Calc Sheet		15.47	11.00	71.1%	-

Level = Level 3		Component			Description		Capacity	Demand	D/C	Elong.
Differential Load:	8.00 (kips)	AT8A-1.5			Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)		**1.75"**	**0.75"**	**42.9%**	-
Tension Load:	13.00 (kips)	AT8A-1.5			Shrinkage Device (1" I.D.) - 1.75" - Allowable Load		20.75	8.00	38.6%	-
Compression:	21.00 (kips)	-			Shrinkage Device - Deflection at Load		-	-	-	0.002
Story Height:	9.63 (ft.)	-			Shrinkage Device - Travel and Seating Increment ΔR		-	-	-	0.000
Plate Height:	8.77 (ft.)	S11-1-1/4"			Bearing Plate at Reaction Point		11.95	8.00	67.0%	0.027
Floor Depth:	10.25 (in.)	R7G36			7/8"-G36 Tension Rod		13.08	13.00	99.4%	0.101
					Limiting Component Tension Load Capacity, Load and D/C Ratio		**13.08**	**13.00**	**99.4%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation		**0.200**	-	**65.0%**	**0.130**
Compression	Outer (2) 2x4	(6) 2x4	Inner		4x Wall Compression Post per Comp Post Calc Sheet		22.88	21.00	91.8%	-
Wood	Posts (2) 2x6	(3) 2x6	Posts		6x Wall Compression Post per Comp Post Calc Sheet		25.78	21.00	81.5%	-

Level = Level 2		Component			Description		Capacity	Demand	D/C	Elong.
Differential Load:	12.00 (kips)	AT10A-1.5			Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)		**1.62"**	**0.50"**	**30.9%**	-
Tension Load:	25.00 (kips)	AT10A-1.5			Shrinkage Device (1-1/4" I.D.) - 1.62" - Allowable Load		28.05	12.00	42.8%	-
Compression:	33.00 (kips)	-			Shrinkage Device - Deflection at Load		-	-	-	0.009
Story Height:	9.63 (ft.)	-			Shrinkage Device - Travel and Seating Increment ΔR		-	-	-	0.000
Plate Height:	8.77 (ft.)	L18-1-1/4"			Bearing Plate at Reaction Point		19.29	12.00	62.2%	0.025
Floor Depth:	10.25 (in.)	R9G55			1 1/8"-G55 Tension Rod		27.96	25.00	89.4%	0.125
					Limiting Component Tension Load Capacity, Load and D/C Ratio		**27.96**	**25.00**	**89.4%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation		**0.200**	-	**79.0%**	**0.158**
Compression	Outer (2) 2x4	(10) 2x4	Inner		4x Wall Compression Post per Comp Post Calc Sheet		34.32	33.00	96.2%	-
Wood	Posts (2) 2x6	(5) 2x6	Posts		6x Wall Compression Post per Comp Post Calc Sheet		36.09	33.00	91.4%	-

Level = Level 1		Component			Description		Capacity	Demand	D/C	Elong.
Differential Load:	4.00 (kips)	AT10A-1.5			Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)		**1.62"**	**0.25"**	**15.4%**	-
Tension Load:	29.00 (kips)	AT10A-1.5			Shrinkage Device (1-1/4" I.D.) - 1.62" - Allowable Load		28.05	4.00	14.3%	-
Compression:	42.00 (kips)	-			Shrinkage Device - Deflection at Load		-	-	-	0.003
Story Height:	11.00 (ft.)	-			Shrinkage Device - Travel and Seating Increment ΔR		-	-	-	0.000
Plate Height:	10.15 (ft.)	S7-1-1/4"			Bearing Plate at Reaction Point		7.54	4.00	53.0%	0.021
Floor Depth:	10.25 (in.)	R10G55			1 1/4"-G55 Tension Rod		34.51	29.00	84.0%	0.140
					Limiting Component Tension Load Capacity, Load and D/C Ratio		**34.51**	**29.00**	**84.0%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation		**0.200**	-	**82.0%**	**0.164**
Compression	Outer (2) 2x4	(18) 2x4	Inner		4x Wall Compression Post per Comp Post Calc Sheet		43.62	42.00	96.3%	-
Wood	Posts (2) 2x6	(7) 2x6	Posts		6x Wall Compression Post per Comp Post Calc Sheet		46.40	42.00	90.5%	-

Level = Footing		Component	Description	Capacity	Demand	D/C	Elong.
Tension Load:	29.00 (kips)	R9G55	1 1/8"-G55 Anchor Rod	27.96	29.00	103.7%	n/a

Design Code: OSSC_2019 Main/State/Local
Loads per: S7.11 01/07/2022
Loads Type: ASD
Steel Stess Increase: No
Takeup Device at Each Level: Yes
Take Off Revision: Rev 3 Eng
Elongation Limit Required: Yes
Elongation Limit per Connection: 0.200 (inch) between load reaction points.
Elongation Components: System Stretch Includes sum of: Rod, Bearing Plate, Shrinkage Device ΔA & Shrinkage Device ΔR.
Shrinkage: 0.250 inch per floor
Shearwall Plates Wood Species: DFL Douglas Fir-Larch
Shearwall Plate Compression Capacity (Cross Grain): 625 psi (all grades)
Compression Post Wood Species: DFL Douglas Fir-Larch
Compression Post Wood Capacity (Parallel to Grain): 1350 psi
Compression Post Design: per AutoTight
Compression Post Species: per Structural Plans S0.03
Compression Post Nail Qty: Allowable per 16d Sinker in DFL = 189, Qty nails = 28, Allowable load = 5.29 kips, Total load = 5.00 kips, D/C = 94.6% .
Rod Alloys: G36 Rod is F1554 Grade 36, G55 Rod is F1554 Grade 55, G105 Rod is F1554 Grade 105

AutoTight® System Run Design Calc. Sheet for: **The Canopy Apts Bldg B**

Engineering Calcs Revision: 0 **Plan Set: Construction Set** **Plan Set Date: 01/07/2022**

Permit #							CAT ID #	21-2371		
Run Name:	**A3-sbs**						Tensile Strength			Calc'd
Run Specifications			Component		Description		Capacity (kips)	Demand (kips)	D/C Ratio	Elong. (in.)
Demand Loads:			Commins AutoTight							
Level = Level 4			Component		Description		Capacity	Demand	D/C	Elong.
Differential Load:	2.00 (kips)		AT4A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)		**1.50"**	**0.75"**	**50.0%**	
Tension Load:	2.00 (kips)		AT4A-1.5		Shrinkage Device - 1.5" (1/2" I.D.) - Allowable Load		6.45	2.00	31.0%	-
Compression:	8.00 (kips)		-		Shrinkage Device - Deflection at Load		-	-	-	0.003
Story Height:	8.71 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR		-	-	-	0.000
Plate Height:	8.71 (ft.)		S5-3/4"		Bearing Plate at Reaction Point		5.96	2.00	33.5%	0.013
			R4G36		1/2"-G36 Tension Rod		4.27	2.00	46.8%	0.027
					Limiting Component Tension Load Capacity, Load and D/C Ratio		**4.27**	**2.00**	**46.8%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation		**0.200**	-	**22.0%**	**0.044**
Compression	Outer	(2) 2x4	(1) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet		9.84	8.00	81.3%	-
Wood	Posts	(1) 2x6	(1) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet		10.31	8.00	77.6%	-

Level = Level 3			Component		Description	Capacity	Demand	D/C	Elong.
Differential Load:	3.00 (kips)		AT6A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)	**1.50"**	**0.50"**	**33.3%**	-
Tension Load:	5.00 (kips)		AT6A-1.5		Shrinkage Device - 1.5" (3/4" I.D.) - Allowable Load	10.55	3.00	28.4%	-
Compression:	15.00 (kips)		-		Shrinkage Device - Deflection at Load	-	-	-	0.003
Story Height:	9.63 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR	-	-	-	0.000
Plate Height:	8.77 (ft.)		S5-3/4"		Bearing Plate at Reaction Point	5.96	3.00	50.3%	0.020
Floor Depth:	10.25 (in.)		R5G36		5/8"-G36 Tension Rod	6.67	5.00	75.0%	0.082
					Limiting Component Tension Load Capacity, Load and D/C Ratio	**6.67**	**5.00**	**75.0%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation	**0.200**	-	**52.5%**	**0.105**
Compression	Outer	(2) 2x4	(4) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet	17.16	15.00	87.4%	-
Wood	Posts	(2) 2x6	(1) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet	15.47	15.00	97.0%	-

Level = Level 2			Component		Description	Capacity	Demand	D/C	Elong.
Differential Load:	7.00 (kips)		AT8A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)	**1.75"**	**0.25"**	**14.3%**	-
Tension Load:	12.00 (kips)		AT8A-1.5		Shrinkage Device (1" I.D.) - 1.75" - Allowable Load	20.75	7.00	33.7%	-
Compression:	18.00 (kips)		-		Shrinkage Device - Deflection at Load	-	-	-	0.001
Story Height:	9.63 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR	-	-	-	0.000
Plate Height:	8.77 (ft.)		S7-1"		Bearing Plate at Reaction Point	7.86	7.00	89.0%	0.036
Floor Depth:	10.25 (in.)		R7G36		7/8"-G36 Tension Rod	13.08	12.00	91.7%	0.093
			Stl Beam		Steel Beam Start in Tension	36.82	12.00	32.6%	0.000
					Limiting Component Tension Load Capacity, Load and D/C Ratio	**13.08**	**12.00**	**91.7%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation	**0.200**	-	**65.0%**	**0.130**
Compression	Outer	(2) 2x4	(5) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet	20.02	18.00	89.9%	-
Wood	Posts	(2) 2x6	(2) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet	20.62	18.00	87.3%	-

Design Code: OSSC_2019 Main/State/Local
Loads per: S7.11 01/07/2022
Loads Type: ASD
Steel Stess Increase: No
Takeup Device at Each Level: Yes — Take Off Revision: Rev 3 Eng
Elongation Limit Required: Yes
Elongation Limit per Connection: 0.200 (inch) between load reaction points.
Elongation Components: System Stretch Includes sum of: Rod, Bearing Plate, Shrinkage Device ΔA & Shrinkage Device ΔR.
Shrinkage: 0.250 inch per floor
Shearwall Plates Wood Species: DFL Douglas Fir-Larch — Shearwall Plate Compression Capacity (Cross Grain): 625 psi (all grades)
Compression Post Wood Species: DFL Douglas Fir-Larch — Compression Post Wood Capacity (Parallel to Grain): 1350 psi
Compression Post Design: per AutoTight
Compression Post Species: per Structural Plans S0.03
Compression Post Nail Qty: Allowable per 16d Sinker in DFL = 189, Qty nails = 12, Allowable load = 2.27 kips, Total load = 2.00 kips, D/C = 88.3% .
Rod Alloys: G36 Rod is F1554 Grade 36, G55 Rod is F1554 Grade 55, G105 Rod is F1554 Grade 105

AutoTight® System Run Design Calc. Sheet for: **The Canopy Apts Bldg B**
Engineering Calcs Revision: 0 **Plan Set: Construction Set** **Plan Set Date: 01/07/2022**

Permit #							CAT ID #	21-2371		
Run Name:	**A1**						Tensile Strength			Calc'd
Run Specifications Demand Loads:		Component Commins AutoTight			Description		Capacity (kips)	Demand (kips)	D/C Ratio	Elong. (in.)
Level = Level 1		Component			Description		Capacity	Demand	D/C	Elong.
Differential Load:	14.00 (kips)	AT8A-1.5			Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)		**1.75"**	**0.25"**	**14.3%**	-
Tension Load:	14.00 (kips)	AT8A-1.5			Shrinkage Device (1" I.D.) - 1.75" - Allowable Load		20.75	14.00	67.5%	-
Compression:	27.00 (kips)	-			Shrinkage Device - Deflection at Load		-	-	-	0.003
Story Height:	11.00 (ft.)	-			Shrinkage Device - Travel and Seating Increment ΔR		-	-	-	0.000
Plate Height:	10.15 (ft.)	L18-1-1/4"			Bearing Plate at Reaction Point		19.29	14.00	72.6%	0.029
Floor Depth:	10.25 (in.)	R7G55			7/8"-G55 Tension Rod		16.91	14.00	82.8%	0.067
					Limiting Component Tension Load Capacity, Load and D/C Ratio		**16.91**	**14.00**	**82.8%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation		**0.200**	-	**49.5%**	**0.099**
Compression	Outer (2) 2x4	(7) 2x4	Inner		4x Wall Compression Post per Comp Post Calc Sheet		29.53	27.00	91.4%	-
Wood	Posts (2) 2x6	(4) 2x6	Posts		6x Wall Compression Post per Comp Post Calc Sheet		30.94	27.00	87.3%	-

Level = Footing		Component	Description	Capacity	Demand	D/C	Elong.
Tension Load:	14.00 (kips)	R7G36	7/8"-G36 Anchor Rod	13.08	14.00	107.0%	n/a

Design Code: OSSC_2019 Main/State/Local
Loads per: S7.11 01/07/2022
Loads Type: ASD
Steel Stess Increase: No
Takeup Device at Each Level: Yes
Elongation Limit Required: Yes
Elongation Limit per Connection: 0.200 (inch) between load reaction points.
Elongation Components: System Stretch Includes sum of: Rod, Bearing Plate, Shrinkage Device ΔA & Shrinkage Device ΔR.
Shrinkage: 0.250 inch per floor
Shearwall Plates Wood Species: DFL Douglas Fir-Larch
Shearwall Plate Compression Capacity (Cross Grain): 625 psi (all grades)
Compression Post Wood Species: DFL Douglas Fir-Larch
Compression Post Wood Capacity (Parallel to Grain): 1350 psi
Compression Post Design: per AutoTight
Compression Post Species: per Structural Plans S0.03
Compression Post Nail Qty: Allowable per 16d Sinker in DFL = 189, Qty nails = 76, Allowable load = 14.35 kips, Total load = 14.00 kips, D/C = 97.6% .
Rod Alloys: G36 Rod is F1554 Grade 36, G55 Rod is F1554 Grade 55, G105 Rod is F1554 Grade 105

