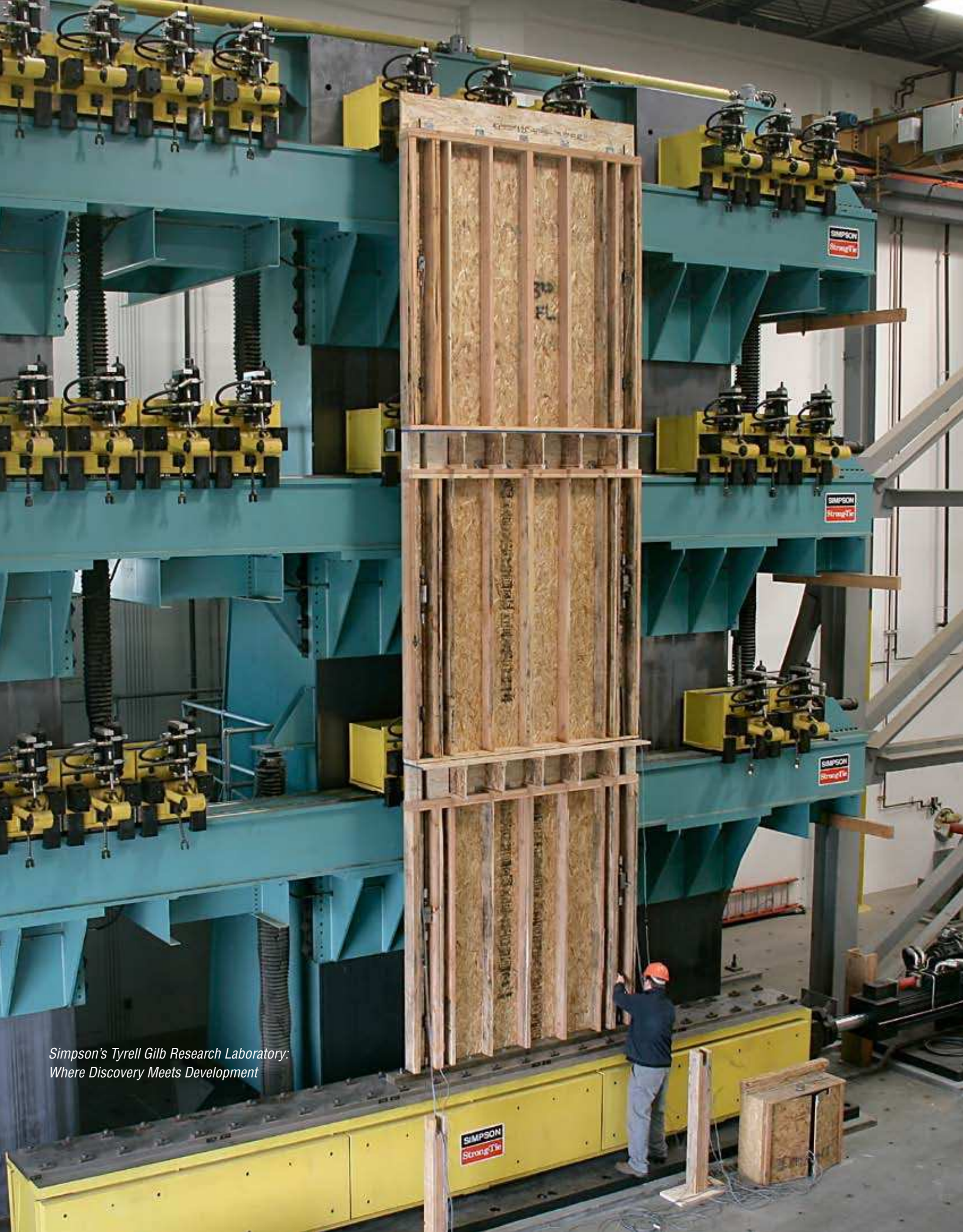
SIMPSON Strong-Tie®

ANCHOR TIEDOWN SYSTEM

For Multi-Story Overturning Restraint

C-ATS07



Simpson's Tyrell Gilb Research Laboratory:
Where Discovery Meets Development

SIMPSON
Strong-Tie
®

Why Simpson?

> *Pioneer in Lateral Systems Development*

> *History of Research and State-of-the-Art Testing*

> *Innovative Product Design*

> *Field and Technical Support*

> *On-Site Training*

> *Product Availability*

Why Simpson Anchor Tiedown System?

> *High Capacity Restraint*

> *Code-Compliance*

> *Reliable, Consistent Performance*

> *Ease of Installation*

> *Design Flexibility for Multistory Applications*

> *Software Support*

A History of Testing, Innovation and Performance

Since Barclay Simpson made his first connector more than 50 years ago, Simpson Strong-Tie has worked with the engineering and building communities to develop products that have significantly improved the structural integrity of homes and buildings. Our team of engineers and product managers continue to look for new ways to solve everyday issues, and use our lab facilities to develop and test new products.

Product Innovation

Simpson's commitment to product design and testing has grown and expanded over the years to include a whole-systems approach to building design. Our Anchor Tiedown System (ATS) is among our lateral systems solutions that is specifically designed for light-frame multi-story construction. This system offers a high-capacity restraint that can resist large uplift and overturning forces. With the introduction of ATS, specifiers and engineers have more design flexibility while increasing building performance.

On-Site Field Support

Our ability to develop new products has a lot to do with the feedback we receive from the field. Our customers often come to us with either a product request or a problem that needs to be solved. Our engineering team is often able to respond and provide the field support needed to keep a project moving. It's these field experiences along with our in-house testing facilities that keep us in the forefront of structural systems technology.

Unparalleled Testing

Our testing and research capabilities increased significantly when we opened our Tyrell Gilb Research Laboratory in 2003. Our state-of-the-art lab allows us to perform full-scale tests on wall sections so we can measure the performance of our products and simulate real-world conditions, such as seismic ground motion, and uplift and lateral force from high winds.

Recently, our engineers have embarked on three-dimensional testing of full-scale buildings. This testing is helping clarify issues regarding allowable resistances of bracing methods under various load conditions.

We know our customers count on us to provide them with the most accurate test results, code approvals, high load values, ease of installation and design versatility—which is why we continue to invest in testing and product development. Because of this, when our customers see the Simpson Strong-Tie brand they don't just think of us as a manufacturer, but also as a research leader with the products and people they can rely on.

INTRODUCTION

The Simpson Strong-Tie Company was founded in Oakland, California and has been manufacturing wood-to-wood and wood-to-concrete connectors since 1956. Since then, Simpson Strong-Tie Company Inc. has grown to be the world's largest manufacturer of construction connectors. In recent years the company's growth has included expanding its product offering to include pre-manufactured shearwalls, anchor systems for concrete and masonry and collated fastening systems.

The Simpson Strong-Tie Company Inc. "NO EQUAL" program includes:

- Quality products value-engineered for the lowest installed cost at the highest rated performance levels.
- Most thoroughly tested and evaluated products in the industry.
- Strategically-located manufacturing and warehouse facilities.
- National Code Agency listings.
- Largest number of patented connectors in the industry.
- European locations with an international sales team.
- In-house R&D, and tool and die professionals.
- In-house product testing and quality control engineers.
- Member of AITC, ASTM, ASCE, AWPA, ACI, AISC, CSI, ICFA, NBMDA, NLBMDA, SETMA, STAFDA, SREA, NFBA, WTCA and local engineering groups.

SIMPSON'S QUALITY POLICY

We help people build safer structures economically. We do this by designing, engineering and manufacturing "No Equal" structural connectors and other related products that meet or exceed our customers' needs and expectations. Everyone is responsible for product quality and is committed to ensuring the effectiveness of the Quality Management System.

Tom Fitzmyers
Chief Executive Officer

Terry Kingsfather
President

WE ARE ISO 9001-2000 REGISTERED

Simpson Strong-Tie is an ISO 9001-2000 registered company. ISO 9001-2000 is an internationally-recognized quality assurance system which lets our domestic and international customers know that they can count on the consistent quality of Simpson Strong-Tie's products and services.

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IMPORTANT INFORMATION & GENERAL NOTES

WARNING

Simpson Strong-Tie Company Inc. structural connectors, anchors, and other products are designed and tested to provide specified design loads. To obtain optimal performance from Simpson Strong-Tie Company Inc. products and achieve maximum allowable design load, the products must be properly installed and used in accordance with the installation instructions and design limits provided by Simpson Strong-Tie Company Inc. To ensure proper installation and use, designers and installers must carefully read the following General Notes, General Instructions For The Installer and General Instructions For The Designer, as well as consult the applicable catalog pages for specific product installation instructions and notes.

Proper product installation requires careful attention to all notes and instructions, including these basic rules:

1. Be familiar with the application and correct use of the connector.
2. Follow all installation instructions provided in the applicable catalog, website, Pocket Installers Guide or any other Simpson publications.
3. Install all required components per installation instructions provided by Simpson Strong-Tie Company Inc.: a) use proper fastener type; b) use proper fastener quantity; c) ensure screws are completely driven.

In addition to following the basic rules provided above as well as all notes, warnings and instructions provided in the catalog, installers, designers, engineers and consumers should consult the Simpson Strong-Tie Company Inc. website at ***www.strongtie.com*** to obtain additional design and installation information, including:

- Information on workshops Simpson conducts at various training centers throughout the country;
- Product specific installation videos;
- Specialty catalogs;
- Code reports;
- Technical fliers and bulletins;
- Master format specifications;
- Material safety data sheets;
- Corrosion information;
- Connector selection guides for engineered wood products *(by manufacturer)*;
- Simpson connector selector software;
- Simpson Autocad menu;
- Simpson Strong-Wall® Selector software;
- Simpson Anchor Tiedown System Selector and anchor related software; and
- Answers to frequently asked questions and technical topics.

Failure to follow fully all of the notes and instructions provided by Simpson Strong-Tie Company Inc. may result in improper installation of products. Improperly installed products may not perform to the specifications set forth in this catalog and may reduce a structure's ability to resist the movement, stress, and loading that occurs from gravity loads as well as impact events such as earthquakes and high velocity winds.

Simpson Strong-Tie Company Inc. does not guarantee the performance or safety of products that are modified, improperly installed or not used in accordance with the design and load limits set forth in this catalog.

GENERAL NOTES

These general notes are provided to ensure proper installation of Simpson Strong-Tie Company Inc. products and must be followed fully.

a. Simpson Strong-Tie Company Inc. reserves the right to change specifications, designs, and models without notice or liability for such changes.
b. Steel used for each Simpson product is individually selected based on the product's steel specifications, including strength, thickness, formability, finish, and weldability. Contact factory for steel information on specific products.
c. Unless otherwise noted, dimensions are in inches, loads are in pounds.
d. Do Not Overload. Do not exceed catalog allowable loads, which would jeopardize the connection.
e. Wood shrinks and expands as it loses and gains moisture, particularly perpendicular to its grain. Take wood shrinkage into account when designing and installing connections. The effects of wood shrinkage are increased in multiple lumber connections, such as floor-to-floor installations. This may result in the vertical rod nuts becoming loose, requiring tightening.
f. Built-up lumber *(multiple members)* must be fastened together to act as one unit to resist the applied load. This must be determined by the Designer.