Take Off Revision: Rev 3 Eng

AutoTight® System Run Design Calc. Sheet for: **The Canopy Apts Bldg B**
Engineering Calcs Revision: 0 **Plan Set: Construction Set** **Plan Set Date: 01/07/2022**

Permit #							CAT ID #	21-2371		
Run Name:	**C4-Bottom**						Tensile Strength			Calc'd
Run Specifications Demand Loads:		Component Commins AutoTight			Description		Capacity (kips)	Demand (kips)	D/C Ratio	Elong. (in.)
Level = Level 1		Component			Description		Capacity	Demand	D/C	Elong.
Differential Load:	29.00 (kips)	AT 125			Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)		**1.10"**	**0.25"**	**22.7%**	-
Tension Load:	29.00 (kips)	AT 125			Shrinkage Device (1-1/4" I.D.) - Allowable Load		34.50	29.00	84.1%	-
Compression:	42.00 (kips)	-			Shrinkage Device - Deflection at Load		-	-	-	0.013
Story Height:	11.00 (ft.)	-			Shrinkage Device - Travel and Seating Increment ΔR		-	-	-	0.002
Plate Height:	10.15 (ft.)	-			Bearing Plate at Reaction Point		-	-	-	
Floor Depth:	10.25 (in.)	R10G55			1 1/4"-G55 Tension Rod		34.51	29.00	84.0%	0.113
					Limiting Component Tension Load Capacity, Load and D/C Ratio		**34.50**	**29.00**	**84.1%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation		**0.200**	-	**64.5%**	**0.129**
Compression	Outer (2) 2x4	(18) 2x4	Inner		4x Wall Compression Post per Comp Post Calc Sheet		43.62	42.00	96.3%	-
Wood	Posts (2) 2x6	(7) 2x6	Posts		6x Wall Compression Post per Comp Post Calc Sheet		46.40	42.00	90.5%	-

Level = Footing		Component	Description	Capacity	Demand	D/C	Elong.
Tension Load:	29.00 (kips)	R9G55	1 1/8"-G55 Anchor Rod	27.96	29.00	103.7%	n/a

Design Code: OSSC_2019 Main/State/Local
Loads per: S7.11 01/07/2022
Loads Type: ASD
Steel Stess Increase: No
Takeup Device at Each Level: Yes
Elongation Limit Required: Yes
Elongation Limit per Connection: 0.200 (inch) between load reaction points.
Elongation Components: System Stretch Includes sum of: Rod, Bearing Plate, Shrinkage Device ΔA & Shrinkage Device ΔR.
Shrinkage: 0.250 inch per floor
Shearwall Plates Wood Species: DFL Douglas Fir-Larch
Shearwall Plate Compression Capacity (Cross Grain): 625 psi (all grades)
Compression Post Wood Species: DFL Douglas Fir-Larch
Compression Post Wood Capacity (Parallel to Grain): 1350 psi
Compression Post Design: per AutoTight
Compression Post Species: per Structural Plans S0.03
Compression Post Nail Qty: Allowable per 16d Sinker in DFL = 189, Qty nails = 154, Allowable load = 29.08 kips, Total load = 29.00 kips, D/C = 99.7% .
Rod Alloys: G36 Rod is F1554 Grade 36, G55 Rod is F1554 Grade 55, G105 Rod is F1554 Grade 105

Take Off Revision: Rev 3 Eng

AutoTight® System Run Design Calc. Sheet for: **The Canopy Apts Bldg B**

Engineering Calcs Revision: 0 **Plan Set: Construction Set** **Plan Set Date: 01/07/2022**

Permit #							CAT ID #	21-2371		
Run Name:	**C4-TopSBS**						Tensile Strength			Calc'd
Run Specifications			Component		Description		Capacity (kips)	Demand (kips)	D/C Ratio	Elong. (in.)
Demand Loads:			Commins AutoTight							
Level = Level 4			Component		Description		Capacity	Demand	D/C	Elong.
Differential Load:	5.00 (kips)		AT6A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)		**1.50"**	**0.75"**	**50.0%**	
Tension Load:	5.00 (kips)		AT6A-1.5		Shrinkage Device - 1.5" (3/4" I.D.) - Allowable Load		10.55	5.00	47.4%	-
Compression:	11.00 (kips)		-		Shrinkage Device - Deflection at Load		-	-	-	0.005
Story Height:	8.71 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR		-	-	-	0.000
Plate Height:	8.71 (ft.)		S5-3/4"		Bearing Plate at Reaction Point		5.96	5.00	83.8%	0.034
			R5G36		5/8"-G36 Tension Rod		6.67	5.00	75.0%	0.041
					Limiting Component Tension Load Capacity, Load and D/C Ratio		**5.96**	**5.00**	**83.8%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation		**0.200**	-	**39.5%**	**0.079**
Compression	Outer	(2) 2x4	(2) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet		13.12	11.00	83.8%	-
Wood	Posts	(2) 2x6	(1) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet		15.47	11.00	71.1%	-

Level = Level 3			Component		Description	Capacity	Demand	D/C	Elong.
Differential Load:	8.00 (kips)		AT8A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)	**1.75"**	**0.50"**	**28.6%**	-
Tension Load:	13.00 (kips)		AT8A-1.5		Shrinkage Device (1" I.D.) - 1.75" - Allowable Load	20.75	8.00	38.6%	-
Compression:	21.00 (kips)		-		Shrinkage Device - Deflection at Load	-	-	-	0.002
Story Height:	9.63 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR	-	-	-	0.000
Plate Height:	8.77 (ft.)		S11-1-1/4"		Bearing Plate at Reaction Point	11.95	8.00	67.0%	0.027
Floor Depth:	10.25 (in.)		R7G36		7/8"-G36 Tension Rod	13.08	13.00	99.4%	0.106
					Limiting Component Tension Load Capacity, Load and D/C Ratio	**13.08**	**13.00**	**99.4%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation	**0.200**	-	**67.0%**	**0.134**
Compression	Outer	(2) 2x4	(6) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet	22.88	21.00	91.8%	-
Wood	Posts	(2) 2x6	(3) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet	25.78	21.00	81.5%	-

Level = Level 2			Component		Description	Capacity	Demand	D/C	Elong.
Differential Load:	12.00 (kips)		AT10A-1.5		Shrinkage at Level, Shrinkage Device travel & D/C Ratio (in.)	**1.62"**	**0.25"**	**15.4%**	-
Tension Load:	25.00 (kips)		AT10A-1.5		Shrinkage Device (1-1/4" I.D.) - 1.62" - Allowable Load	28.05	12.00	42.8%	-
Compression:	33.00 (kips)		-		Shrinkage Device - Deflection at Load	-	-	-	0.009
Story Height:	9.63 (ft.)		-		Shrinkage Device - Travel and Seating Increment ΔR	-	-	-	0.000
Plate Height:	8.77 (ft.)		L18-1-1/4"		Bearing Plate at Reaction Point	19.29	12.00	62.2%	0.025
Floor Depth:	10.25 (in.)		R9G55		1 1/8"-G55 Tension Rod	27.96	25.00	89.4%	0.118
			Stl Beam		Steel Beam Start in Tension	36.82	25.00	67.9%	0.000
					Limiting Component Tension Load Capacity, Load and D/C Ratio	**27.96**	**25.00**	**89.4%**	-
					Maximum Allowed Level Elongation, D/C Ratio and Total Level Elongation	**0.200**	-	**75.5%**	**0.151**
Compression	Outer	(2) 2x4	(10) 2x4	Inner	4x Wall Compression Post per Comp Post Calc Sheet	34.32	33.00	96.2%	-
Wood	Posts	(2) 2x6	(5) 2x6	Posts	6x Wall Compression Post per Comp Post Calc Sheet	36.09	33.00	91.4%	-

Design Code: OSSC_2019 Main/State/Local
Loads per: S7.11 01/07/2022
Loads Type: ASD
Steel Stess Increase: No
Takeup Device at Each Level: Yes — Take Off Revision: Rev 3 Eng
Elongation Limit Required: Yes
Elongation Limit per Connection: 0.200 (inch) between load reaction points.
Elongation Components: System Stretch Includes sum of: Rod, Bearing Plate, Shrinkage Device ΔA & Shrinkage Device ΔR.
Shrinkage: 0.250 inch per floor
Shearwall Plates Wood Species: DFL Douglas Fir-Larch — Shearwall Plate Compression Capacity (Cross Grain): 625 psi (all grades)
Compression Post Wood Species: DFL Douglas Fir-Larch — Compression Post Wood Capacity (Parallel to Grain): 1350 psi
Compression Post Design: per AutoTight
Compression Post Species: per Structural Plans S0.03
Compression Post Nail Qty: Allowable per 16d Sinker in DFL = 189, Qty nails = 28, Allowable load = 5.29 kips, Total load = 5.00 kips, D/C = 94.6% .
Rod Alloys: G36 Rod is F1554 Grade 36, G55 Rod is F1554 Grade 55, G105 Rod is F1554 Grade 105

AutoTight® Mid Wall Termination Header Design Calculations for: The Canopy Apts Bldg B

Take Off Revision: Rev 3 Eng Calcs Revision: 0 Plan Set: Construction Set Plan Date: 01/07/2022 **CAT Project ID: 21-2371**

Code:OSSC_2019 Main/State/Local (2005 NDS)

C to C Stud (in)	Bay Width/2 (in)	Outer Post Thickness (in)	Inner Post Thickness (in)	Beam Length (in)	Bearing Plate Length, L (in)	Bearing Plate L / 2 (in)	L_{span} (in)	Term Header Species	Header Min Size (Nominal)	Header Width (in)	Header Depth (in)	Demand Load Compression P (lbs)	Allowable Capacity psi DFL	section modulus Z	Allowable Capacity (lb)	Demand/ Capacity Ratio D/C	Wall Thickness
Run: A4					S5-3/4" = Bearing Plate Name												
16.00	7.25	3.00	1.50	10.00	3.00	1.50	3.50	DFL	4x6	3.50	5.50	2,000	625	17.65	6,302	31.7%	4x Wall
16.00	7.25	1.50	1.50	10.00	3.00	1.50	3.50	DFL	6x6	5.50	5.50	2,000	625	27.73	9,903	20.2%	6x Wall
Bending above:																	
Shear:				10.00	3.00	Shear Load Fraction =			0.00	3.50	5.50	0	625	Shear	16,042	0.0%	4x Wall
Shear:				10.00	3.00	Shear Load Fraction =			0.00	5.50	5.50	0	625	Shear	25,208	0.0%	6x Wall
Compression:		3.00	1.50			Bearing Area per end =			15.75	3.50		2,000	625	Comp.	9,844	20.3%	4x Wall
Compression:		1.50	1.50			Bearing Area per end =			16.50	5.50		2,000	625	Comp.	10,313	19.4%	6x Wall
Run: B4					S5-3/4" = Bearing Plate Name												
16.00	7.25	3.00	3.00	10.00	3.00	1.50	3.50	DFL	4x6	3.50	5.50	3,000	625	17.65	6,302	47.6%	4x Wall
16.00	7.25	1.50	1.50	10.00	3.00	1.50	3.50	DFL	6x6	5.50	5.50	3,000	625	27.73	9,903	30.3%	6x Wall
Bending above:																	
Shear:				10.00	3.00	Shear Load Fraction =			0.00	3.50	5.50	0	625	Shear	16,042	0.0%	4x Wall
Shear:				10.00	3.00	Shear Load Fraction =			0.00	5.50	5.50	0	625	Shear	25,208	0.0%	6x Wall
Compression:		3.00	3.00			Bearing Area per end =			21.00	3.50		3,000	625	Comp.	13,125	22.9%	4x Wall
Compression:		1.50	1.50			Bearing Area per end =			16.50	5.50		3,000	625	Comp.	10,313	29.1%	6x Wall
Run: B4-elv					S5-3/4" = Bearing Plate Name												
16.00	7.25	3.00	3.00	10.00	3.00	1.50	3.50	DFL	4x6	3.50	5.50	3,000	625	17.65	6,302	47.6%	4x Wall
16.00	7.25	1.50	1.50	10.00	3.00	1.50	3.50	DFL	6x6	5.50	5.50	3,000	625	27.73	9,903	30.3%	6x Wall
Bending above:																	
Shear:				10.00	3.00	Shear Load Fraction =			0.00	3.50	5.50	0	625	Shear	16,042	0.0%	4x Wall
Shear:				10.00	3.00	Shear Load Fraction =			0.00	5.50	5.50	0	625	Shear	25,208	0.0%	6x Wall
Compression:		3.00	3.00			Bearing Area per end =			21.00	3.50		3,000	625	Comp.	13,125	22.9%	4x Wall
Compression:		1.50	1.50			Bearing Area per end =			16.50	5.50		3,000	625	Comp.	10,313	29.1%	6x Wall
Run: C4					S5-3/4" = Bearing Plate Name												
16.00	7.25	3.00	3.00	10.00	3.00	1.50	3.50	DFL	4x6	3.50	5.50	5,000	625	17.65	6,302	79.3%	4x Wall
16.00	7.25	3.00	1.50	10.00	3.00	1.50	3.50	DFL	6x6	5.50	5.50	5,000	625	27.73	9,903	50.5%	6x Wall
Bending above:																	
Shear:				10.00	3.00	Shear Load Fraction =			0.00	3.50	5.50	0	625	Shear	16,042	0.0%	4x Wall
Shear:				10.00	3.00	Shear Load Fraction =			0.00	5.50	5.50	0	625	Shear	25,208	0.0%	6x Wall
Compression:		3.00	3.00			Bearing Area per end =			21.00	3.50		5,000	625	Comp.	13,125	38.1%	4x Wall
Compression:		3.00	1.50			Bearing Area per end =			24.75	5.50		5,000	625	Comp.	15,469	32.3%	6x Wall
Run: A3-sbs					S5-3/4" = Bearing Plate Name												
16.00	7.25	3.00	1.50	10.00	3.00	1.50	3.50	DFL	4x6	3.50	5.50	2,000	625	17.65	6,302	31.7%	4x Wall
16.00	7.25	1.50	1.50	10.00	3.00	1.50	3.50	DFL	6x6	5.50	5.50	2,000	625	27.73	9,903	20.2%	6x Wall
Bending above:																	
Shear:				10.00	3.00	Shear Load Fraction =			0.00	3.50	5.50	0	625	Shear	16,042	0.0%	4x Wall
Shear:				10.00	3.00	Shear Load Fraction =			0.00	5.50	5.50	0	625	Shear	25,208	0.0%	6x Wall
Compression:		3.00	1.50			Bearing Area per end =			15.75	3.50		2,000	625	Comp.	9,844	20.3%	4x Wall
Compression:		1.50	1.50			Bearing Area per end =			16.50	5.50		2,000	625	Comp.	10,313	19.4%	6x Wall