GENERAL INSTRUCTIONS FOR THE INSTALLER

These general instructions for the installer are provided to ensure proper selection and installation of Simpson Strong-Tie Company Inc. products and must be followed carefully. These general instructions are in addition to the specific installation instructions and notes provided for each particular product, all of which should be consulted prior to and during installation of Simpson Strong-Tie Company Inc. products.

a. All specified connectors must be installed according to the instructions in this catalog. Incorrect connection quantity, size, placement, or type may cause the connection to fail.
b. Use the materials specified in the installation instructions. Substitution of or failure to use specified materials may cause the connection to fail.
c. Do not add fastener holes or otherwise modify Simpson Strong-Tie Company Inc. products. The performance of modified products may be substantially weakened. Simpson will not warrant or guarantee the performance of such modified products.
d. Install products in the position specified in the catalog.
e. Do not alter installation procedures from those set forth in this catalog.
f. Some hardened fasteners may have premature failure if exposed to moisture. These fasteners are recommended to be used in dry interior applications.
g. Use proper safety equipment.
h. Welding galvanized steel may produce harmful fumes; follow proper welding procedures and safety precautions. Welding should be in accordance with A.W.S. *(American Welding Society)* standards. Unless otherwise noted Simpson connectors cannot be welded.
i. The installer shall cut Strong-Rod™ or threaded rod to length as required.
j. Shearwall sheathing shall not have vertical joints at any of the specified compression members except at the shearwall perimeter.
k. See page 35 for shearwall edge nailing details.
l. When installing hex nuts or Isolator Nuts on the Strong-Rod, make the nut snug on the bearing plate and tighten an additional ½ turn.

GENERAL INSTRUCTIONS FOR THE DESIGNER

These general instructions for the designer are provided to ensure proper selection and installation of Simpson Strong-Tie Company Inc. products and must be followed carefully. These general instructions are in addition to the specific design and installation instructions and notes provided for each particular product, all of which should be consulted prior to and during the design process.

a. The term "Designer" used throughout this catalog is intended to mean a qualified licensed professional engineer, or a qualified licensed architect.
b. All connected members and related elements shall be designed by the Designer.
c. All installations should be designed only in accordance with the allowable load values set forth in this catalog.
d. The Designer is responsible for verifying that all design loads do not exceed the allowable loads listed for each component in the restraint system. This includes, but is not limited to, the cumulative tension, incremental bearing, concrete anchorage, and wood framing members. The design of these elements must be performed to the satisfaction of the building official.
e. Anchor Tiedown System (ATS) capacities listed in the catalog tables are provided based on the 9th and 13th edition AISC Allowable Stress Design (ASD). The capacities listed in the CTDS runs are based on the 9th edition ASD.
f. The Designer is responsible for verifying that the building drift is within acceptable limitations and code limitations.
g. Stock run components are designed for 4" nominal wall widths. Alternate ATS components are available that may be more economical. These components are specific to demand loads and/or 6" nominal wall widths. These configurations require the use of the ATS Selector Software. Visit www.strongtie.com to download a free copy.

IMPORTANT INFORMATION & GENERAL NOTES

GENERAL INSTRUCTIONS FOR THE DESIGNER (continued)

h. Studs, posts and blocking details shall be specified by the Designer and are not shipped with the Anchor Tiedown System. See tables on pages 35–41 for compression member allowable capacities, design assumptions and general notes.
i. In some cases tension anchorage solutions may be designed and provided by Simpson for ATS based on the rod tensile capacity at the first floor. Alternate anchor bolt solutions may be provided by the Designer. Foundation and reinforcement design shall be specified by the Designer. If anchorage is designed by others, contact Simpson to coordinate connecting components for the 1st level.
j. Simpson strongly recommends the following addition to construction drawings and specifications: "Simpson Strong-Tie® connectors are specifically required to meet the structural calculations of plan. Before substituting another brand, confirm load capacity based on reliable published testing data or calculations. The Designer should evaluate and give written approval for substitution prior to installation."
k. ATS is designed to be installed floor by floor as the structure is built. Installation in this manner, with shearwalls, will provide a lateral force resisting system during construction.
l. The allowable loads published in this catalog are for use when utilizing the traditional Allowable Stress Design methodology. A method for using Load and Resistance Factor Design (LRFD) for wood has been published in AF&PA/ASCE 16.
m. See pages 19–20 for a design example and guide for the Designer.
n. Do not weld products listed in this catalog unless this publication specifically identifies a product as acceptable for welding, or unless specific approval for welding is provided in writing by Simpson. Some steels have poor weldability and a tendency to crack when welded. Cracked steel will not carry load and must be replaced.
o. Refer to adjacent table for applicability of load duration factor and applicable ⅓ steel stress increase.
p. Local and/or regional building codes may require meeting special conditions. Building codes often require special inspection of anchors installed in concrete and masonry. For compliance with these requirements, it is necessary to contact the local and/or regional building authority. Except where mandated by code, Simpson's products do not require special inspection.

Applicability of Load Duration Factor, ⅓ Steel Stress Increase Table, and Steel Code Reference

Code	Load Combination	Cd (Wood) Allowed	⅓ Stress Increase (Steel) Allowed	AISC Edition
ASCE 7-2002 ASCE 7-2005	Basic	Yes	No	2002–9th Ed. 2005–13th Ed.
2000 International Building Code	Basic	Yes	No	9th Ed.
	Alternate	Yes	Yes	
2003/2006 International Building Code	Basic	Yes	No	2003–9th Ed. 2006–13th Ed.
	Alternate	Yes	No	
1997 Uniform Building Code	Basic	Yes	No	9th Ed.
	Alternate	Yes	Yes	
2004 Florida Building Code	Basic	Yes	No	9th Ed.
	Alternate	Yes	No	

LIMITED WARRANTY

Simpson Strong-Tie Company Inc. warrants catalog products to be free from defects in material or manufacturing. Simpson Strong-Tie Company Inc. products are further warranted for adequacy of design when used in accordance with design limits in this catalog and when properly specified, installed, and maintained. This warranty does not apply to uses not in compliance with specific applications and installations set forth in this catalog, or to non-catalog or modified products, or to deterioration due to environmental conditions.

Simpson Strong-Tie connectors are designed to enable structures to resist the movement, stress, and loading that results from impact events such as earthquakes and high velocity winds. Other Simpson Strong-Tie products are designed to the load capacities and uses listed in this catalog. Properly-installed Simpson Strong-Tie products will perform in accordance with the specifications set forth in the applicable Simpson catalog. Additional performance limitations for specific products may be listed on the applicable catalog pages.

Due to the particular characteristics of potential impact events, the specific design and location of the structure, the building materials used, the quality of construction, and the condition of the soils involved, damage may nonetheless result to a structure and its contents even if the loads resulting from the impact event do not exceed Simpson catalog specifications and Simpson Strong-Tie connectors are properly installed in accordance with applicable building codes.

All warranty obligations of Simpson Strong-Tie Company Inc. shall be limited, at the discretion of Simpson Strong-Tie Company Inc., to repair or replacement of the defective part. These remedies shall constitute Simpson Strong-Tie Company Inc.'s sole obligation and sole remedy of purchaser under this warranty. In no event will Simpson Strong-Tie Company Inc. be responsible for incidental, consequential, or special loss or damage, however caused.

This warranty is expressly in lieu of all other warranties, expressed or implied, including warranties of merchantability or fitness for a particular purpose, all such other warranties being hereby expressly excluded. This warranty may change periodically – consult our website www.strongtie.com for current information.

TERMS & CONDITIONS OF SALE

PRODUCT USE

Products in this catalog are designed and manufactured for the specific purposes shown, and should not be used with other connectors not approved by a qualified Designer. Modifications to products or changes in installations should only be made by a qualified Designer. The performance of such modified products or altered installations is the sole responsibility of the Designer.

INDEMNITY

Customers or Designers modifying products or installations, or designing non-catalog products for fabrication by Simpson Strong-Tie Company Inc. shall, regardless of specific instructions to the user, indemnify, defend, and hold harmless Simpson Strong-Tie Company Inc. for any and all claimed loss or damage occasioned in whole or in part by non-catalog or modified products.

NON-CATALOG AND MODIFIED PRODUCTS

Consult Simpson Strong-Tie Company Inc. for applications for which there is no catalog product, or for connectors for use in hostile environments, with excessive wood shrinkage, or with abnormal loading or erection requirements.

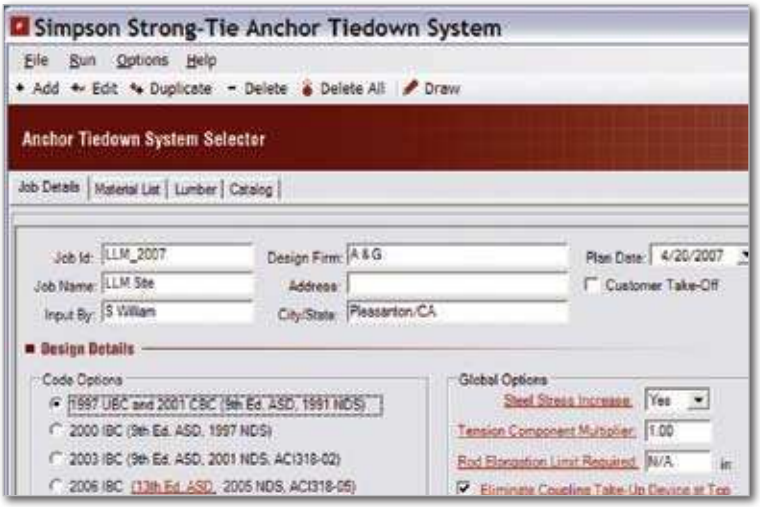
Non-catalog products must be designed by the customer and will be fabricated by Simpson Strong-Tie in accordance with customer specifications.

Simpson Strong-Tie cannot and does not make any representations regarding the suitability of use or load-carrying capacities of non-catalog products. Simpson Strong-Tie provides no warranty, express or implied, on non-catalog products. F.O.B. Shipping Point unless otherwise specified.

ATS SELECTOR SOFTWARE

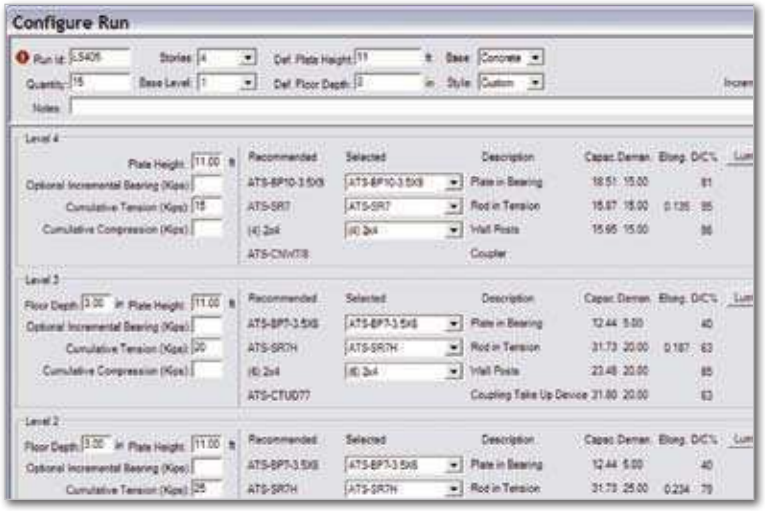
ATS SELECTOR SOFTWARE – DESIGN MADE EASIER

The new ATS Selector software has been created with enhanced design versatility. The program allows engineers and architects to easily create a standard system design or customize the system to meet the specific needs of a project.



Easy to use

The easy-to-use input screens make it simple to enter all the pertinent job details like project name and address as well as requirements such as number of stories (up to 6), applicable building code, and demand loads. Choose from three base types: concrete, wood and steel. You can request a solution from our stock runs or customize the solution with the "user-defined" design feature. The helpful errors and warnings feature will point out input errors as well as alert the user to any design issues they need to consider with the application.



Customizable solutions that save time

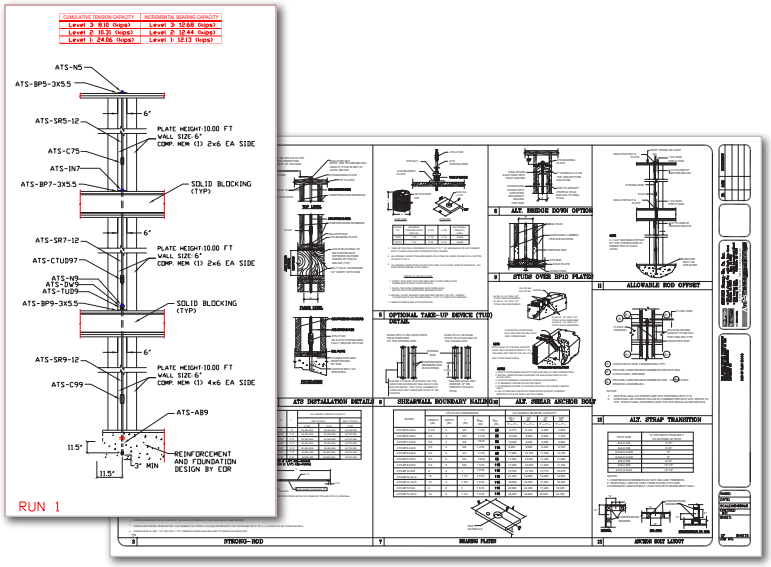
Based upon your inputs, the software recommends an ATS run to meet the requirements of your project. Once a solution is displayed, you can go in and customize it level by level based upon the demand vs. the capacity of the system. You can generate and save multiple runs and the program compiles a complete ATS materials list as well as a compression member lumber list.

Output the way you like it

Once results are saved, they can be used in several ways:

- Send solutions electronically to others who have the ATS Selector program.
- Export the information into AutoCAD to create run drawings complete with material callouts and standard detail sheets that can be dropped into your own plans.
- Generate a complete job summary including run configurations and calculations as well as an ATS material and lumber list all in PDF format that can be saved, printed or emailed.

Visit www.strongtie.com to download the ATS Selector software free of charge, or call 800-999-5099 to request the program on CD ROM.



Solutions export into AutoCAD so run drawings and standard details can be easily added to existing plans

THE NEW ATS

WHAT YOU CAN EXPECT FROM THE NEW ANCHOR TIEDOWN SYSTEM

The Simpson Strong-Tie® Anchor Tiedown System (ATS) has emerged as an innovative solution for light frame multi-story construction. The continuous rod system extends from the foundation to the top of the structure and is restrained (tied off) at each level to provide the load capacity and overturning resistance that's necessary for multistory buildings—which is especially critical during earthquakes and high wind events.

Simpson launched its ATS product line in 2000. Since that time, the company has gathered feedback from engineers and installers to fine-tune the product design so that loads are higher, and installation is faster and easier.

THE NEW ATS

INNOVATIVE TAKE-UP DEVICE

The stacking of multiple stories can create a significant amount of settling within the structure due to shrinkage and construction loading. The ATS's new Coupling Take-Up Device (CTUD) helps resolve this issue. The CTUD is an innovative spring-driven rod coupling device, which contracts to compensate for rod movement caused by settling of the structure.

LOWER INSTALLED COSTS, SAVINGS FOR BUILDERS

The new Anchor Tiedown System provides several cost advantages. The new CTUD streamlines installation and cuts labor costs by one-third compared to the previous cage system. The system design also eliminates the need for installers to precisely cut the rod at each floor—now only one precision cut is needed at the top floor. By reducing the number of parts, there are fewer materials to track and distribute, and fewer products lost at the jobsite.

Previous Anchor Tiedown System

New and Improved Anchor Tiedown System

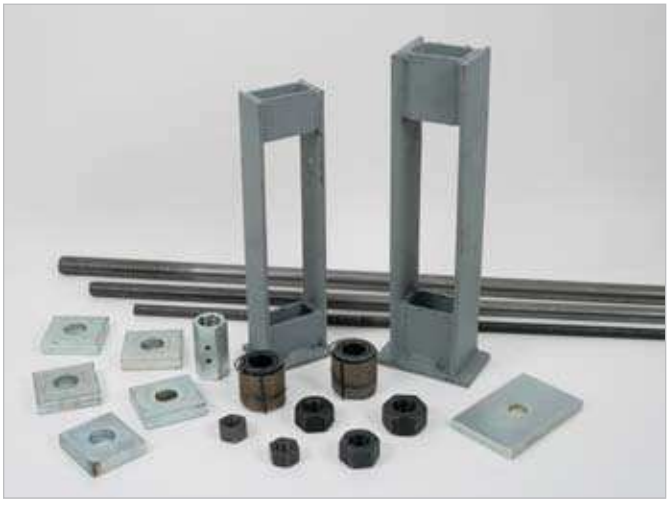
FEWER PARTS, EASIER INSTALLATION

The ATS design has been simplified so there are fewer parts—64% less than the previous design, making the system easier and faster to install. The CTUD combines a coupler nut with a shrinkage take-up device, reducing the number of parts. In addition, the ATS parts are all color-coded and stamped, so it's simple to match system components.

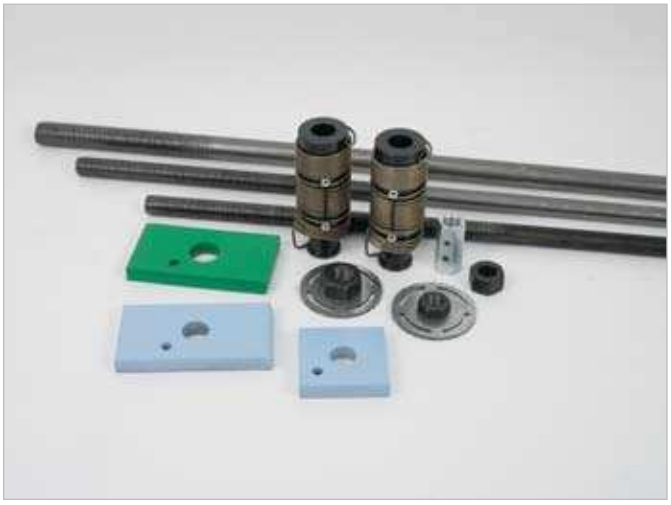
NEW, IMPROVED SOFTWARE

The new ATS Selector software, available at **www.strongtie.com**, has been created with enhanced design versatility. The program allows engineers and architects to easily create a standard system design or customize the system to meet the specific needs of a project. It also includes CAD drawings, calculations, installation details and elevation drawings to help simplify specification.

Previous ATS: More Parts to Organize and Install



New and Improved ATS: Less Parts for a Simplified Installation



HIGHER LOADS, MORE DESIGN FLEXIBILITY

All of these product enhancements have increased ATS's load capacity by as much as 10,000 lbs. With higher loads, the system has a wider range of applications, and designers and engineers have more flexibility in their building design.

CODE-LISTED, RELIABLE PERFORMANCE

As with all new products, Simpson has gone through the proper testing procedures to meet code requirements. Our CTUD and TUD are code listed per the International Building Code (ICC-ES ESR-2320), City of Los Angeles Building Code (RR 25643).

SKIPPED FLOORS

DO ALL FLOORS NEED TO BE TIED OFF?

There are several continuous tiedown systems available that offer solutions to resist the high overturning forces inherent in multi-story light frame structures. Typically these systems fall into one of two categories: those that call for every floor to be tied off and those where floors are skipped.

A skipped floor system restrains two or more floors with a single restraint point to provide overturning resistance. An all floors tied-off system differs in that it establishes overturning restraint at every floor.

Although a skipped floor system and an all floors tied-off system initially appear to be similar, there are some significant differences in load path and performance that could potentially compromise the integrity of a structure. Skipping floors is not recommended, and familiarization with potential issues is strongly encouraged when choosing a tiedown system.

ISSUES TO CONSIDER WITH SKIPPED FLOOR SYSTEMS:

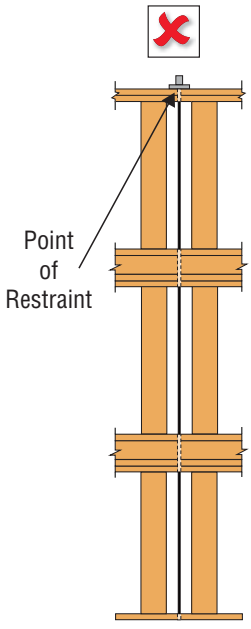
INCREASE IN COMPONENT SIZES – In a skipped floor system, the overturning forces transfer up the building until a restraint is reached. As a result, all elements at the restrained point have to resist uplift forces for any non-restrained stories below. This results in increased lumber, threaded rod, and bearing plate sizes. In a tied-off system, the incremental uplift at each level is transferred directly into the tiedown system at that level.

DRIFT – A skipped-floors system that is properly designed to resist demand loads may not be sufficient to satisfy drift requirements. Test results indicate that skipping floors has the potential to substantially increase inter-story drift. Even if drift analysis is not required in you area, it is a critical element to multi-story design.