AutoTight® Mid Wall Termination Header Design Calculations for: The Canopy Apts Bldg B

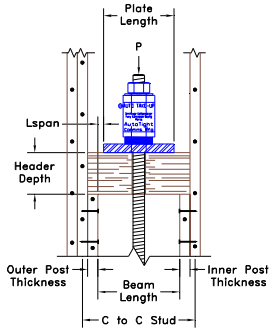
Take Off Revision: Rev 3 Eng Calcs Revision: 0 Plan Set: Construction Set Plan Date: 01/07/2022 **CAT Project ID: 21-2371**

Code:OSSC_2019 Main/State/Local (2005 NDS)

C to C Stud (in)	Bay Width/2 (in)	Outer Post Thickness (in)	Inner Post Thickness (in)	Beam Length (in)	Bearing Plate Length, L (in)	Bearing Plate L / 2 (in)	L_{span} (in)	Term Header Species	Header Min Size (Nominal)	Header Width (in)	Header Depth (in)	Demand Load Compression P (lbs)	Allowable Capacity psi DFL	section modulus Z	Allowable Capacity (lb)	Demand/ Capacity Ratio D/C	Wall Thickness
Run: A1					L18-1-1/4" = Bearing Plate Name												
16.00	7.25	3.00	6.00	10.00	5.50	2.75	2.25	DFL	6x6	5.50	5.50	14,000	625	27.73	15,405	90.9%	6x Wall
Bending above:																	
Shear:				10.00	5.50		Shear Load Fraction =		0.00	3.50	5.50	0	625	Shear	16,042	0.0%	4x Wall
Shear:				10.00	5.50		Shear Load Fraction =		0.00	5.50	5.50	0	625	Shear	25,208	0.0%	6x Wall
Compression:		3.00	10.50				Bearing Area per end =		47.25	3.50		14,000	625	Comp.	29,531	47.4%	4x Wall
Compression:		3.00	6.00				Bearing Area per end =		49.50	5.50		14,000	625	Comp.	30,938	45.3%	6x Wall
Run: C4-Bottom					L30-1-1/4" = Bearing Plate Name												
16.00	7.25	3.00	27.00	10.00	9.00	4.50	0.50	DFL	4x6	3.50	5.50	29,000	625	17.65	44,115	65.7%	4x Wall
16.00	7.25	3.00	10.50	10.00	9.00	4.50	0.50	DFL	6x6	5.50	5.50	29,000	625	27.73	69,323	41.8%	6x Wall
Bending above:																	
Shear:				10.00	9.00		Shear Load Fraction =		0.00	3.50	5.50	0	625	Shear	16,042	0.0%	4x Wall
Shear:				10.00	9.00		Shear Load Fraction =		0.00	5.50	5.50	0	625	Shear	25,208	0.0%	6x Wall
Compression:		3.00	27.00				Bearing Area per end =		105.00	3.50		29,000	625	Comp.	65,625	44.2%	4x Wall
Compression:		3.00	10.50				Bearing Area per end =		74.25	5.50		29,000	625	Comp.	46,406	62.5%	6x Wall
Run: C4-TopSBS					S5-3/4" = Bearing Plate Name												
16.00	7.25	3.00	3.00	10.00	3.00	1.50	3.50	DFL	4x6	3.50	5.50	5,000	625	17.65	6,302	79.3%	4x Wall
16.00	7.25	3.00	1.50	10.00	3.00	1.50	3.50	DFL	6x6	5.50	5.50	5,000	625	27.73	9,903	50.5%	6x Wall
Bending above:																	
Shear:				10.00	3.00		Shear Load Fraction =		0.00	3.50	5.50	0	625	Shear	16,042	0.0%	4x Wall
Shear:				10.00	3.00		Shear Load Fraction =		0.00	5.50	5.50	0	625	Shear	25,208	0.0%	6x Wall
Compression:		3.00	3.00				Bearing Area per end =		21.00	3.50		5,000	625	Comp.	13,125	38.1%	4x Wall
Compression:		3.00	1.50				Bearing Area per end =		24.75	5.50		5,000	625	Comp.	15,469	32.3%	6x Wall

Header Design Notes:

1. Bearing Plate spreads load.
2. Point Load (P) location transfer of combined termination tension.
3. Beam supported at both ends 2 equal symmetrical loads max stress=W*a/Z
   where a= Lspan & W=P/2 & Z=section modulus of beam
4. Shear calculated per NDS 2005 eqn 3.4-2 & sec 3.4.3 which says:
   "…uniformly distributed loads within a distance from supports equal to the depth of the bending member, d, shall be permitted to be ignored."
   fv=3*V/2*b*d where fv=actual stress=species capacity, V=shear load=allowable, b=breadth, d=depth
5. When the plate overlaps the post or gets too close to the post the beam equation does not apply, see shear instead.



Weld Strength Calculations for Anchoring Holdown Rods to Steel Floor Plates or Steel Beams.

21-2371 The Canopy Apts Bldg B

Run Name:	A3-sbs C4-TopSBS	
Rod Size Name:	R8	
Alloy: F1554 Gr 105 Load (kips):	36.82	kips Allowable of F1554 Gr 105 Rod
Rod Dia:	1	inches
Weld Plate Name:	sbs-8-3x3	CMI Part Name
Weld Plate Thickness:	1 1/4	inches
Weld Plate Height:	3	inches
Weld Plate Length:	3	inches
Weld Rod Strength:	70	kips E70 Electrode
AISC fillet weld nominal strength & omega factors:	0.300	=0.60/2.00 [AISC 14th Ed Table J2.5 p 16.1-114 0.600*Fexx, & 1/omega =1/2.00] The 3x Seismic Factor is already included via the Required Rod Strength
Weld Strength / inch @ 1/16" weld size:	0.928	=70 kips * 0.30 * 0.0625 / sqrt(2)

Field Weld Plate to Floor-Plate or to Steel Beam Weld:

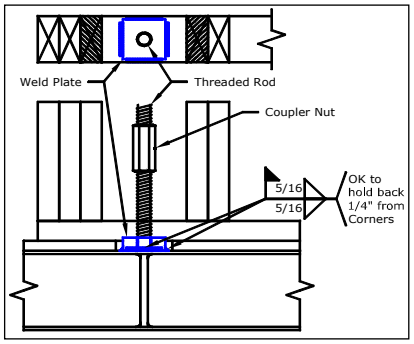
Weld Size:	5/16	inches (See AISC Table J2.4 for min welds)
Rod-to-Plate Weld Strength per inch of length:	4.64	=0.928 * Weld Size in 1/16 th's
Weld Length inches:	10.00	=(plate height - hole dia) * 2
Weld Strength kips:	46.40	=weld length * strength per inch
D/C Ratio:	79%	=Rod Allowable Load / Weld Strength

Plate Strength:

Weld-Plate Cross Section:	3.750	=Plate Thickness * Plate Length
Weld-Plate Yield kips:	50	=Fy for Gr 50
AISC nominal strength factor (tension):	0.60	=0.60
Weld Plate Reduced Yield kips:	30	=Plate Fy * 0.60
Plate Strength kips:	112.50	=Plate Cross Section * Plate Reduced Yield
D/C Ratio:	33%	=Rod Allowable Load / Plate Strength

Thread Strength based on full nut length of engagement per IFI Fastener Standards p. A-9:

Rod Dia:	1	inches
Plate Thickness:	1 1/4	inches
n (thread per inch):	8	tpi
Nut Thickness = Engagement Length:	1.000	inches
Internal Thread Strippping Area:	2.148	IFI Fastener Standards p. A-9: ASn=pi*Engagement_Length*DSmin*tpi*[(1/2*tpi)+0.57735*(Dsmin-Enmax)]
Weld Plate Yield kips:	50	=Fy for Gr 50
AISC nominal strength factor (tension):	0.60	=0.60
Weld Plate Reduced Yield kips:	30	=Plate Fy * 0.60
Thread Pull-Out Strength kips:	64	=Internal Thread Stripping Area * Plate Reduced Yield
D/C Ratio:	57%	=Rod Allowable Load / Thread Strength



Weld sizes in picture are for example only.
AISC Table J2.4 min welds: (>0<=1/4:1/8) (>1/4<=1/2:3/16)(>1/2<=3/4:1/4)(>3/4: 5/16)

The Canopy Apts Bldg B

21-2371

Compression Post Schedule 4x Wall

Level Name	Run Name	A4		B4		B4-elv		C4		A3-sbs		Level Name	A1		C4-Bottom		C4-TopSBS	
	Wall Size	4x Wall		4x Wall		4x Wall		4x Wall		4x Wall			4x Wall		4x Wall		4x Wall	
	Post Location	Outer	Inner	Outer	Inner	Outer	Inner	Outer	Inner	Outer	Inner		Outer	Inner	Outer	Inner	Outer	Inner
Level 4	Post Size	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	Level 4					2x4	2x4
	Post Qty	2	1	2	2	2	2	2	2	2	1						2	2
	Post Length inches	54.00		54.00		54.00		54.00		54.00							54.00	
	Required Load kips	8.00		10.00		10.00		11.00		8.00							11.00	
	Allowable Load kips	9.84		13.12		13.12		13.12		9.84							13.12	
	Limiting Failure Mode	Crushing		Crushing		Crushing		Crushing		Crushing							Crushing	
Level 3	Post Size	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	Level 3					2x4	2x4
	Post Qty	2	4	2	5	2	5	2	6	2	4						2	6
	Post Length inches	100.75		100.75		100.75		100.75		100.75							100.75	
	Required Load kips	15.00		20.00		20.00		21.00		15.00							21.00	
	Allowable Load kips	17.16		20.02		20.02		22.88		17.16							22.88	
	Limiting Failure Mode	Buckling		Buckling		Buckling		Buckling		Buckling							Buckling	
Level 2	Post Size	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	Level 2					2x4	2x4
	Post Qty	2	5	2	10	2	10	2	10	2	5						2	10
	Post Length inches	100.75		100.75		100.75		100.75		100.75							100.75	
	Required Load kips	18.00		33.00		33.00		33.00		18.00							33.00	
	Allowable Load kips	20.02		34.32		34.32		34.32		20.02							34.32	
	Limiting Failure Mode	Buckling		Buckling		Buckling		Buckling		Buckling							Buckling	
Level 1	Post Size	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4			Level 1	2x4	2x4	2x4	2x4		
	Post Qty	2	11	2	16	2	16	2	18				2	7	2	18		
	Post Length inches	116.25		116.25		116.25		116.25					54.00		116.25			
	Required Load kips	27.00		39.00		39.00		42.00					27.00		42.00			
	Allowable Load kips	28.35		39.26		39.26		43.62					29.53		43.62			
	Limiting Failure Mode	Buckling		Buckling		Buckling		Buckling					Crushing		Buckling			

Notes:

1. Posts may be arranged as desired by the builder as long as:
   a. The total post quantity is the same as or greater than the quantity listed here.
   b. And there is at least 1 post on each side of each rod.
   c. Compression post lengths shown in schedule are for calculation purposes only.
      Framer is responsible for actual post lengths.
2. These Posts are in addition to gravity load post counts on Plans.
3. Calculations are per NDS 2015 sections 3.6 & 15.3.
4. Bottom Plates are Douglas Fir-Larch Grade #2 or better.
5. Compression Posts are Douglas Fir-Larch Grade #2 or better.

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AutoTight® Holdown Systems

by Commins Manufacturing

CAT Project ID: 21-2371 Takeoff File Name: 21-2371 Canopy Bldg B Rev 3 Eng 03-30-22.xlsm

The Canopy Apts Bldg B

21-2371

Compression Post Schedule 6x Wall

Level Name	Run Name	A4		B4		B4-elv		C4		A3-sbs		Level Name	A1		C4-Bottom		C4-TopSBS	
	Wall Size	6x Wall		6x Wall		6x Wall		6x Wall		6x Wall			6x Wall		6x Wall		6x Wall	
	Post Location	Outer	Inner	Outer	Inner	Outer	Inner	Outer	Inner	Outer	Inner		Outer	Inner	Outer	Inner	Outer	Inner
Level 4	Post Size	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	Level 4					2x6	2x6
	Post Qty	1	1	1	1	1	1	2	1	1	1						2	1
	Post Length inches	54.00		54.00		54.00		54.00		54.00							54.00	
	Required Load kips	8.00		10.00		10.00		11.00		8.00							11.00	
	Allowable Load kips	10.31		10.31		10.31		15.47		10.31							15.47	
	Limiting Failure Mode	Crushing		Crushing		Crushing		Crushing		Crushing							Crushing	
Level 3	Post Size	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	Level 3					2x6	2x6
	Post Qty	2	1	2	2	2	2	2	3	2	1						2	3
	Post Length inches	100.75		100.75		100.75		100.75		100.75							100.75	
	Required Load kips	15.00		20.00		20.00		21.00		15.00							21.00	
	Allowable Load kips	15.47		20.62		20.62		25.78		15.47							25.78	
	Limiting Failure Mode	Crushing		Crushing		Crushing		Crushing		Crushing							Crushing	
Level 2	Post Size	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	Level 2					2x6	2x6
	Post Qty	2	2	2	5	2	5	2	5	2	2						2	5
	Post Length inches	100.75		100.75		100.75		100.75		100.75							100.75	
	Required Load kips	18.00		33.00		33.00		33.00		18.00							33.00	
	Allowable Load kips	20.62		36.09		36.09		36.09		20.62							36.09	
	Limiting Failure Mode	Crushing		Crushing		Crushing		Crushing		Crushing							Crushing	
Level 1	Post Size	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6			Level 1	2x6	2x6	2x6	2x6		
	Post Qty	2	4	2	6	2	6	2	7				2	4	2	7		
	Post Length inches	116.25		116.25		116.25		116.25					54.00		116.25			
	Required Load kips	27.00		39.00		39.00		42.00					27.00		42.00			
	Allowable Load kips	30.94		41.25		41.25		46.40					30.94		46.40			
	Limiting Failure Mode	Crushing		Crushing		Crushing		Crushing					Crushing		Crushing			

Notes:

1. Posts may be arranged as desired by the builder as long as:
   a. The total post quantity is the same as or greater than the quantity listed here.
   b. And there is at least 1 post on each side of each rod.
   c. Compression post lengths shown in schedule are for calculation purposes only.
      Framer is responsible for actual post lengths.
2. These Posts are in addition to gravity load post counts on Plans.
3. Calculations are per NDS 2015 sections 3.6 & 15.3.
4. Bottom Plates are Douglas Fir-Larch Grade #2 or better.
5. Compression Posts are Douglas Fir-Larch Grade #2 or better.