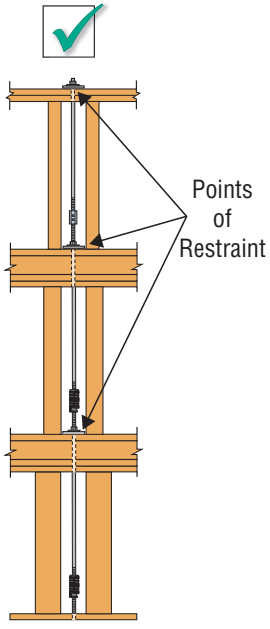
REDUNDANCY – Even when appropriately designed, structural elements can perform unexpectedly during major seismic and high wind events. In a skipped floor system, multiple floors rely on a single component for their performance. If that element fails, the entire uplift resistance for all non-restrained floors below may be compromised. However, with an all floors tied-off system, the lower floors do not rely on the stability of the upper floors for their performance.

SHRINKAGE – In tiedown systems wood shrinkage creates gaps at the restraint points. When a floor does not have a restraint, this gap will transfer up to the next restraint point, resulting in a larger space between the nut and bearing plate. This additional space will result in increased horizontal drift. In addition, it is recommended that shrinkage is compensated for at every level.

CONSTRUCTION STABILITY – A functioning shearwall needs to have holdowns installed to properly perform. A system where all floors are tied off requires no additional shoring or bracing during construction because the structure is restrained at each level once the system is installed. In a skipped-floor system, the designer or builder may want to consider requiring a temporary bracing method during construction until the skipped floor system is completely installed. This temporary bracing can help prevent collapse or any damage that might occur during a seismic or wind event. In a tied-off system, all holdowns are installed as the structure is built ensuring that the shearwalls will perform as designed if an event occurs during construction.



SKIPPED FLOOR SYSTEM:
A single point of restraint for multiple levels



ALL FLOORS TIED-OFF SYSTEM:
Overturning restraint provided at each level

To learn more about skipped floor vs. tied-off systems and Simpson's ATS testing, visit www.strongtie.com/skip.

ROD SPECIFICATIONS AND CONTINUOUS TIEDOWN SYSTEMS

As a vital part of any continuous rod tiedown system, it is critical that the rod material have the appropriate performance characteristics. The Strong-Rod™ within the ATS system is made from rod materials chosen from the approved list in section A3 of AISC 360 (Specification for Structural Steel Buildings). This specification was developed as a consensus document to provide uniform design criteria for steel construction. Staying within the AISC specification provides a history of successful usage, advances in the state of knowledge, and changes in design practice.

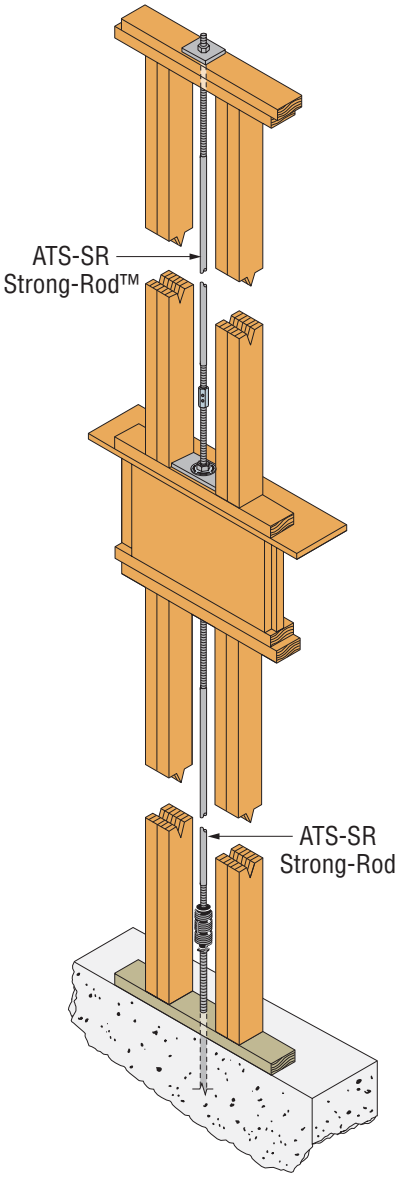
In addition to strength, ductility is an important consideration when evaluating rods in continuous tiedown systems. AISC does not establish minimum elongation requirements for ductility, however the lowest elongation of any rod material on the approved list is 14%.

STRONG-ROD AND THE NEW ATS

There are three grades of Strong-Rod material, each one chosen based upon its performance characteristics (See page 13 for details). To eliminate confusion and ensure that the right material is used on the job, the model number and steel grade is etched on every Strong-Rod. Strong-Rod is the only rod available that is etched in this manner for easy identification, and is only available with the ATS system.

NOT ALL RODS ARE CREATED EQUAL

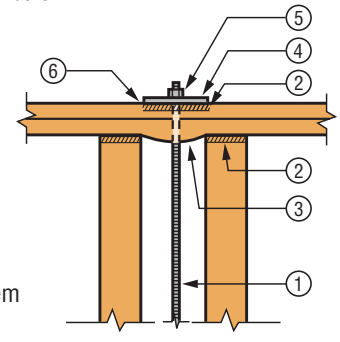
When evaluating continuous tiedown systems it is important to be aware that, in an effort to cut costs, some systems may allow rods to be used that are not approved in the AISC specification. When non-approved materials are proposed, the Designer should consider not only the material strength, but also elongation characteristics to truly provide an equivalent substitution to materials listed by AISC.



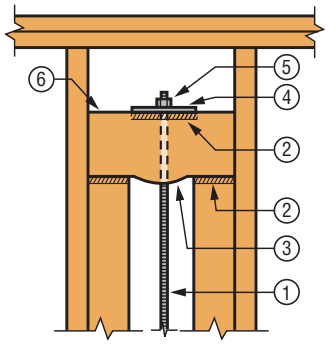
Typical Strong-Rod Installation

SOURCES OF DEFLECTION IN CONTINUOUS TIEDOWN SYSTEMS AT ROD TERMINATION

1. Rod elongation occurs between floor restraints.
2. Wood crushing occurs at the points where the bearing plate bears onto the wood plates, and where the wood plates bear onto the compression members.
3. Wood bending occurs between the compression members. The deflection increases as the distance between the supports is increased.
4. Bending of the steel plate.
5. Movement can occur when the nuts are not correctly tightened.
6. Wood shrinkage can occur, creating a space between the steel plate and the nut. Shrinkage may be significantly increased when the system terminates at a bridge block rather than double top plates.
7. Rod elongation, wood bending, steel plate bending, nut movement, and wood shrinkage will occur at floor levels also, and should be considered.



Top Plate



Bridge Block

CTUD *Coupling Take-Up Device*

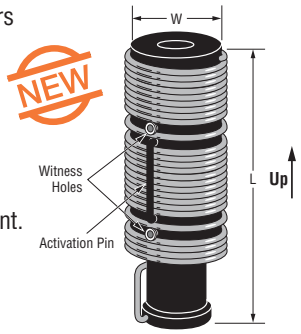
The CTUD is a combination coupler nut and take-up device. It compensates for the slack that develops in the system due to the shrinkage of wood members and settlement caused by dead load and construction loading. It will accommodate up to 1" of movement and is available in standard and reducing sizes for ⅝", ⅞" and 1⅛" diameter Strong-Rod™ or threaded rod.

- Design of the CTUD eliminates parts and simplifies installation.
- Easy installation saves time, resulting in a lower installed cost.
- Witness Holes™ allow for easy inspection to verify proper thread engagement.
- The positive stop at each end ensures that the rod is threaded to the proper depth.

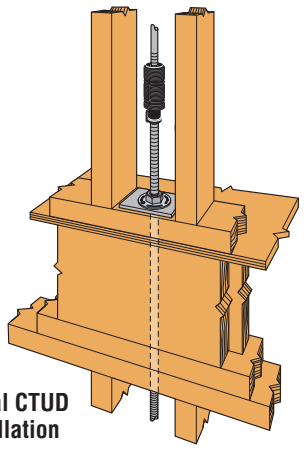
Codes: ICC-ES ESR-2320; City of L.A. RR-25643

Installation:

- Thread the specified CTUD (wider end up) onto the embedded anchor (in first floor applications) or the Strong-Rod from the level below. Position so that the activation pin faces out for easy access.
- Thread the Strong-Rod from the level above into the CTUD. The CTUD is correctly installed when the anchor or threaded rod is visible through both witness holes.
- Secure Strong-Rod at the level above with specified bearing plate and Isolator Nut. Attach Isolator Nut to sill plate above with #8 x 3" screw (included). Continue system installation at each level until the run is complete.
- Remove activation pin after level above is secured with Isolator Nut and prior to covering. IMPORTANT: DO NOT REMOVE THE ACTIVATION PIN UNTIL THE ISOLATOR NUT IS INSTALLED AT THE LEVEL ABOVE.



CTUD
Patent Pending



Typical CTUD Installation

Model No.	Threaded Rod Dia. (in)	W (in)	L (in)	Allowable Tension Capacity (lbs)	Component Color Code
CTUD55	⅝ - ⅝	1⅞	5	15,520	Blue
CTUD75	⅞ - ⅝	2	5½	31,795	Green/ Blue
CTUD77	⅞ - ⅞	2	5½	31,795	Green
CTUD97	1⅛ - ⅞	2½	6⅛	55,955	Orange/Green
CTUD99	1⅛ - 1⅛	2½	6⅛	55,955	Orange

1. Allowable tension capacities are for CTUD only.
2. No further steel stress increase allowed.
3. Thread specification for threaded rod must be UNC class 2A per ANSI/ASME B1.1.

Naming Scheme:

CTUD97

- **Coupling Take-Up Device**
- **Strong-Rod™ Diameter from Level Above***
- **Strong-Rod Diameter from Level Below***

*** Units in ⅛" Increments (Ex: 9 = ⅝" or 1⅛")**

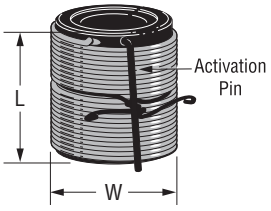
TUD *Take-Up Device*

In some cases, the TUD and CTUD can be combined within a run to substitute a TUD for a CTUD. Call Simpson for details. The TUD is suitable for rod diameters up to 1¼".

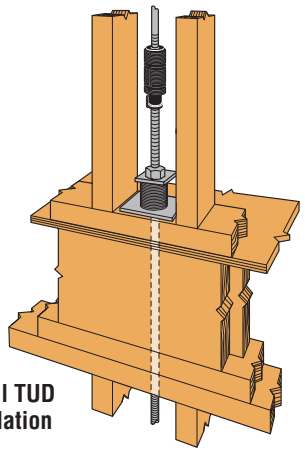
Codes: ICC-ES ESR-2320; City of L.A. RR-25643

Installation:

- Install the specified bearing plate over the Strong-Rod onto the bottom plate of the wall.
- Remove vertical plastic retaining strip and/or wires from TUD. DO NOT REMOVE ACTIVATION PIN UNTIL NUT IS INSTALLED.
- Install TUD with either end up over Strong-Rod and onto the bearing plate with the activation pin facing out.
- Install specified plate washer and then nut on top.
- Finger-tighten nut plus an additional ⅓ to ½ turn with a wrench.
- Remove tie wire and activation pin.