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AutoTight® Holdown Systems

by Commins Manufacturing

CAT Project ID: 21-2371 Takeoff File Name: 21-2371 Canopy Bldg B Rev 3 Eng 03-30-22.xlsm

21-2371 Canopy Bldg B

CONTINUOUS HOLDOWN SYSTEM SCHEDULE BUILDING B

LEVEL	HOLDOWN							
	A4		B4		C4		D1	
	T	C	T	C	T	C	T	C
4	2	8	3	10	5	11	N/A	N/A
3	5	15	7	20	13	21	N/A	N/A
2	12	18	15	33	25	33	N/A	N/A
1	14	27	17	39	29	42	4	11
BASE ANCHORAGE AT CONCRETE								
DETAIL	3/S7.11		3/S7.11		3/S7.11		5/S7.12	
HOLDOWN ANCHOR	7/8"Ø		1"Ø		1 1/8"Ø		HDU4-SDS2.5	
	ASTM F1554 GR. 36		ASTM F1554 GR. 36		ASTM F1554 GR. 55		ASTM F1554 GR. 36	
UPLIFT PL SIZE	3/4"x2 1/2"x0'-2 1/2"		3/4"x3"x0'-3"		1"x3"x0'-3"		N/A	
	GRADE 50		GRADE 50		GRADE 50		N/A	
MIN. EMBEDMENT	1'-0"		1'-4"		2'-0"		6 1/2"	
MIN. DIST. TO FTG. EDGE	11"		11"		12"		10"	

AutoTight® Component Hardware

Section 3: Tie-Down System Components:

Threaded Rod, Bearing plates, TUDs, Couplers, Nuts & Washers.

"Tighter Connections, Stronger Buildings"

Since 2000

Threaded rod, Bearing Plates and TUDs (Take-Up Devices) are separated into ASD & LRFD Load capacities for the convenience of designers.
Nuts & Couplers are industry standard to match rods and apply to both ASD & LRFD.

06-18-18

Components: AutoTight® Rod

Rod Holdown systems use continuous threaded rod. Typical lengths 2', 3', 4', 6', 10', and 12'.

Rod is specified by diameter, in 1/8" increments, grade, and length.

Examples:

R5-A307 X 10' =
Rod, 5/8" Dia., Grade A307, 10' (120").

R9-B7 X 12' =
Rod, 1-1/8" Dia., ASTM A193-B7, 12' (144").

Finish: Standard Black or zinc plated.
Optional Hot Dip Galvanized (HDG)
Note: HDG rod thread must be chased to fit standard nuts & couplers or modified couplers used.

Standard Thread is Unified National Coarse (UNC). Rod is available from 3/8" (R3) to 2" (R16) diameter.

Strength: AISC 360, 14th ed. and ICC AC 391-3.2.1.1.

Code Acceptance: Tensile Values per IBC 2015, IBC 2012, IBC 2009, as specified in AISC 360 14th edition.

Note: ICC ES AC 391-3.2.1.1 recognizes the increased elongation fully threaded rod (rolled threads) provides compared to solid rod with cut threads. See Rod Table note 3.

Rod Grade Identification

Calculating Elongation

Both strength and elongation are critical to shear wall performance. Rod is a major contributor to total system elongation. Lower rod elongation results in lower shear wall drift and better performance. The fastest manual method of determining rod strength and elongation is to use a rod table and adjust to actual length and strength.

When using a rod table:
1. Select rod for strength;
2. Calculate rod elongation at required load & rod length.
3. Compare the elongation to requirements.
4. Increase rod diameter to reduce elongation.

Special Note: Rod elongation.
Per AC391, 3.2.1.1, rod elongation is calculated:

Δ Rod = PL/AnE where:

P=Load, L=length,
An=0.7854 (D-0.9743/n)^2,
(An is precalculated in tables)
D = nominal rod dia. n = threads per inch,
E = elastic modulus = 29,000,000.

Note: the code required formula is identical to the AISC calculation, PL/AE, **except** AISC didn't include material lost through threading. But almost all threaded rod is rolled from a reduced diameter blank rod. Both "All Thread" or "Smooth Shank" rod have the same net diameter, net area and same elongation. Using the full diameter verses actual area in calculations vs can understate drift by 26 to 38%.
Exception: If full diameter rod is used and the threads are cut then elongation for full area rod can be used for 60% to 75% of the rod length. HS rod is not stiffer than standard strength.

High Strength rod is identified with a stamp on the rod end as follows:
Plain for A307, A36 & F1554G36
"55" for F1554G55,
"105" for F1554G105,
"B7" for A193-B7 and F1554 Gr. 105

ASD

	Diameter & Thread	Rod ID	A307		Rod Area
		Model	ASD Allowable Tension (lb)	Elongation (in. per 10' at full load)	Stress Area (for Elongation)
Standard Strength	1/2"-13 UNC	R4-A307	4,418	0.129	0.142
	5/8"-11 UNC	R5-A307	6,903	0.126	0.226
	3/4"-10 UNC	R6-A307	9,940	0.123	0.334
	7/8"-9 UNC	R7-A307	13,530	0.121	0.462
	1"-8 UNC	R8-A307	17,671	0.121	0.606
	1-1/8"-7 UNC	R9-A307	22,365	0.121	0.763
	1-1/4"-7 UNC	R10-A307	27,612	0.118	0.969
	1-3/8"-6 UNC	R11-A307	33,410	0.120	1.155
	1-1/2"-6 UNC	R12-A307	39,761	0.117	1.405
	1-3/4"-5 UNC	R14-A307	54,119	0.118	1.899
	2"-4.5 UNC	R16-A307	70,686	0.117	2.498

	Diameter & Thread	Rod ID	F1554 Grade 55		Rod Area
		Model	ASD Allowable Tension (lb)	Elongation (in. per 10' at full load)	Stress Area (for Elongation)
Standard Strength +	1/2"-13 UNC	R4-G55	5,522	0.161	0.142
	5/8"-11 UNC	R5-G55	8,629	0.158	0.226
	3/4"-10 UNC	R6-G55	12,425	0.154	0.334
	7/8"-9 UNC	R7-G55	16,912	0.152	0.462
	1"-8 UNC	R8-G55	22,089	0.151	0.606
	1-1/8"-7 UNC	R9-G55	27,957	0.152	0.763
	1-1/4"-7 UNC	R10-G55	34,515	0.147	0.969
	1-3/8"-6 UNC	R11-G55	41,763	0.150	1.155
	1-1/2"-6 UNC	R12-G55	49,701	0.146	1.405
	1-3/4"-5 UNC	R14-G55	67,649	0.147	1.899
	2"-4.5 UNC	R16-G55	88,357	0.146	2.498

	Diameter & Thread	Rod ID	A193-B7		Rod Area
		Model	ASD Allowable Tension (lb)	Elongation (in. per 10' at full load)	Stress Area (for Elongation)
High Strength	1/2"-13 UNC	R4-B7	9,204	0.268	0.142
	5/8"-11 UNC	R5-B7	14,381	0.263	0.226
	3/4"-10 UNC	R6-B7	20,709	0.256	0.334
	7/8"-9 UNC	R7-B7	28,187	0.253	0.462
	1"-8 UNC	R8-B7	36,816	0.251	0.606
	1-1/8"-7 UNC	R9-B7	46,595	0.253	0.763
	1-1/4"-7 UNC	R10-B7	57,524	0.246	0.969
	1-3/8"-6 UNC	R11-B7	69,604	0.249	1.155
	1-1/2"-6 UNC	R12-B7	82,835	0.244	1.405
	1-3/4"-5 UNC	R14-B7	112,748	0.246	1.899
	2"-4.5 UNC	R16-B7	147,262	0.244	2.498

Material Properties:

1. ASTM A307 Fu = 60, Fy =43 ksi.
   ASTM F1554 Gr.55 Fu = 75, Fy =55 ksi.
   ASTM A193-B7, Fu=125, Fy=105 ksi.
   ASTM F1554 Gr.105 Fu=125, Fy =105 ksi.
   ASTM A354-BD, Fu = 150, Fy =130 ksi.

2. ASD Allowable = P asd = 0.75 x Fu x Ag/2
   Per AISC 360 14th ed. Table 7.2 p.7-23,
   Table J3.2 p.16.1-120 &. J3-1 p.16.1-124
   LRFD Strength = P lrfd = 0.75 x 0.75 x Fu x Ag
   Per AISC 360 14th ed Tables 7.2 p.7-23
   & J3.2 p.16.1-120 & Eqn. J3-1p.16.1-124
   Where Ag = Nominal Area (Area of Nominal Thread Dia.) & Fu=ultimate Tensile Strength.
   Stress increase not allowed with AISC 14th.

3. Rod elongation is calculated per AC391 3.2.1.1 as follows:
   Δ Rod = PL/AnE where: P=Load, L=length, An=0.7854 (D-0.9743/n)^2, D = nominal rod dia, n = threads per inch,
   E = modulus = 29e6.
   Almost without exception threaded rod is rolled from the same diameter "coil" rod whether it is made as all-thread rod or as threaded ends only. The result is identical elongation for both all thread rod and threaded ends only.

4. Table elong. is for 120" at full rod load.

5. High Strength Rods are marked.

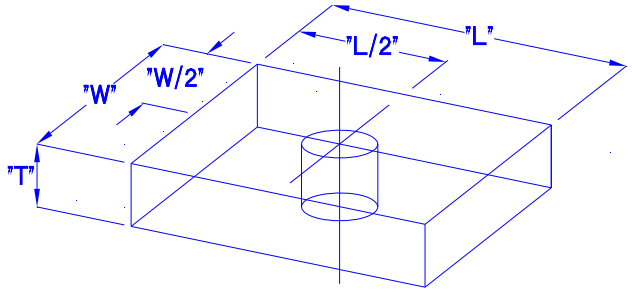
6. If you order A36 we will send A307, which is slightly stronger.

7. F1554 Gr. 105 which is identical to A193-B7.

Bearing Plates

Bearing plates distribute uplift loads into the structure at reaction points. AutoTight plates exceed the flexural requirements of AISC 360 (14th ed.) and wood bearing requirements of the 2015 NDS. (ICC ES AC391 Section 1.4.6, March 1, 2015)

Per the 2015 NDS, plate design deflection is 0.040 inch at the compressive design value with a linear load deformation. (ICC ES AC 391 section 3.2.1.2).



Determining Compression Deflection

AutoTight bearing plates provide a maximum deformation of 0.040" at their rated capacity.
To select:
1. Determine the reaction load.
2. Select the smallest plate that can carry the reaction load.

Check that plates Fit: Rod dia. & Wall Width
(4X or 6X Wall)

Adjust for Actual Deformation
Wood deformation at the design load is linear. The load-deformation at the design load

$$\Delta = 0.040" * \text{design load} / \text{rated load}.$$

Example:
Reaction is 11,000 pounds on Douglas Fir.
Rod is 1-1/8" Ø.

Select an S11-1-1/4" bearing plate, rated capacity 11,948 pounds.

$$\Delta = 0.040 * 11{,}000 / 11{,}948 = 0.037"$$

For system deformation add the 0.037" to the rod and shrinkage compensator deformation plus Δr. (per AC 391, section 3.2.1.2)

Minimizing Total Deformation

To lower system deformation increase the size of the bearing plate.

Example:
If the reaction load is 11,000 pounds on Douglas Fir. (previous example) and an L20-1-1#4" plate is selected, plate deformation lowers to:

$$\Delta = 0.040" * 11{,}000 / 21{,}016 = 0.021"$$

Along with changing rod size, changing the bearing plate is the other method that lets you adjust total system deflection (elongation) to achieve a tight system.

The AutoTight Software uses drop down menus. This allows for a fast, easy change of rod, bearing plates or shrinkage compensators to achieve the required system deflection.

Bearing Plates

Bearing Plates load the structure at reaction points. Bearing loads are limited by wood crushing at the NDS allowable wood bearing capacity.

Material: Complies with ASTM A 36

Finish: S5 and S7 are HDG. Others are black steel

Bearing Plates				Allowable ASD Loads			
Wall Width	Model No.	T * W * L	Max. Rod Ø	ASD Allowable Load (@ 0.040" Cross Grain Crushing) DFL @ 625	HF @ 425	SYP @ 565	SPF @ 405
For Walls 4X and Up	S5 -3/4"	1/4" * 3" * 3"	3/4"	5,964	3,864	5,391	4,055
	For 1/2" through 1" Rod						
	S7 -1"	3/8" * 3-1/2" * 3-1/2"	1"	7,863	5,095	7,108	5,347
	For 3/4" through 1-1/4" Rod						
	S7 -1-1/4"	3/8" * 3-1/2" * 3-1/2"	1-1/4"	7,540	4,886	6,816	5,127
	S11 -1-1/4"	1/2" * 3-1/2" * 5-1/2"		11,948	7,742	10,801	8,125
	S16 -1-1/4"	1" * 3-1/4" * 8"		15,404	9,982	13,926	10,475
For Walls 6X and Up	L18 -1-1/4"	1/2" * 5-1/2" * 5-1/2"		19,292	12,501	17,440	13,119
	L20 -1-1/4"	5/8" * 5-1/2" * 6"		21,016	13,618	18,998	14,291
	L25 -1-1/4"	3/4" * 5-1/2" * 7-1/2"		24,936	16,158	22,542	16,956
	L30 -1-1/4"	1" * 5-1/2" * 9"		30,092	19,500	27,203	20,462
	L33 -1-1/4"	1" * 5-1/2" * 10"		33,529	21,727	30,311	22,800
	L37 -1-1/4"	1-1/4" * 5-1/2" * 11"		36,967	23,955	33,418	25,137
	L40 -1-1/4"	1-1/4" * 5-1/2" * 12"		40,404	26,182	36,526	27,475
	For 1-1/2" Rod						
	L18 -1-1/2"	1/2" * 5-1/2" * 5-1/2"	1-1/2"	18,915	12,257	17,099	12,862
	L20 -1-1/2"	5/8" * 5-1/2" * 6"		20,641	13,375	18,659	14,036
	L25 -1-1/2"	3/4" * 5-1/2" * 7-1/2"		24,583	15,930	22,223	16,716
	L30 -1-1/2"	1" * 5-1/2" * 9"		29,739	19,271	26,884	20,223
	L33 -1-1/2"	1" * 5-1/2" * 10"		33,177	21,498	29,992	22,560
	L37 -1-1/2"	1-1/4" * 5-1/2" * 11"		36,614	23,726	33,099	24,898
	L40 -1-1/2"	1-1/4" * 5-1/2" * 12"		40,052	25,953	36,207	27,235
	For 1-3/4" through 2" Rod						
	L18 -2"	1/2" * 5-1/2" * 5-1/2"	2"	17,965	11,641	16,240	12,216
	L20 -2"	5/8" * 5-1/2" * 6"		19,695	12,763	17,805	13,393
	L25 -2"	3/4" * 5-1/2" * 7-1/2"		23,693	15,353	21,419	16,111
	L30 -2"	1" * 5-1/2" * 9"		28,849	18,694	26,080	19,618
	L33 -2"	1" * 5-1/2" * 10"		32,287	20,922	29,187	21,955
	L37 -2"	1-1/4" * 5-1/2" * 11"		35,724	23,149	32,295	24,293
	L40 -2"	1-1/4" * 5-1/2" * 12"		39,162	25,377	35,402	26,630

Notes:
Plate ID includes maximum rod diameter. All rod clearance holes are 1/16" oversize.
Wood Bearing Capacity ASD per NDS 2015: DFL = 625, HF = 405, SPF = 425 psi. (Fc perp)
Wood Bearing Strength LRFD per NDS 2015: DFL = 939, HF = 608, SPF = 638 PSI (Fc perp lrfd) Table 4.3.1

Plate ASD Allowable Capacity = (Fc perp) * Bearing Area (per AC 391 3.2.1.2) at a deflection of 0.040".
Plate LRFD Strength=(Fc perp of the wood in LRFD)*Bearing Area (per AC 391 3.2.1.2) @ 0.040" deflection.
Bearing area factor, Cb, included in listed capacities. Deflection is 0.040" at Allowable Load. Bearing Plate bending based on ASTM A36 Steel, Fy = 36 ksi. per AISC 14th ed.

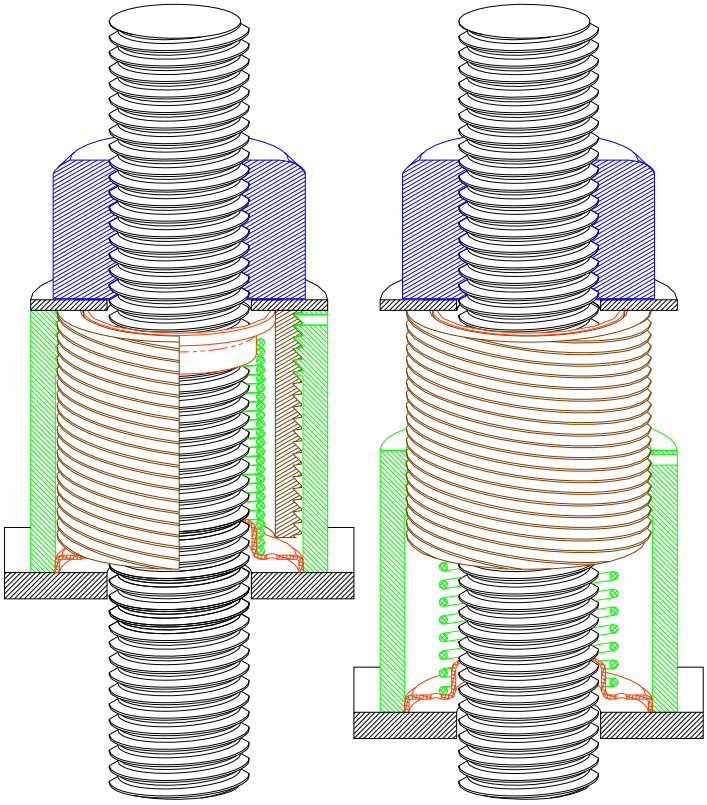
TUD's Take-Up Devices or
Shrinkage compensators require evaluation for: fit, strength, expansion and deflection.
Two code defined deflections **(ΔA)** and **(ΔR)** are required.

Load-deflection
(ΔA) = design load/actual load * Rated ΔA.
Delta R (ΔR) is always added in full to system deflection. Delta R is the internal slack.

Example: Reaction Load = 11,000 pounds

TUD = AT 100 (Select based on the rod size)
Rated Capacity: 25,300 pounds.
Deflection: ΔA = 0.032", ΔR = 0.002"
Expansion 1.2" (ICC ESR 1344)

Load/Deflection
(ΔA) = 0.032 * 11,000/25,300 = 0.014"
(ΔR) (From Table) = 0.002"
Total Deformation = 0.016"
Add total to the system elongation per AC 316 & AC 391 section 3.1.1.



US Patents 6,390747 & 6,585,469.
Other Patents foreign and domestic, pending.

AutoTight:

Tighter Systems
Better Performance

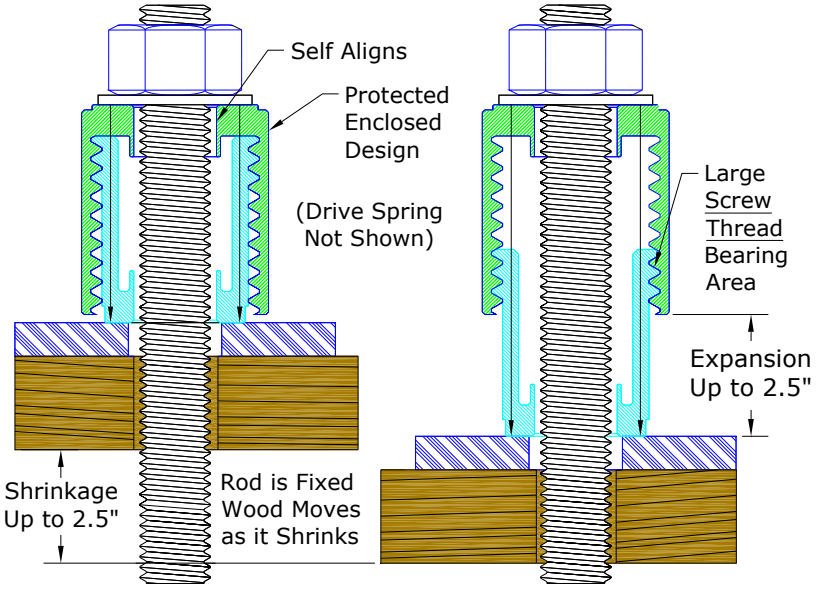
Rod Sizes up to 2" Ø

Robust,
Precise,
Protected
Mechanism

AutoTight® Component Hardware ASD

The AutoTight shrinkage compensator automatically expands, eliminates looseness.
Threaded Mechanism = NO Backlash (Δr) = No Looseness!

Code Listed:
ICC ESR-1344, COLA RR-25480,
Tested to AC 316 & AC 391,
IBC 2018 Rated



	Model Number	Rod Diameter (Max.)	Matl.	Dimensions (Inches) O.D.	Dimensions (Inches) H	Rated Take-Up (Inches)	Allowable Load Pounds	Δ_R (inches) Seating Increment	Δ_A (inches) Deflection at Allowable Load
	AT4A-1.5	1/2"	Aluminum	1-1/2	3.00	1.50	6,450	0.000*	0.011
	AT4A-2.5				4.06	2.50			
	AT6A-1.5	3/4"		2-1/8	3.19	1.50	10,550		0.011
	AT6A-2.5				4.19	2.50			
New	AT8A-1.5	1"		2-3/4	3.50	1.75	20,750	0.000*	0.004
New	AT10A-1.5	1-1/4"		3-1/4	3.50	1.62	28,050	0.000*	0.021
New	AT12A-1.5	1-1/2"		3-1/4	3.50	1.62	28,050	0.000*	0.021
New	AT16A-2.0	2"		4	3.50	2.07	39,450	0.001*	0.011
	AT 75	3/4"	Steel	2	2.80	1.10	16,450	0.002	0.024
	AT 75-2.5				4.00	2.50	15,200		0.021
	AT 100	1"		2-1/4	2.90	1.10	25,300		0.032
	AT 125	1-1/4"		2-3/4	2.86	1.10	34,500		0.016
New	AT 200-2.0	2"		4	3.88	2.18	83,200	0.000*	0.009

Note: ΔR= Average Travel and Seating Increment is the "Lost Motion" with device direction change from advancing to load resistance. This is sometimes called "Backlash".
*AutoTight Shrinkage Compensators shown as 0.000" have less than 0.0005" (Δr.)

Components: AutoTight® Rod
Rod Holdown systems use continuous threaded rod. Typical lengths 2', 3', 4', 6', 10', and 12'.

Rod is specified by diameter, in 1/8" increments, grade, and length. **Examples**:

R5-A307 X 10' =
Rod, 5/8" Dia., Grade A307, 10' (120").

R9-B7 X 12' =
Rod, 1-1/8" Dia., ASTM A193-B7, 12' (144").

Finish: Standard Black or zinc plated.
Optional Hot Dip Galvanized (HDG)
Note: HDG rod thread must be chased to fit standard nuts & couplers or modified couplers used.

Standard Thread is Unified National Coarse (UNC). Rod is available from 3/8" (R3) to 2" (R16) diameter.

Strength: AISC 360, 14th ed. and ICC AC 391-3.2.1.1.

Code Acceptance: Tensile Values per IBC 2015, IBC 2012, IBC 2009, as specified in AISC 360 14th edition.

Note: ICC ES AC 391-3.2.1.1 recognizes the increased elongation fully threaded rod (rolled threads) provides compared to solid rod with cut threads. See Rod Table note 3.

Rod Grade Identification

Calculating Elongation

Both strength and elongation are critical to shear wall performance. Rod is a major contributor to total system elongation. Lower rod elongation results in lower shear wall drift and better performance. The fastest manual method of determining rod strength and elongation is to use a rod table and adjust to actual length and strength.

When using a rod table:
1. Select rod for strength;
2. Calculate rod elongation at required load & rod length.
3. Compare the elongation to requirements.
4. Increase rod diameter to reduce elongation.

Special Note: Rod elongation.
Per AC391, 3.2.1.1, rod elongation is calculated:

Δ Rod = PL/AnE where:

P=Load, L=length,
An=0.7854 (D-0.9743/n)^2, (An is precalculated in tables)
D = nominal rod dia, n = threads per inch,
E = elastic modulus = 29,000,000.

Note: the code required formula is identical to the AISC calculation, PL/AE, **except** AISC didn't include material lost through threading. But almost all threaded rod is rolled from a reduced diameter blank rod. Both "All Thread" or "Smooth Shank" rod have the same net diameter, net area and same elongation. Using the full diameter verses actual area in calculations vs can understate drift by 26 to 38%.
Exception: If full diameter rod is used and the threads are cut then elongation for full area rod can be used for 60% to 75% of the rod length. HS rod is not stiffer than standard strength.