TUD



Typical TUD Installation

Model No.	Maximum Threaded Rod Dia. (in)	W (in)	L (in)	Allowable Compression Capacity (lbs.)
TUD9	1⅛	2⅛	2¼	34,655
TUD10	1¼	2⅜	2¼	45,400

1. Allowable capacities are for the TUD only.
2. No further steel stress increase is allowed.

Naming Scheme:

TUD9

- **Take-Up Device**
- **Maximum Rod Clearance in ⅛" Increments (Ex: 9 = ⅝" or 1⅛")**

STRONG-ROD™

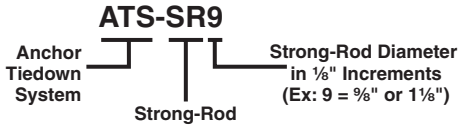
Strong-Rod™ threaded rods are the tension transfer element within the ATS system. Strong-Rods are threaded on both ends, with the top end having 48" of thread to allow for installation flexibility. Information clearly etched on the shank allows easy identification in the field.

The Strong-Rod XL is designed for applications where minimum rod elongation is critical. While the threaded ends are 1⅛" in diameter, the body of the rod is 1¾" to limit rod elongation under load.

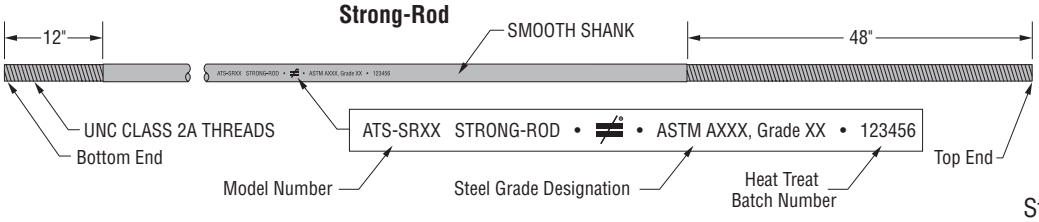
Material: Standard (Model SR_) – ASTM A307, Grade A
High strength (Model SR_H) – ASTM A449 or ASTM A193, Grade B7
Higher strength (Model SR_H150) – ASTM A434, Class BD or ASTM A354, Class BD

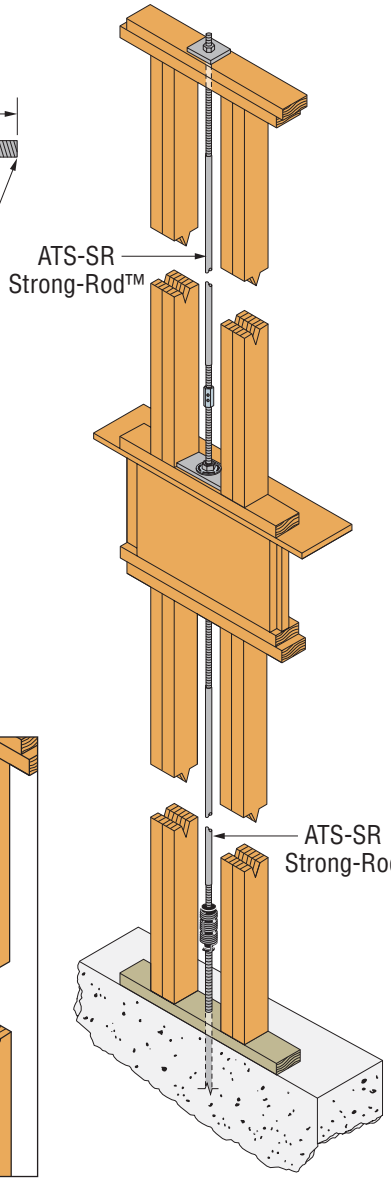
Finish: None

Naming Scheme:



Strong-Rod

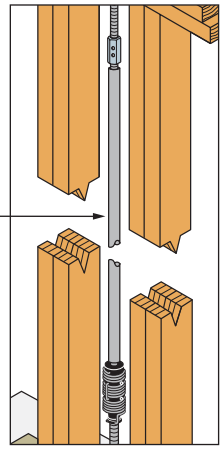




Strong-Rod Technical Data

Model No.	Diameter (in)	Allowable Tensile Capacity			Component Color Code
		AISC 9th Ed.		AISC 13th Ed.	
		(100)	(133)	(100)	
ATS-SR5[1]	⅝	6,075	8,100	6,340	Blue
ATS-SR7[1]	⅞	11,905	15,875	12,815	Green
ATS-SR9[1]	1⅛	19,680	26,240	21,205	Orange
ATS-SR5H[2]	⅝	12,150	16,200	13,570	Blue
ATS-SR7H[2]	⅞	23,810	31,745	27,060	Green
ATS-SR9H[2]	1⅛	39,365	52,485	44,730	Orange
ATS-SR9H150[3]	1⅛	49,205	65,605	55,915	Orange
ATS-SR10H150[3]	1¼	60,745	80,995	69,030	Purple

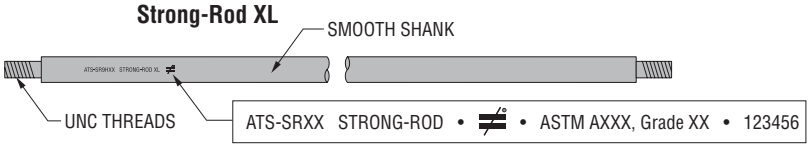
1. Standard Simpson Strong-Rod is based on minimum F_u = 60,000 psi and F_y = 43,000 psi.
2. High strength Simpson Strong-Rod is based on minimum F_u = 120,000 psi and F_y = 92,000 psi.
3. H150 Simpson Strong-Rod is based on minimum F_u = 150,000 psi and F_y = 130,000 psi.
4. Refer to page 6 for applicability of ⅓ steel stress increase.
5. No increase permitted on AISC 13th Edition values.



Strong-Rod XL Installation

Strong-Rod Installation

Strong-Rod XL

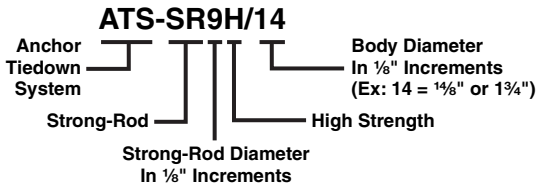


Strong-Rod XL Technical Data

Model No.	Thread Dia. (in)	Rod Dia. (in)	Allowable Tensile Capacity			Component Color Code
			AISC 9th Ed.		AISC 13th Ed.	
			(100)	(133)	(100)	
ATS-SR9H/14[1]	1⅛	1¾	39,365	52,485	44,730	Orange
ATS-SR9H150/14[2]	1⅛	1¾	49,205	65,605	55,915	Orange

1. High strength Simpson Strong-Rod is based on minimum Fu = 120,000 psi and F_y = 92,000 psi.
2. H150 Simpson Strong-Rod is based on minimum F_u = 150,000 psi and F_y = 130,000 psi.
3. Refer to page 6 for applicability of ⅓ steel stress increase.
4. No increase permitted on AISC 13th Edition values.

Naming Scheme:



ISOLATOR NUT

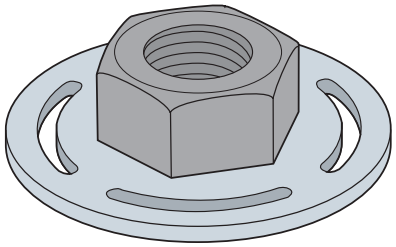
Isolator Nuts isolate the rod movement, caused by setttling of the structure, to each level within the ATS system. This segmenting of the movement ensures consistent performance. The Isolator Nut consists of a heavy hex nut connected to a slotted washer, and is fastened with one screw driven through the slotted washer and bearing plate into the bottom plate. Isolator Nuts are required on the bottom plate of the floor(s) above a level where a CTUD is used.

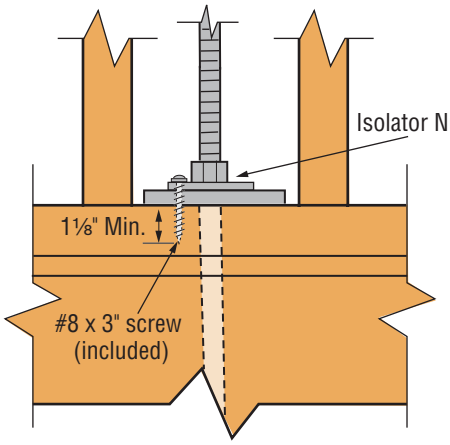
Finish: Nut – none; Washer – Zinc plated

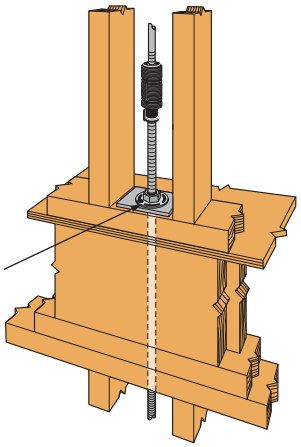
Installation:

- Thread the Isolator Nut onto the Strong-Rod™ from the level below until it is snug with the bearing plate, and tighten an additional ½ turn.
- Align one of the slots in the washer with the smaller hole in the bearing plate so that a screw can pass through both.
- Drive #8 x 3" screw (provided) through the washer and bearing plate into the bottom plate. A minimum of 1⅛" of penetration into the bottom plate is required.

Model No.	Threaded Rod Diameter (in)	Fastener to Bottom Plate (provided)	Washer O.D. (in)
ATS-IN5KT	⅝	(1) #8 x 3" screw	3.125
ATS-IN7KT	⅞	(1) #8 x 3" screw	3.125
ATS-IN9KT	1⅛	(1) #8 x 3" screw	3.125







Isolator Nut Installation

COUPLER NUTS

CNW and ATS-C coupling nuts are used to connect Strong-Rods and connect to anchor bolts within the ATS system.

CNWs and ATS-C coupling nuts exceed the tensile capacity of the corresponding standard ASTM A307 Strong-Rod. ATS-HSC coupling nuts exceed the tension capacity of the corresponding high strength ASTM A449 and A193 Grade B7 Strong-Rod. ATS-HSSC coupling nuts exceed the tension capacity of the corresponding higher strength (H150) Strong-Rod.

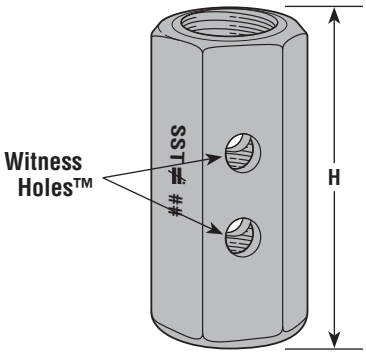
Finish: Zinc Plated

Installation:

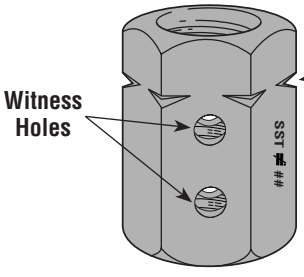
- Tighten the two rods until each all-thread rod can be fully seen in the witness hole.

Model No.	Rod Diameter (in)	H (in)
CNW⅝ or ATS-C55	⅝	1½
CNW⅞ or ATS-C77	⅞	2
ATS-C75	⅞ - ⅝	2
ATS-C97	1⅛ - ⅞	3
ATS-C99	1⅛	3
ATS-HSC55	⅝	2⅛
ATS-HSC75	⅞ - ⅝	2
ATS-HSC77	⅞	2½
ATS-HSC97	1⅛ - ⅞	3
ATS-HSC99	1⅛	3
ATS-HSSC1010	1¼	3

Additional coupler nuts including oversized (OST) couplers for galvanized anchor bolts are available. Contact Simpson for details.



CNW or ATS-C



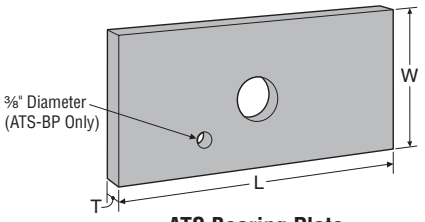
High Strength Coupler ATS-HSC (ATS-HSSC similar)

BEARING PLATES

Bearing plates are used to tie down individual levels within the system. They resist incremental bearing loads by spreading forces to minimize crushing of the wood when the system is loaded. DW plates are used when TUDs or weldable cages are specified.

Material: ASTM A36

Finish: BP – Powder Coated
DW – Zinc Plated



ATS Bearing Plate

Model No.	W (in)	L (in.)	T (in)	Hole Diameter (in)	Component Color Code	Allowable Bearing Capacity			
						DF-L	SP	HF	SPF
ATS-DW5	3	2⅞	¾	11/16	Blue	–	–	–	–
ATS-DW7	3	2⅞	¾	15/16	Green	–	–	–	–
ATS-DW9	3	2⅞	¾	1 3/16	Orange	–	–	–	–
ATS-DW10	3	2⅞	¾	1 5/16	Purple	–	–	–	–
ATS-BP5-3X3.5	3	3½	⅜	11/16	Blue	6,775	6,125	4,390	4,605
ATS-BP5-3X5.5	3	5½	⅝	11/16	Blue	10,540	9,530	6,830	7,165
ATS-BP5-5X5.5	5	5½	¾	11/16	Blue	17,885	16,165	11,590	12,160
ATS-BP7-3X5.5	3	5½	⅝	15/16	Green	10,280	9,290	6,660	6,990
ATS-BP7-5X5.5	5	5½	⅝	15/16	Green	17,620	15,930	11,420	11,985
ATS-BP9-3X5.5	3	5½	⅝	1 3/16	Orange	9,950	8,995	6,450	6,765
ATS-BP9-5X5.5	5	5½	⅝	1 3/16	Orange	17,295	15,635	11,205	11,760
ATS-BP10-3X9	3	9	1	1 5/16	Purple	15,700	14,195	10,175	10,675
ATS-BP10-3X12	3	12	1½	1 5/16	Purple	21,325	19,280	13,820	14,500
ATS-BP10-3X15	3	15	1¾	1 5/16	Purple	26,950	24,365	17,465	18,325
ATS-BP10-5X9	5	9	1	1 5/16	Purple	26,950	24,365	17,465	18,325
ATS-BP10-5X12	5	12	1½	1 5/16	Purple	36,325	32,840	23,540	24,700

1. Bearing area factor, Cb, included in listed capacities.
2. Bearing plate thicknesses are such that allowable capacity is not limited by plate bending.
3. When ATS-BP hole diameter is too large for rod diameter, and Isolator Nut is not used, a DW plate may be used as a washer.

WELDABLE CAGE

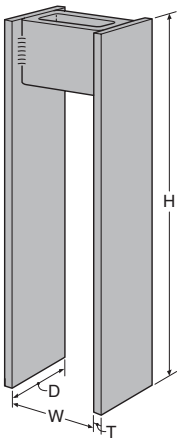
The ATS Weldable Cage is for use on projects where the run is to be anchored to steel beams. Beam design is the responsibility of the Designer.

Material: Side Plates - ASTM A36; Tube - ASTM A500, Grade B

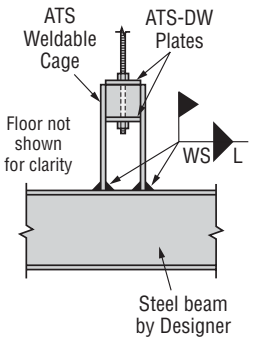
Finish: Gray Paint

Model No.	T Thickness (in)	D Depth (in)	H Height (in)	W Width (in)	WS Min. Weld Size (in)	L Min. Weld Length (in)	Allowable Tensile Capacity		
							AISC 9th Ed.		AISC 13th Ed.
							100	133	(100)
ATS-1/2-2B	3/16	2	16	3	3/16	1½	16,200	21,600	16,200
ATS-1/2-2D	¼	3	16	3	¼	2¼	32,400	43,200	32,400
ATS-1/2-2E	⅜	3	16	3	5/16	2¾	48,600	64,800	48,600

1. ATS-1/2 cages are fabricated from A36 material, with F_u = 58,000 psi.
2. 1" maximum rod diameter for ATS-1/2-2B.
3. 1¼" maximum rod diameter for ATS-1/2-2D and ATS-1/2-2E cages.
4. Minimum weld size and length listed are required to develop weldable cage tensile capacities – use E70XX electrodes.
5. No increase permitted on AISC 13th Edition values.



Weldable Cage



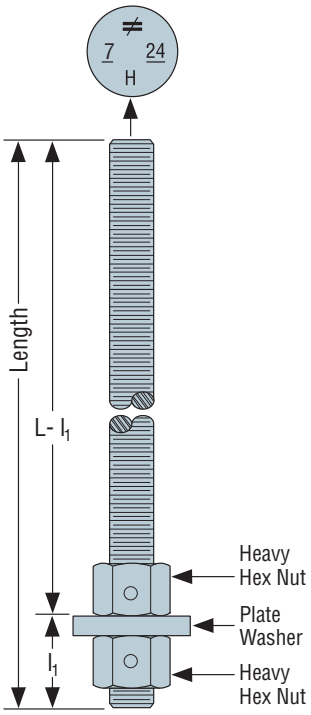
Steel Beam Detail

ANCHOR BOLTS

ATS-AB anchor bolts are pre-assembled anchor bolts that have been designed for use with the ATS system. They are available in 18", 24" and 36" lengths and match the strength and material grade of the corresponding Strong-Rod connecting rods. The heavy hex nuts are pressed onto the bolt to keep them in place.

Material: Standard (Model AB_) – ASTM A307, Grade A
High strength (Model AB_H) – ASTM A449 or ASTM A193, Grade B7
Higher strength (Model AB_H150) – ASTM A434, Class BD or ASTM A354, Class BD

Finish: None



ATS-AB Anchor Bolt

Naming Scheme:

ATS-AB5Hx24

- ATS Anchor Bolt
- Diameter and Grade
- Length

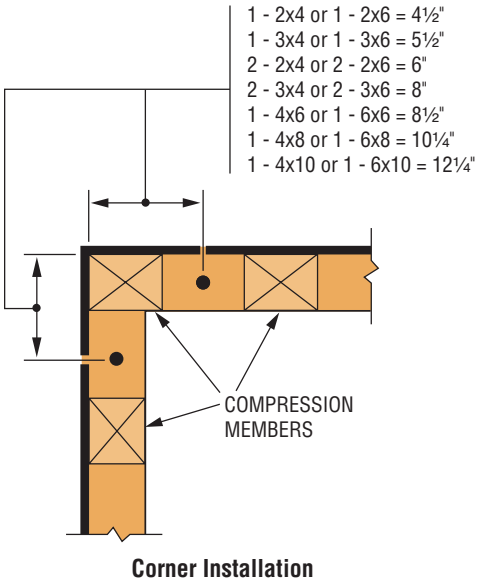
*** Units in ⅛" Increments (Ex: 9 = ⅝" or 1⅛")**

Anchor Bolt Model No.	Bolt Diameter (in)	Plate Washer Size (in)	l_1 (in)	Component Color Code
ATS-AB5	⅝	⅜ x 1½ x 1½	1¼	Blue
ATS-AB7	⅞	⅜ x 2¼ x 2¼	1½	Green
ATS-AB9	1⅛	⅜ x 2¾ x 2¾	1¾	Orange
ATS-AB5H	⅝	⅜ x 1½ x 1½	1¼	Blue
ATS-AB7H	⅞	⅜ x 2¼ x 2¼	1½	Green
ATS-AB9H	1⅛	⅜ x 2¾ x 2¾	1¾	Orange
ATS-AB9H150	1⅛	½ x 3 x 3	1⅞	Orange
ATS-AB10H150	1¼	1 x 3½ x 3½	2½	Purple

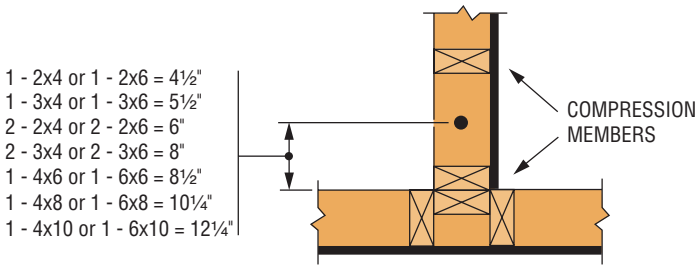
1. Anchor rods are available in 18", 24" and 36" lengths.
2. Standard Anchor bolts are based on minimum F_u = 60,000 psi and F_y = 43,000 psi.
3. High strength anchor bolts are based on minimum F_u = 120,000 psi and F_y = 92,000 psi.
4. H150 anchor bolts are based on minimum F_u = 150,000 psi and F_y = 130,000 psi.