High Strength rod is identified with a stamp on the rod end as follows:

Plain for A307, A36 & F1554G36
"55" for F1554G55,
"105" for F1554G105,
"B7" for A193-B7 and F1554 Gr. 105

LRFD

	Diameter & Thread	Rod ID Model	A307 LRFD Load Tension (lb)	A307 Elongation (in. per 10' at full load)	Rod Area Net Tensile Stress Area
Standard Strength	1/2"-13 UNC	R4-A307	6,627	0.193	0.142
	5/8"-11 UNC	R5-A307	10,354	0.190	0.226
	3/4"-10 UNC	R6-A307	14,910	0.184	0.334
	7/8"-9 UNC	R7-A307	20,295	0.182	0.462
	1"-8 UNC	R8-A307	26,507	0.181	0.606
	1-1/8"-7 UNC	R9-A307	33,548	0.182	0.763
	1-1/4"-7 UNC	R10-A307	41,417	0.177	0.969
	1-3/8"-6 UNC	R11-A307	50,115	0.180	1.155
	1-1/2"-6 UNC	R12-A307	59,641	0.176	1.405
	1-3/4"-5 UNC	R14-A307	81,178	0.177	1.899
	2"-4.5 UNC	R16-A307	106,029	0.176	2.498

	Diameter & Thread	Rod ID Model	F1554 Grade 55 LRFD Load Tension (lb)	F1554 Grade 55 Elongation (in. per 10' at full load)	Rod Area Net Tensile Stress Area
Standard Strength +	1/2"-13 UNC	R4-G55	8,283	0.242	0.142
	5/8"-11 UNC	R5-G55	12,943	0.237	0.226
	3/4"-10 UNC	R6-G55	18,638	0.231	0.334
	7/8"-9 UNC	R7-G55	25,368	0.227	0.462
	1"-8 UNC	R8-G55	33,134	0.226	0.606
	1-1/8"-7 UNC	R9-G55	41,935	0.227	0.763
	1-1/4"-7 UNC	R10-G55	51,772	0.221	0.969
	1-3/8"-6 UNC	R11-G55	62,644	0.224	1.155
	1-1/2"-6 UNC	R12-G55	74,551	0.220	1.405
	1-3/4"-5 UNC	R14-G55	101,473	0.221	1.899
	2"-4.5 UNC	R16-G55	132,536	0.220	2.498

	Diameter & Thread	Rod ID Model	A193-B7[1] LRFD Load Tension (lb)	A193-B7[1] Elongation (in. per 10' at full load)	Rod Area Net Tensile Stress Area
High Strength	1/2"-13 UNC	R4-B7	13,806	0.403	0.142
	5/8"-11 UNC	R5-B7	21,572	0.395	0.226
	3/4"-10 UNC	R6-B7	31,063	0.384	0.334
	7/8"-9 UNC	R7-B7	42,280	0.379	0.462
	1"-8 UNC	R8-B7	55,223	0.377	0.606
	1-1/8"-7 UNC	R9-B7	69,892	0.379	0.763
	1-1/4"-7 UNC	R10-B7	86,286	0.368	0.969
	1-3/8"-6 UNC	R11-B7	104,407	0.374	1.155
	1-1/2"-6 UNC	R12-B7	124,252	0.366	1.405
	1-3/4"-5 UNC	R14-B7	169,121	0.368	1.899
	2"-4.5 UNC	R16-B7	220,893	0.366	2.498

Material Properties:

1. ASTM A307 Fu = 60, Fy = 43 ksi.,
   ASTM F1554 Gr.55 Fu = 75, Fy = 55,
   ASTM A193-B7, Fu=125, Fy=105 ksi.,
   ASTM F1554 Gr.105 Fu=125, Fy=105 ksi.,
   ASTM A354-BD, Fu = 150 Fy = 130 ksi.

2. ASD Allowable = P asd = 0.75 x Fu x Ag/2
   Per AISC 360 14th ed. Table 7.2 p.7-23,
   Table J3.2 p.16.1-120 &. J3-1 p.16.1-124
   LRFD Strength = P lrfd = 0.75 x 0.75 x Fu x Ag
   Per AISC 360 14th ed Tables 7.2 p.7-23
   & J3.2 p.16.1-120 & Eqn. J3-1p.16.1-124
   Where Ag = Nominal Area (Area of Nominal Thread Dia.) & Fu=ultimate Tensile Strength.
   Stress increase not allowed with AISC 14th.

3. Rod elongation is calculated per AC391 3.2.1.1 as follows:
   Δ Rod = PL/AnE where: P=Load, L=length,
   An=0.7854 (D-0.9743/n)^2, D = nominal rod dia, n = threads per inch,
   E = modulus = 29e6.
   Almost without exception threaded rod is rolled from the same diameter "coil" rod whether it is made as all-thread rod or as threaded ends only. The result is identical elongation for both all thread rod and threaded ends only.

4. Table elong. is for 120" at full rod load.

5. High Strength Rods are marked.

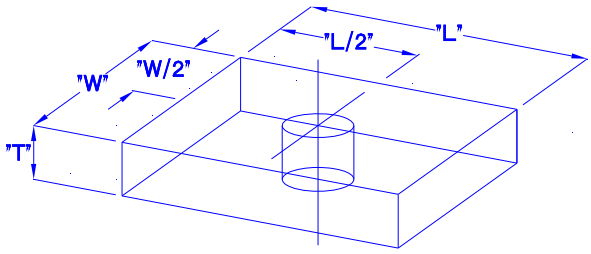
6. If you order A36 we will send A307, which is slightly stronger.

7. F1554 Gr. 105 which is identical to A193-B7.

Bearing Plates

Bearing plates distribute uplift loads into the structure at reaction points. AutoTight plates exceed the flexural requirements of AISC 360 (14th ed.) and wood bearing requirements of the 2015 NDS. (ICC ES AC391 Section 1.4.6, March 1, 2015)

Per the 2015 NDS, plate design deflection is 0.040 inch at the compressive design value with a linear load deformation. (ICC ES AC 391 section 3.2.1.2).



Determining Compression Deflection

AutoTight bearing plates provide a maximum deformation of 0.040" at their rated capacity.
To select: 1. Determine the reaction load.
2. Select the smallest plate that can carry the reaction load.

Check that plates Fit: Rod dia. & Wall Width (4X or 6X Wall)

Adjust for Actual Deformation
Wood deformation at the design load is linear. The load-deformation at the design load

= 0.040" * design load / rated load.

Example:
Reaction is 11,000 pounds on Douglas Fir.
Rod is 1-1/8" Ø.

Select an S11-1-1/4" bearing plate rated capacity 11,948 pounds.

Actual deformation (per AC 391, section 3.2.1.2)

= 0.040 * 11,000 / 11,948 = 0.037"

or system deformation add the 0.037" to the rod and shrinkage compensator deformation plus Δr. (per AC 391, section 3.2.1.2)

Minimizing Total Deformation

To lower system deformation increase the size of the bearing plate.

Example:
If the reaction load is 11,000 pounds on Douglas Fir. (previous example) and an L20-1-1#4" plate is selected, plate deformation lowers to:

Δ = 0.040" * 11,000 / 21,016 = 0.021"

Along with changing rod size, changing the bearing plate is the other method that lets you adjust total system deflection (elongation) to achieve a tight system.

The AutoTight Software uses drop down menus. This allows for a fast, easy change of rod, bearing plates or shrinkage compensators to achieve the required system deflection.

Bearing Plates

Bearing Plates load the structure at reaction points. Bearing loads are limited by wood crushing at the NDS allowable wood bearing capacity.

Identification:
Plates or boxes marked with Part #.
Efficiency tip: Minimize the number of sizes used on any single job, i.e. Keep it Simple.
"S" Plates fit 4x & Larger walls,
"L" plates fit 6x & Larger walls.

Material: Complies with ASTM A36

Bearing Plates					LRFD Strength			
Wall Width	Model No.		T * W * L	Max. Rod Ø	LRFD Load (@ 0.040" Cross Grain Crushing)			
					DFL @ 938	HF @ 608	SYP @ 848	SPF @ 638
For Walls 4X and Up	S5	-3/4"	1/4" * 3" * 3"	3/4"	8,945	5,797	8,087	6,083
	For 1/2" through 1" Rod							
	S7	-1"	3/8" * 3-1/2" * 3-1/2"	1"	11,795	7,643	10,662	8,020
	For 3/4" through 1-1/4" Rod							
	S7	-1-1/4"	3/8" * 3-1/2" * 3-1/2"	1-1/4"	11,311	7,329	10,225	7,691
	S11	-1-1/4"	1/2" * 3-1/2" * 5-1/2"		17,922	11,614	16,202	12,187
	S16	-1-1/4"	1" * 3-1/4" * 8"		23,107	14,973	20,888	15,712
For Walls 6X and Up	L18	-1-1/4"	1/2" * 5-1/2" * 5-1/2"		28,938	18,752	26,160	19,678
	L20	-1-1/4"	5/8" * 5-1/2" * 6"		31,523	20,427	28,497	21,436
	L25	-1-1/4"	3/4" * 5-1/2" * 7-1/2"		37,403	24,237	33,813	25,434
	L30	-1-1/4"	1" * 5-1/2" * 9"		45,138	29,249	40,805	30,694
	L33	-1-1/4"	1-1/8" * 5-1/2" * 10"		50,294	32,591	45,466	34,200
	L37	-1-1/4"	1-1/4" * 5-1/2" * 11"		55,450	35,932	50,127	37,706
	L40	-1-1/4"	1-1/2" * 5-1/2" * 12"		64,357	41,703	58,178	43,762
	For 1-1/2" through 2" Rod							
	L18	-2"	1/2" * 5-1/2" * 5-1/2"	2"	26,947	17,462	24,360	18,324
	L20	-2"	5/8" * 5-1/2" * 6"		29,543	19,144	26,707	20,089
	L25	-2"	3/4" * 5-1/2" * 7-1/2"		35,540	23,030	32,128	24,167
	L30	-2"	1" * 5-1/2" * 9"		43,274	28,042	39,120	29,426
	L33	-2"	1-1/8" * 5-1/2" * 10"		48,430	31,383	43,781	32,933
	L37	-2"	1-1/4" * 5-1/2" * 11"		53,587	34,724	48,442	36,439
	L40	-2"	1-1/2" * 5-1/2" * 12"		62,493	40,495	56,493	42,495

Notes:
Plate ID includes maximum rod diameter. All rod clearance holes are 1/16" oversize.
Wood Bearing Capacity ASD per NDS 2015: DFL = 625, HF = 405, SPF = 425 psi. (Fc perp)

Wood Bearing Strength LRFD per NDS 2015:
DFL = 939, HF = 608, SPF = 638 PSI
(Fc perp lrfd) Table 4.3.1
Plate ASD Allowable Capacity = (Fc perp) * Bearing Area (per AC 391 3.2.1.2) at a deflection of 0.040".

Plate LRFD Strength=(Fc perp of the wood in LRFD)*Bearing Area (per AC 391 3.2.1.2) @ 0.040" deflection.
Bearing area factor, Cb, included in listed capacities. Deflection is 0.040" at Allowable Load.
Bearing Plate bending based on ASTM A36 Steel, Fy = 36 ksi. per AISC 14th ed.

Finish: S5, S7, L11 and L18, S5, S7-1" and S7-1-1/4" plates are HDG and may be used on the first floor mudsill for end of wall connections. All others are black steel.

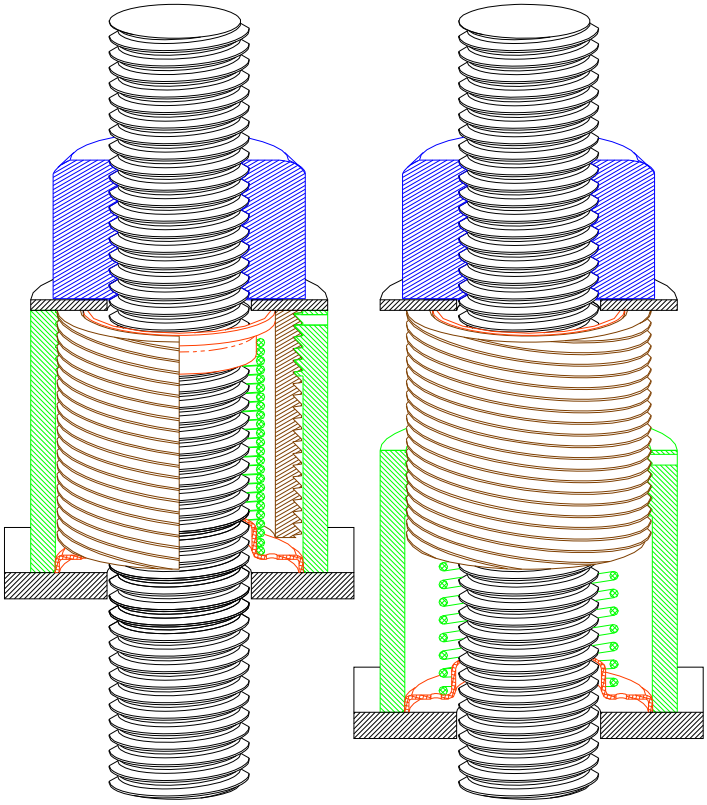
TUD's TakeUp Devices or
Shrinkage compensators require evaluation for: fit, strength, expansion and deflection.
Two code defined deflections **(ΔA)** and **(ΔR)** are required.

Load-deflection
(ΔA) = design load/actual load * Rated ΔA.
Delta R (ΔR) is always added in full to system deflection. Delta R is the internal slack.

Example: Reaction Load = 11,000 pounds

TUD = AT 100 (Select based on the rod size)
Rated Capacity: 25,300 pounds.
Deflection: ΔA = 0.032", ΔR = 0.002"
Expansion 1.2" (ICC ESR 1344)

Load/Deflection
(ΔA) = 0.032 * 11,000/25,300 = 0.014"
(ΔR) (From Table = 0.002"
Total Deformation = 0.016"
Add total to the system elongation per AC 316 & AC 391 section 3.1.1.



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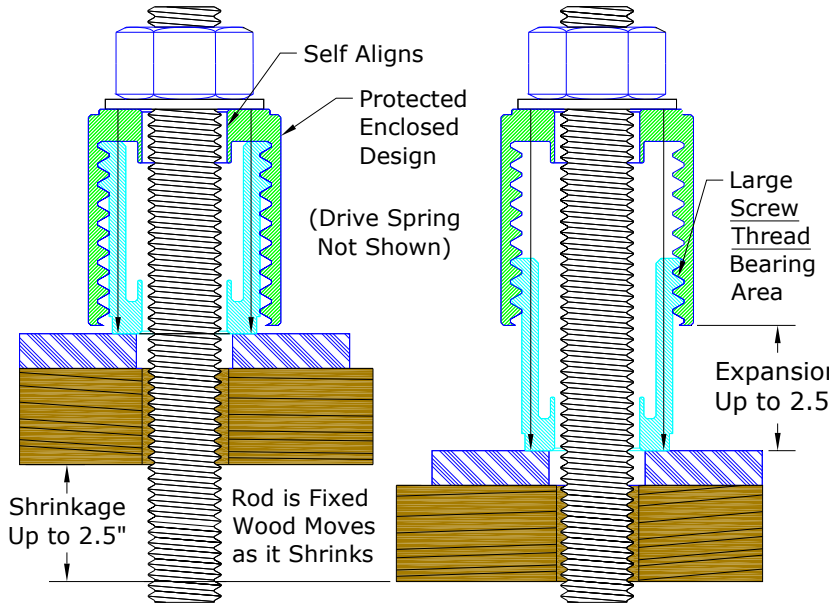
Tighter Systems
Better Performance

Rod Sizes up to 2" Ø

Robust,
Precise,
Protected
Mechanism

The AutoTight shrinkage compensator automatically expands, eliminates looseness.
Threaded Mechanism = NO Backlash (Δr) = No Looseness!