ANCHOR BOLT LOCATIONS

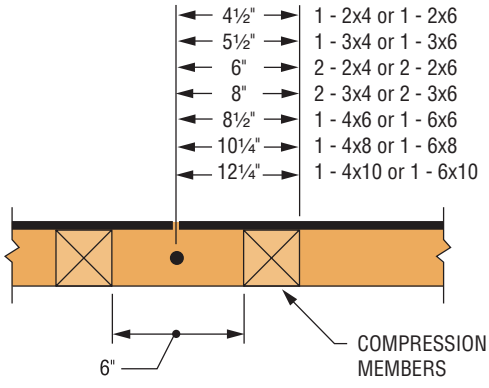
Anchor bolts shall be specified by the Designer.



Corner Installation



Perpendicular-To-Wall Installation

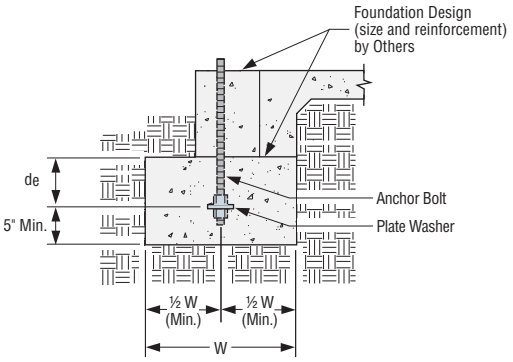


Mid-Wall Installation

ANCHOR BOLTS

Wind and Seismic Design 97 UBC with Supplementary Reinforcing

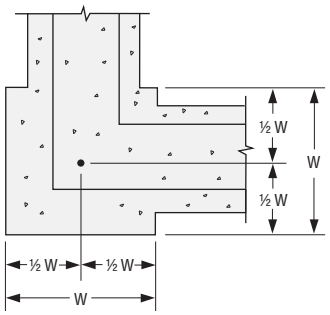
Anchor Rod Model No.	f'_c = 2500		f'_c = 3000		f'_c = 4500	
	de	W	de	W	de	W
ATS-AB5	5.5	11	4.5	9	4	8
ATS-AB7	8	16	6	12	5	10
ATS-AB9	10	20	7.5	15	6.5	13
ATS-AB5H	8.5	17	6.5	13	5.5	11
ATS-AB7H	11.5	23	8.5	17	7.5	15
ATS-AB9H	14.5	29	11	22	10	20
ATS-AB9H150	16.5	33	12.5	25	11	22
ATS-AB10H150	18	36	13.5	27	12	24



Section View

Wind and Seismic Design 97 UBC without Supplementary Reinforcing

Anchor Rod Model No.	f'_c = 2500		f'_c = 3000		f'_c = 4500	
	de	W	de	W	de	W
ATS-AB5	6.5	13	5	10	4.5	9
ATS-AB7	9	18	7	14	6	12
ATS-AB9	11.5	23	8.5	17	8	16
ATS-AB5H	9.5	19	7.5	15	6.5	13
ATS-AB7H	13	26	10	20	9	18
ATS-AB9H	17	34	13	26	11.5	23
ATS-AB9H150	19	38	14.5	29	13	26
ATS-AB10H150	21	42	16	32	14	28



Plan View

Seismic Design All IBC Codes

Anchor Rod Model No.	f'_c = 2500		f'_c = 3000		f'_c = 4500	
	de	W	de	W	de	W
ATS-AB5	6.5	19.5	6.5	19.5	5.5	16.5
ATS-AB7	10.5	31.5	10	30	8.5	25.5
ATS-AB9	14	42	13.5	40.5	12	36
ATS-AB5H	10.5	31.5	10	30	8.5	25.5
ATS-AB7H	16	48	15	45	13.5	40.5
ATS-AB9H	21	63	20	60	18	54
ATS-AB9H150	24	72	23	69	20.5	61.5
ATS-AB10H150	27.5	82.5	26	78	23	69

Wind Design All IBC Codes

Anchor Rod Model No.	f'_c = 2500		f'_c = 3000		f'_c = 4500	
	de	W	de	W	de	W
ATS-AB5	5.5	16.5	5.5	16.5	4.5	13.5
ATS-AB7	8.5	25.5	8	24	7	21
ATS-AB9	12	36	11	33	10	30
ATS-AB5H	8.5	25.5	8	24	7	21
ATS-AB7H	13.5	40.5	12.5	37.5	11	33
ATS-AB9H	18	54	17	51	15	45
ATS-AB9H150	20.5	61.5	19.5	58.5	17	51
ATS-AB10H150	23	69	22	66	19.5	58.5

1. IBC calculations are based on ACI 318, Appendix D
2. For UBC and IBC wind design, embedment de, is based on the design strength of the anchor per AISC. Embedment and edge distances are calculated in order to attain a ductile steel failure mode.
3. For IBC seismic design, concrete strength is reduced by a factor of 0.75 per ACI 318, Section D.3.3.3. Steel strength is based on AISC calculations and does not include an 0.75 reduction factor. Embedment and edge distances meet the ductile requirements of ACI 318, Section D.3.3.4.
4. For UBC design anchor design for 2500 psi minimum concrete assumes no special inspection and a multiplier of 2.0 on the concrete per section 1923.3.2. For 3000 psi and 4500 psi concrete, special inspection is assumed and a multiplier of 1.3 is applied.
5. Plate washers have been designed for plate bending.
6. Alternate anchor bolt solutions may be provided by the Designer.
7. Foundation dimensions are for anchorage only. The Designer is responsible for the foundation size and reinforcement for all load conditions.

ALTERNATE TOP STORY INSTALLATION

Reduce the number of floors in the CTDS run by using straps at the top story.

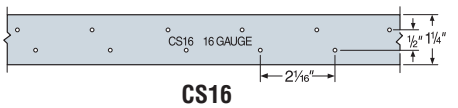
Codes: ICC-ES ER 5672, ICC-ES ER 4935; LA RR 25293 (CMST12 & CMST14); Florida FL 1901

See most recent *Wood Construction Connectors* catalog for additional information and requirements.

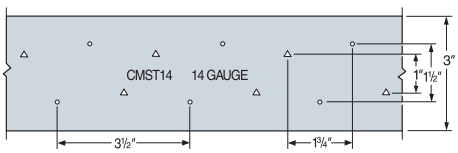
Alternate Top Story Strap Installation

Strap Model No.	Ga.	Width (in)	DF/SP			SPF/HF			Minimum Stud Required	Allowable Tension Loads		Nail Spacing O.C. (in a row)
			End Length (in)	Cut Length or Actual Length	Total Number of Fasteners per Strap	End Length (in)	Cut Length or Actual Length	Total Number of Fasteners per Strap		(133)	(160)	
2-CS16	16	1 1/4	14	Clear Span + 28"	26-8d	17	Clear Span + 34"	30-8d	2x	3410	3410	2 1/16"
			12	Clear Span + 24"	22-10d	15	Clear Span + 30"	26-10d		3410	3410	
2-MSTC40	16	3	11 1/8"	Length = 40 1/4"	28-16d sinkers	—	Length = 40 1/4"	—	2-2x	4670	5600	1½"
			12 1/8"		36-16d sinkers	—		—		6000	7200	
			—		—	11 1/8"		28-16d sinkers		4030	4840	
			—		—	12 1/8"		36-16d sinkers		5180	6220	
2-MSTC52	16	3	17 1/8"	Length = 52 1/4"	44-16 sinkers	—	Length = 52 1/4"	—	2-2x	7330	8800	1½"
			18 1/8"		48-16 sinkers	—		—		8000	9170	
			—		—	17 1/8"		44-16 sinkers		6340	7600	
			—		—	18 1/8"		48-16 sinkers		6910	8290	
2-CMSTC16	16	3	23	Clear Span + 46"	56-16d sinkers	27	Clear Span + 54"	66-16d sinkers	2-2x	9170	9170	1½"
			45	Clear Span + 90"	56-16d sinkers	52	Clear Span + 104"	66-16d sinkers		9170	9170	3"
2-CMST14	14	3	30	Clear Span + 60"	66-16d	35	Clear Span + 70"	76-16d	2-2x	12980	12980	1¾"
			34	Clear Span + 68"	76-10d	40	Clear Span + 80"	88-10d		12980	12980	1¾"
			59	Clear Span + 118"	66-16d	68	Clear Span + 136"	76-16d		12980	12980	3½"
			68	Clear Span + 136"	76-10d	78	Clear Span + 156"	88-10d		12980	12980	3½"
2-CMST12	12	3	39	Clear Span + 78"	86-16d	45	Clear Span + 90"	100-16d	2-2x	18430	18430	1¾"
			45	Clear Span + 90"	100-10d	51	Clear Span + 102"	114-10d		18430	18430	1¾"
			76	Clear Span + 152"	86-16d	89	Clear Span + 178"	100-16d		18430	18430	3½"
			89	Clear Span + 178"	100-10d	101	Clear Span + 202"	114-10d		18430	18430	3½"

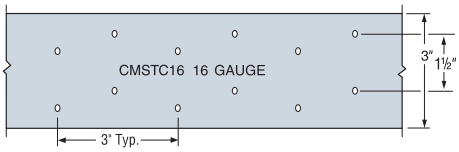
1. Loads are for 2 straps.
2. Use half of the nails at each member being connected to achieve the listed loads.
3. Fasteners shall not be located in clear span.



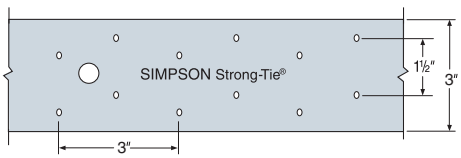
CS16



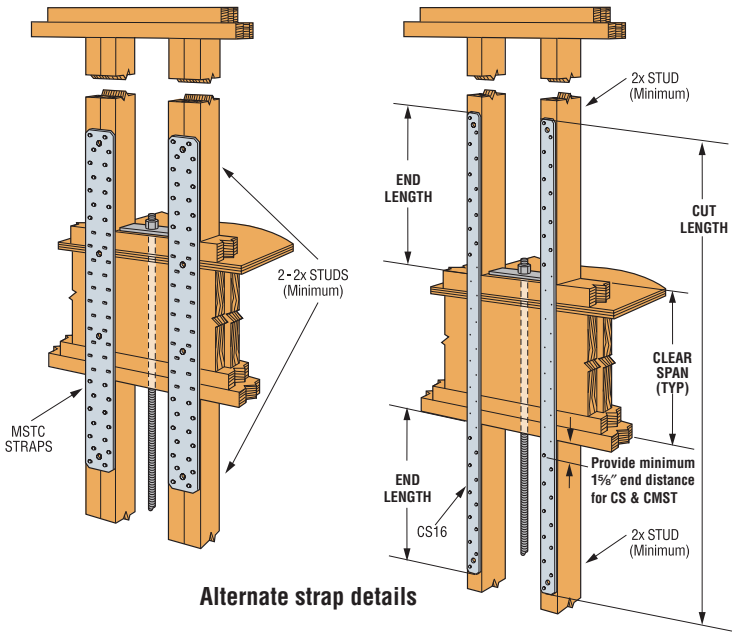
CMST14 & CMST12



CMSTC16



MSTC52



Alternate strap details

DESIGN EXAMPLE

DESIGN NOTES

Specify:

The Designer will need to determine the holdown loads required at each floor. Use the charts provided to pick the appropriate Anchor Tiedown System (ATS) run based on the number of floors and the capacity. The ATS will provide only the tension part of the shearwall; the Designer will need to determine the compression shear edge nailing schedule, horizontal drift, and meet all other requirements in accordance with the applicable building code.