Code Listed: ICC ESR-1344, COLA RR-25480, Tested to AC 316 & AC 391, IBC 2018 Rated



No Backlash with AutoTight = Much Better Shear Wall Performance

	Model Number	Rod Diameter (Max.)	Matl.	Dimensions (Inches) O.D.	Dimensions (Inches) H	Rated Take-Up (Inches)	LRFD Load Pounds	Δ_R (inches) Seating Increment	Δ_A (inches) Deflection at LRFD Load
	AT4A-1.5	1/2"	Aluminum	1-1/2	3.00	1.50	9,675	0.000*	0.017
	AT4A-2.5				4.06	2.50			
	AT6A-1.5	3/4"		2-1/8	3.19	1.50	15,825		0.017
	AT6A-2.5				4.19	2.50			
New	AT8A-1.5	1"		2-3/4	3.50	1.75	31,125	0.000*	0.007
New	AT10A-1.5	1-1/4"		3-1/4	3.50	1.62	42,075	0.000*	0.031
New	AT12A-1.5	1-1/2"		3-1/4	3.50	1.62	42,075	0.000*	0.031
New	AT16A-2.0	2"		4	3.50	2.07	59,175	0.001*	0.016
	AT 75	3/4"	Steel	2	2.80	1.10	24,675	0.002	0.036
	AT 75-2.5				4.00	2.50	22,800		0.032
	AT 100	1"		2-1/4	2.90	1.10	37,950		0.048
	AT 125	1-1/4"		2-3/4	2.86	1.10	51,750		0.024
New	AT 200-2.0	2"		4	3.88	2.18	124,800	0.000*	0.013

Note: ΔR= Average Travel and Seating Increment is the "Lost Motion" with device direction change from advancing to load resistance. This is sometimes called "Backlash".
*AutoTight Shrinkage Compensators shown as 0.000" have less than 0.0005" (Δr.)

AutoTight® Take-Up:
Installation, Activation, Inspection

A. Review Plans:

Verify materials required at each reaction point.

Verify: wood hole size is proper diameter (Ø). **Recommended** wood plate hole Ø is **Rod Ø + 1/4".**
Example : a 1" Ø rod uses a 1-1/4 Ø hole

The 1/4" clearance allows the rod to move vertically as the building shrinks and settles.

Verify the hole is **in the center of the wood plate**. (The bearing plate must be fully supported.)

B. Install components in the following order:

1. **Bearing Plate: Verify Size**. Note: plates **wider** than 3-1/2" will **NOT** fit a 4X wall.

2. Place **AutoTight® TUD** over the rod.
   Aluminum TUDs (Shown) have Activation pin positioned on the top. (see photo)
   Steel TUDs have the activation screw at bottom.

3. **Washer:** Install the washer (See chart). The washer helps keep jobsite sawdust out of the TUD! Steel AT 75, 100 and 125 use SAE washers. All others use SS washers.

4. Install the specified **nut**. (See photo next page)

Washers for Steel Tuds				
Steel Tud	Rod Ø	Model Number	ID Inside Ø	OD Outside Ø
AT 75	5/8	W-5	0.656	1.312
	3/4	W-6	0.938	1.469
AT 100	7/8	W-7	1.062	1.750
	1	W-8	1.062	2.000
AT 125	1 1/8	W-9	1.250	2.250
	1 1/4	W-10	1.375	2.500
AT 200	1 3/4	W-13-USS	1.750	3.750
	2	W-15-USS	2.000	4.250

Washers for Aluminum Tuds				
Aluminum Tud	Rod Ø	Model Number	ID Inside Ø	OD Outside Ø
AT4A	1/2	W-4-USS	0.562	1.375
AT6A	5/8	W-5-USS	0.688	1.750
	3/4	W-6-USS	0.812	2.000
AT8A	7/8	W-8-USS	1.062	2.500
	1	W-8-USS	1.062	2.500
AT10A	1 1/8	W-10-USS	1.375	3.000
	1 1/4	W-10-USS	1.375	3.000
AT12A	1 1/2	W-11-USS	1.500	3.250
AT16	1 3/4	W-13-USS	1.750	3.750
	2	W-15-USS	2.000	4.250

Do **NOT** Activate now.
Activation begins just before enclosing the walls.

C. Activating the AutoTight® TUD.

TUD initial installation.
Ready to activate.

Wait to Activate TUDs until just before the walls are enclosed. This can take 6 months or more.

Retighten before Activation
The Gap under the Nut shows the Shrinkage of the buildng.

Activating the AutoTight® TUD.

Start on the **lowest** level. Activate **All** TUDs at each level before proceeding up to the next level. Or Activate TUDs from the lowest to the highest in any given run.

When activating, remove the pin (or screw). The activated TUD will "come alive", move and sometimes rotate. You, the installer, will know it is fully active and working. This is the final inspection as the TUD is placed in service.

Properly installed
Ready to Expand

If you could look into The wall several months later you would see the

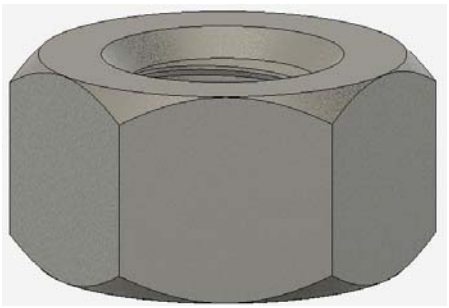
expanded **AutoTight® TUD** working to keep the building tight.

AutoTight®
Tighter Connections, Better Performance™

Nuts

Standard Nuts	
Model Number	Diameter-Thread
N-4	1/2"-13 NC
N-5	5/8"-11 NC
N-6	3/4"-10 NC
N-7	7/8"-9 NC
N-8	1"-8 NC
N-9	1-1/8"-7 NC
N-10	1-1/4"-7 NC
N-12	1-1/2"-6 NC
N-14	1-3/4"-5 NC
N-16	2"-4.5 NC

High Strength Nuts	
Model Number	Diameter-Thread
NHS-4	1/2"-13 NC
NHS-5	5/8"-11 NC
NHS-6	3/4"-10 NC
NHS-7	7/8"-9 NC
NHS-8	1"-8 NC
NHS-9	1-1/8"-7 NC
NHS-10	1-1/4"-7 NC
NHS-12	1-1/2"-6 NC
NHS-14	1-3/4"-5 NC
NHS-16	2"-4.5 NC



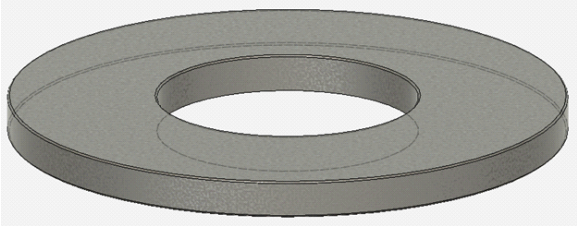
Nuts are Unified National Coarse thread (UNC or NC).
Standard Nuts are SAE Grade 2 or ASTM 563-Grade A
High Strength Nuts are SAE grade 5, ASTM 563-Grade C or A194-2H to match rod requirements.

Washers

Washers for Steel Tuds				
Steel Tud	Rod Ø	Model Number	Nominal Diameter	Outside Diameter
AT 75	1/2	W-4	1/2"	1-1/16"
	5/8	W-5	5/8"	1-5/16"
	3/4	W-6	3/4"	1-1/2"
AT 100	7/8	W-7	7/8"	1-3/4"
	1	W-8	1"	2"
AT 125	1 1/8	W-9	1-1/8"	2-1/4"
	1 1/4	W-10	1-1/4"	2-1/2"
AT 200	1 1/2	W-12	1-1/2"	3-1/2"
	1 3/4	W-14	1-3/4"	3-3/8"
	2	W-16	2"	3-3/4"

Washers for Aluminum Tuds				
Aluminum Tud	Rod Ø	Model Number	ID Inside Ø	OD Outside Ø
AT4A	3/8	W-3-1.5 OD	0.406	1.500
	1/2	W-4-USS	0.562	1.375
AT6A	5/8	W-5-USS	0.688	1.750
	3/4	W-6-USS	0.812	2.000
AT8A	7/8	W-8-USS	1.062	2.500
	1	W-8-USS	1.062	2.500
AT10A	1 1/8	W-10-USS	1.375	3.000
	1 1/4	W-10-USS	1.375	3.000
AT12A	1 1/2	W-11-USS	1.500	3.250
AT16	1 3/4	W-13-USS	1.750	3.750
	2	W-15-USS	2.000	4.250

SAE washers are used for steel TUDs up to AT125.
USS (Common) Washers are used for all other TUDs.
These washers distribute load into the Tud and help keep jobsite debris out of the Tud mechanism.
Washer sizes are not always the nominal size of the Rod or the TUD.

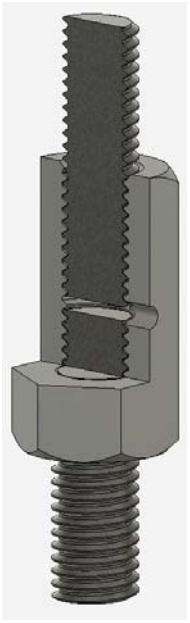


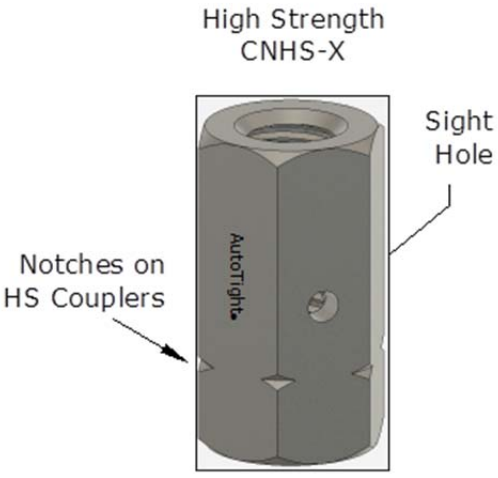
Straight Coupler Nuts

Coupler nuts connect threaded rod to form a continuous rod system.

Straight couplers have the same thread on both ends.
Coupler Nut Reducers have different diameter threads on each end.

Thread pitch is Unified National Coarse (NC or UNC).
Coupler nuts are available to fit rod from 1/2"-13 through 2"-4.5 NC.





Installation:

Thread coupler onto rod until the rod can be seen in the sight hole. Thread the next rod until it can also be seen through the sight hole. A thin nail inserted into the sight hole can be used for a temporary stop. Position Coupler so Inspector can see both rod ends.
Note: Full strength is achieved with thread engagement equal to a standard nut. This is typically one rod diameter.

Straight Coupler Identification: Example CN-9
CN = Coupler Nut,
9 = rod Size in 9/8 inch = 1-1/8" dia.

Grade: Standard Coupler Nuts are ASTM A563 Grade A (Grade 2)
High Strength Couplers are ASTM A563 Grade C (Grade 8)
Over 1-1/4" are ASTM A563 Grade B (Grade 5)
Sighted couplers have holes drilled to aid installation.

Straight Couplers Standard Strength	
Model Number	**Rod Ø Both Ends**
CN-4	1/2"
CN-5	5/8"
CN-6	3/4"
CN-7	7/8"
CN-8	1"
CN-9	1-1/8"
CN-10	1-1/4"

Straight Couplers High Strength	
Model Number	**Rod Ø Both Ends**
CNHS-5	5/8"
CNHS-6	3/4"
CNHS-7	7/8"
CNHS-8	1"
CNHS-9	1-1/8"
CNHS-10	1-1/4"
CNHS-12	1-1/2"
CNHS-14	1-3/4"
CNHS-16	2"

Options:

Oversized threads with reduced strength in coupler nuts for use with galvanized rod are available. Contact factory for details.

Coupler Nut Reducer Use coupler nut reducers to change rod size.

Coupler Nut Reducer Identification: Example: CNR-610: CNR = Coupler Nut Reducer, 610 = 3/4" NC to 1-1/4" - 7 NC Thread.

Grade: Standard Coupler Nuts are ASTM A563 Grade A (Grade 2). High strength Couplers are ASTM A563 Grade C (Grade 8). Sizes over 1-1/4" at the large end ASTM A563 Grade B (Grade 5) is supplied.

All reducer couplers have sight holes.

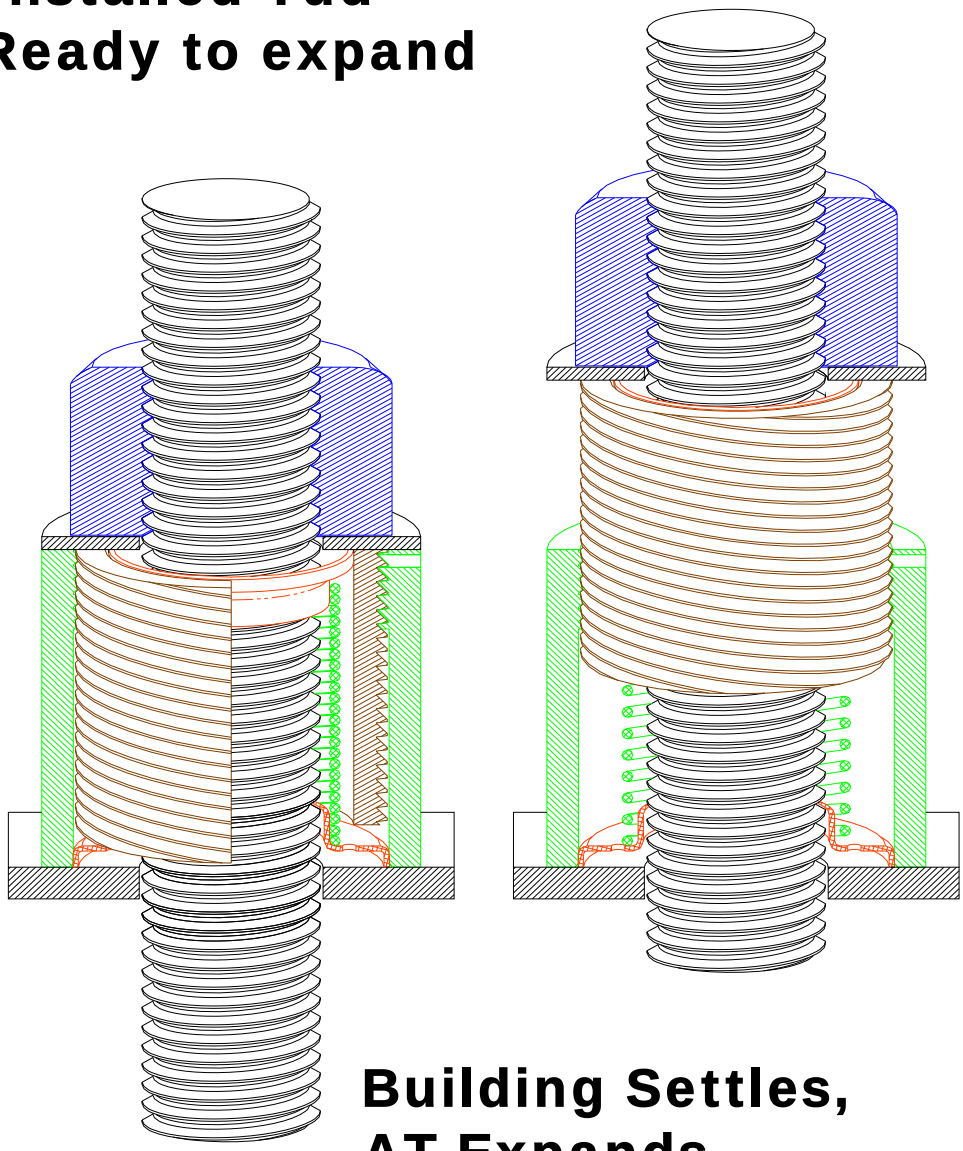
Coupler Nut Reducers Standard Strength		
Model Number	Rod Ø	
	Small	Large
CNR-45	1/2"	5/8"
CNR-46		3/4"
CNR-47		7/8"
CNR-48		1"
CNR-56	5/8"	3/4"
CNR-57		7/8"
CNR-58		1"
CNR-59		1-1/8"
CNR-67	3/4"	7/8"
CNR-68		1"
CNR-69		1-1/8"
CNR-610		1-1/4"
CNR-78	7/8"	1"
CNR-79		1-1/8"
CNR-710		1-1/4"
CNR-89	1"	1-1/8"
CNR-810		1-1/4"
CNR-910	1-1/8"	1-1/4"

Grade 2 coupler do not have notches.

High Strength Couplers (Grade 8) have notches on the small ends.

Coupler Nut Reducers High Strength		
Model Number	Rod Ø	
	Small	Large
CNRHS-56	5/8"	3/4"
CNRHS-57		7/8"
CNRHS-58		1"
CNRHS-59		1-1/8"
CNRHS-67	3/4"	7/8"
CNRHS-68		1"
CNRHS-69		1-1/8"
CNRHS-610		1-1/4"
CNRHS-78	7/8"	1"
CNRHS-79		1-1/8"
CNRHS-710		1-1/4"
CNRHS-89	1"	1-1/8"
CNRHS-810		1-1/4"
CNRHS-812		1-1/2"
CNRHS-910	1-1/8"	1-1/4"
CNRHS-912		1-1/2"
CNRHS-1012	1-1/4"	1-1/2"
CNRHS-1014		1-3/4"
CNRHS-1016		2"
CNRHS-1214	1-1/2"	1-3/4"
CNRHS-1216		2"
CNRHS-1416	1-3/4"	2"

Installed Tud
Ready to expand



Building Settles,
AT Expands
Connection is Tight
Building Performs

"Tighter Connections, Stronger Buildings"™

Notes:

ICC EVALUATION SERVICE®

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ICC-ES Evaluation Report

ESR-1344

Reissued December 2021

This report is subject to renewal December 2022.

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 05 23—Wood, Plastic, and Composite Fastenings

REPORT HOLDER:

COMMINS MANUFACTURING, INC.

EVALUATION SUBJECT:

AT AUTOMATIC TAKE-UP™ SHRINKAGE COMPENSATOR

1.0 EVALUATION SCOPE

Compliance with the following codes:

2018, 2015, and 2012 *International Building Code*® (IBC)

Property evaluated:

Structural

2.0 USES

The AT Automatic Take-Up™ Shrinkage Compensator device is used to remove slack in hold-down systems due to settlement or wood shrinkage in accordance with IBC Sections 2303.7 and 2304.3.3.

3.0 DESCRIPTION

3.1 General:

The AT Automatic Take-Up™ Shrinkage Compensator is a self-expanding washer used in connections of shearwall hold-down connectors or tension tie connectors incorporating threaded rods or threaded anchor bolts. The shrinkage compensator is available with either a steel body or an aluminum body. The devices automatically expand, axially, to eliminate any gaps between the bearing surface and the nut on the threaded rod that occur due to settlement or wood shrinkage. Sizes, rod diameters, dimensions, maximum expansion (shrinkage compensation capacity), and capacities are listed in Table 1. See Figure 1 for a typical installation.

3.2 Materials:

3.2.1 Auto Take-Up Device (AT Steel and ATA Aluminum): Steel AT's: The outer (body) component of the device has internal threads. The inner (stud) component of the device has matching external threads. The inner components are manufactured from ASTM A108-13 Grade 12L14 steel with minimum yield and tensile strengths of 65 and 75 ksi (448 and 517 MPa), respectively. The outer components are manufactured from either ASTM A108-13 Grade 12L14 steel with minimum yield and tensile strengths of 65 and 75 ksi (448 and 517 MPa), respectively, or DOM 1020/1028 steel tubing with minimum yield and tensile strengths of 84 and 95 ksi (579 and 657 MPa), respectively, for the AT75-2.5, and 71 and 80 ksi (490 and 551 MPa), respectively, for all the other AT devices. For the AT200-2 the outer and inner components are manufactured from ASTM A513-15 Grade 1026 steel with minimum yield and tensile strengths of 75 and 85 ksi (517 and 568 MPa) respectively. A finish and lubricant, specified in the approved quality control manual, is applied to the outer and inner components to resist corrosion. The device has an internal spring manufactured from HDMB steel wire per ASTM A764-07(2017) or high-carbon steel music wire per ASTM A228-16.

3.2.2 Aluminum AT's: The outer (body) component of the device has internal threads. The inner (stud) component of the device has matching external threads. The outer and inner components are manufactured from 6061-T6 aluminum with minimum yield and tensile strengths of 40 and 45 ksi (275 and 310 MPa), respectively. A lubricant, specified in the approved quality control manual, is applied to the outer and inner components to resist corrosion. The device has an internal spring manufactured from HDMB steel wire per ASTM A764-07(2017) or high-carbon steel music wire per ASTM A228-16.

4.0 DESIGN AND INSTALLATION

4.1 Design and Allowable Loads:

The allowable compression loads for the AT Automatic Take-Up™ Shrinkage Compensator designed under allowable stress design are as shown in Table 1. The devices are to be used where the expected shrinkage does not exceed the expansion limit of the devices. Two devices may be used in-line where the expected shrinkage exceeds the expansion limit of one device.

When the devices are used in continuous rod systems that resist light-frame shear wall overturning forces, calculations must be submitted to the code official confirming that the total vertical displacement, which would include steel rod elongation and the shrinkage

compensating device deflection, is less than or equal to 0.20-inch (5 mm) for each story, or between restraints, whichever is more restrictive, using allowable stress design (ASD). Shear wall drift limit calculations must consider the 0.20-inch (5 mm) vertical displacement limit. This 0.20-inch (5 mm) vertical displacement limit may be exceeded when it can be demonstrated that the shear wall story drift limit and the deformation compatibility requirements of IBC Section 1604.4 are met when considering all sources of vertical displacement.

4.2 Installation:

The AT Automatic Take-Up™ Shrinkage Compensator must only be used where there is sufficient clearance along the sides of the device to permit the device to expand. The device must be installed over the hold-down or bearing plate with the threaded rod through the axial center of the device. An SAE flat washer and steel nut must be installed on the threaded rod and tightened prior to activation of the device. Activation occurs by removal of a factory-inserted screw from the side of the device. The continuous tie-down system in which the AT Automatic Take-Up™ Shrinkage Compensator is used must be installed plumb, such that the offset angle between the top of the floor and the bottom of the top plates or bridge block above does not exceed 1.33 degrees from vertical.

5.0 CONDITIONS OF USE

The AT Automatic Take-Up™ Shrinkage Compensator described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 subject to the following conditions:

5.1 Calculations, demonstrating that the applied loads do not exceed the allowable loads and that the expected shrinkage does not exceed the expansion limits of the device, must be submitted to the code official for approval. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.2 The Commins AT Automatic Take-Up™ Shrinkage Compensator must be limited to installations in dry, interior locations.

5.3 No increase in allowable stresses or loads for duration of load is permitted for the Commins AT Automatic Take-Up™ Shrinkage Compensator.

5.4 The AT Automatic Take-Up™ Shrinkage Compensator must not be used to support dead load other than its own weight.

6.0 EVIDENCE SUBMITTED

Data in accordance with ICC-ES Acceptance Criteria for Shrinkage Compensating Devices (AC316), dated June 2013 (editorially revised November 2017).

7.0 IDENTIFICATION

7.1 Each AT Automatic Take-Up™ Shrinkage Compensator must bear a label on the device or on the packaging indicating the manufacturer's name (Commins Manufacturing, Inc.), the model number, and the evaluation report number (ESR-1344).

7.2 The report holder's contact information is the following:

COMMINS MANUFACTURING, INC.
960 B GUARD STREET
FRIDAY HARBOR, WASHINGTON 98250
(360) 378-9484
www.comminsmfg.com

TABLE 1—AT AUTOMATIC TAKE-UP™ SHRINKAGE COMPENSATOR DESCRIPTION AND ALLOWABLE LOADS[1,3]

MODEL NO.	INSIDE DIAMETER (inches)	OUTSIDE DIAMETER (inches)	DEVICE LENGTH (inches)		MAXIMUM EXPANSION (inches)	SEATING INCREMENT[2] Δ_R (inches)	ALLOWABLE AXIAL COMPRESSION LOAD P_A (pounds)	DEFLECTION AT ALLOWABLE LOAD[2] Δ_A (inch)
			Minimum	Maximum				
Aluminum								
AT 4A-1.5	1/2	1 1/2	3.0	4.5	1.50	0.000	6,450	0.011
AT 4A-2.5	1/2	1 1/2	4.06	6.56	2.50	0.000	6,450	0.011
AT 6A-1.5	3/4	2 1/8	3.19	4.69	1.50	0.000	10,550	0.011
AT 6A-2.5	3/4	2 1/8	4.19	6.69	2.50	0.000	10,550	0.011
AT 8A-1.5	1	2 3/4	3.50	5.25	1.75	0.000	20,750	0.004
AT 10A-1.5	1 1/4	3 1/4	3.50	5.12	1.62	0.000	28,050	0.020
AT12A-1.5	1 1/2	3 1/4	3.50	5.12	1.62	0.000	28,050	0.020
AT16A-2.0	2	4	3.50	5.57	2.07	0.001	39,450	0.011
Steel								
AT 75	3/4	2	2.80	3.90	1.10	0.002	16,450	0.024
AT 75-2.5	3/4	2	4.0	6.5	2.50	0.002	15,200	0.021
AT 100	1	2 1/4	2.90	4.00	1.10	0.002	25,300	0.032
AT 125	1 1/4	2 3/4	2.86	3.98	1.10	0.002	34,500	0.016
AT 200-2.0	2	4	3.88	6.06	2.18	0.000	83,200	0.009

For **SI:** 1 inch = 25.4 mm, 1 pound = 4.45 N.

[1]Listed values are for the AT Automatic Take-Up™ Shrinkage Compensator only. All other components in the system must be designed in accordance with the applicable code.

[2]The device average travel and seating increment, Δ_R, and deflection at allowable load, Δ_A, are additive and describe the total movement of the device at allowable load, Δ_T. For design loads, P_D, less than the allowable load, P_A, the total movement of the device, Δ_T, is calculated as follows: $\Delta_T = \Delta_R + \Delta_A(P_D/P_A)$.

[3]LRFD resistance capacity = ASD allowable load x 1.5.

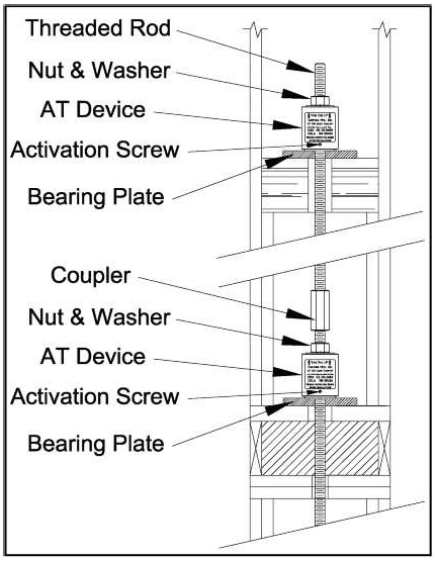

FIGURE 1—TYPICAL INSTALLATION

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 05 23—Wood, Plastic, and Composite Fastenings

REPORT HOLDER:

COMMINS MANUFACTURING, INC.

EVALUATION SUBJECT:

AT AUTOMATIC TAKE-UP™ SHRINKAGE COMPENSATOR

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the AT Automatic Take-Up™ Shrinkage Compensator, described in ICC-ES evaluation report ESR-1344, has also been evaluated for compliance with the code noted below.

Applicable code edition:

2016 *California Building Code* (CBC)

2.0 CONCLUSIONS

The AT Automatic Take-Up™ Shrinkage Compensator**,** described in Sections 2.0 through 7.0 of the evaluation report ESR-1344, complies with CBC Chapter 23, provided the design and installation are in accordance with the 2015 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of with CBC Chapters 16, 16A, 17, 17A and 23, as applicable.

This supplement expires concurrently with the evaluation report, reissued December 2021.