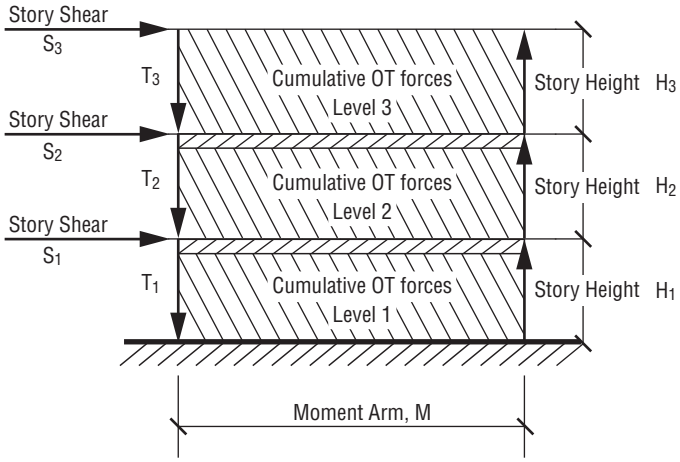
For simplicity during installation the Designer may want to designate and group similar runs.

Given: **IBC 2000 (AISC 9th Ed.), ⅓ steel stress increase applies**
8' plate height
4" nominal wall thickness
Douglas Fir-Larch studs and wall plates

Given Overturning (OT) Forces

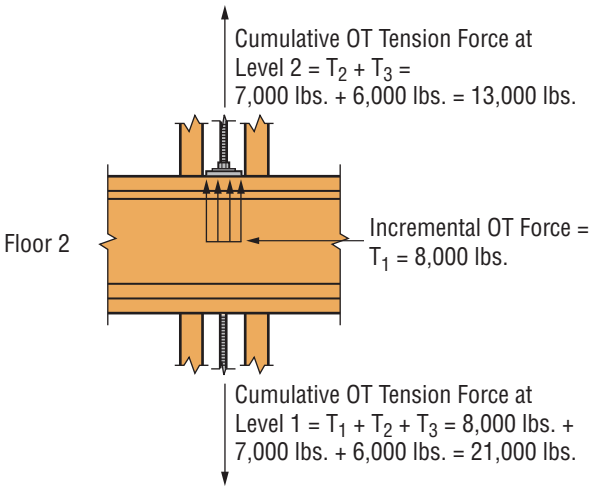
Level	Incremental OT Forces (lbs)	ASD Cumulative OT Tension Forces (lbs)	ASD Cumulative OT Compression Forces (lbs)
3	6000	6000	8000
2	7000	13000	16000
1	8000	21000	25000

1. The structural design overturning forces listed above are arbitrary and intended only for this design example. Simpson Strong-Tie is not responsible for structural design of the building or derivation of the structural forces.
2. The incremental OT Forces are the difference between the cumulative OT Forces at each level.



Example for Derivation of Forces at Level 1:

1. Note that Moment Arm, M, is the distance between the centerline of compression members to centerline of tension members.
2. Incremental OT Force = $T_1 = \frac{S_1 (H_1)}{M}$ = 8,000 lbs. The incremental OT Force is calculated at each level. T_2 = 7,000 lbs. T_3 = 6,000 lbs. The incremental OT Forces are typically the incremental bearing forces.
3. Cumulative OT Tension Force at level 1 = $T_1 + T_2 + T_3$ = 6,000 lbs. + 7,000 lbs. + 8,000 lbs. = 21,000 lbs.
4. See sketch at right for additional information.
5. Cumulative OT Compression Forces are higher than Cumulative OT Tension Forces due to the addition of code requied dead loads.



Rod Length Calculation = Plate height plus floor system plus 12" rounded up in 1 foot increments.

Rod Length Example:

1 - 2x Plates	=	1.50
2 x 12 Floor System	=	11.25
¾" Floor	=	0.75
		13.50"

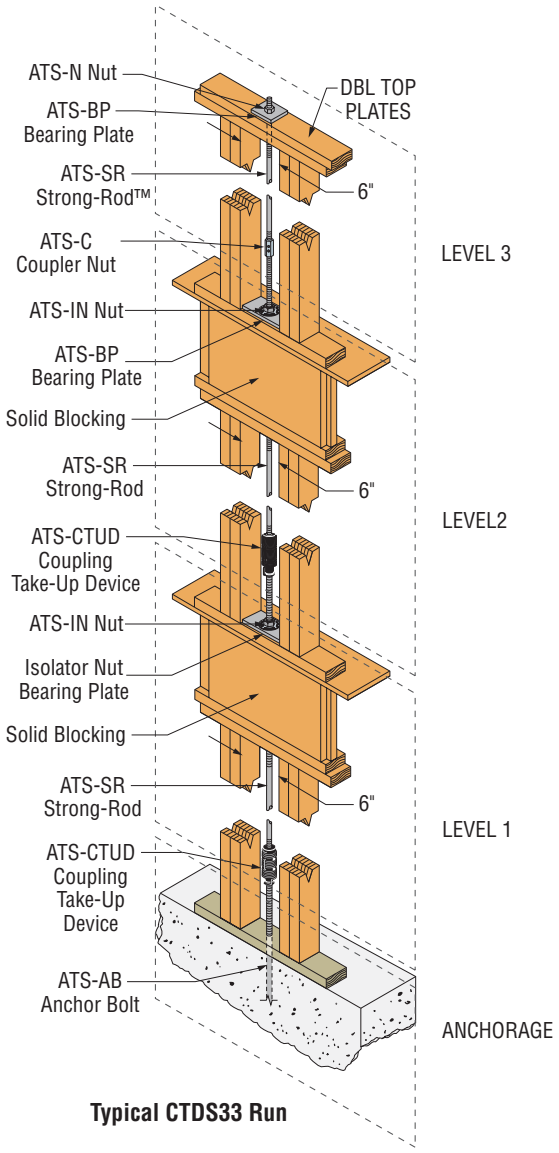
8' Plate Height + 13½" + 8" Takeup Clearance = 9'-9½" = Rod Length 10'
Actual rod length will be 2' longer than the plate height for all floors except the top floor, in this example.

DESIGN EXAMPLE

Step 1: Check Incremental and Cumulative ASD OT Forces against capacities.

Level	Load Components	CTDS33 Capacity DF	CTDS33 Capacity SP	CTDS33 Component	Demand Forces: Incremental OT Force (lbs)	Demand Forces: Cumulative OT Tension Force (lbs)
Three	Incremental Bearing Capacity (lb)	10540	9530	ATS-N7 ATS-BP5-3X5.5	6000	—
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C75	—	6000
Two	Incremental Bearing Capacity (lb)	10280	9280	ATS-IN7 ATS-BP7-3X5.5	7000	—
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD97	—	13000
One	Incremental Bearing Capacity (lb)	9950	8995	ATS-IN9 ATS-BP9-3X5.5	8000	—
	Allowable Tension Capacity (100/133) (lb)	19680 / 26240		ATS-SR9 ATS-CTUD99	—	21000
Anchorage	Anchor Bolt Grade and Size	See page 17 for minimum embedment and edge distance		ATS-SR9	—	—

1. The Designer is responsible for verifying that the building drift is within acceptable limitations and code limitations.



Typical CTDS33 Run

Step 2: Use Compression Member Selection Tables to Select Compression Members

Level	Cumulative OT Compression Forces (lbs)		8' D. Fir-L 4x Stud Compression Capacity (lbs)	Compression Members Each Side of ATS Rod
3	8000	<	10938	(1) 3x4
2	16000	<	21875	(2) 3x4
1	25000	<	31719	(1) 4x8

1. See page 36 for 8-foot D.Fir-L compression capacity.
2. 8'–0" plate height and 1.33 load duration factor used.
3. Calculations based on 2005 NDS.
4. Example only reviews compression case for the lumber species, plate height, and loads provided. Designer must review compression post and size for any additional loads, load combinations, variation in species, variation in lumber grade, or unsupported heights as specified in the code.

Step 3: The Solution

CTDS33 AND COMPRESSION MEMBERS SHOWN.

To identify the most economical design, download the ATS Selector software at www.strongtie.com

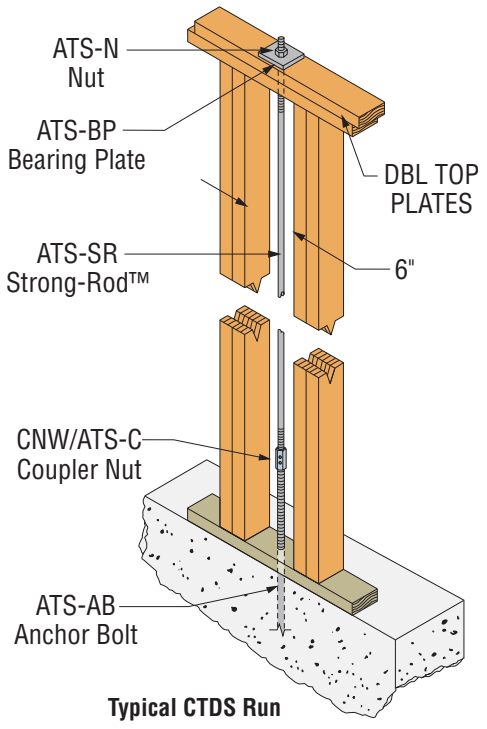
ATS Load Capacities for One Story Applications: Douglas Fir & Southern Pine

Level	One Story Systems	CTDS11			CTDS12			CTDS13		
		DF Capacity	SP Capacity	Component	DF Capacity	SP Capacity	Component	DF Capacity	SP Capacity	Component
One	Incremental Bearing Capacity (lb)	10540	9530	ATS-N5 ATS-BP5-3.5X5.5	10280	9290	ATS-N7 ATS-BP7-3X5.5	15700	14195	ATS-N9 DW9 ATS-BP10-3X9
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C55	11905 / 15875		ATS-SR7 ATS-C77	19680 / 26240		ATS-SR9 ATS-C99
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB5	See page 17 for min. embedment and edge distance		ATS-AB7	See page 17 for min. embedment and edge distance		ATS-AB9

ATS Load Capacities for One Story Applications: Hem Fir & Spruce Pine Fir

Level	One Story Systems	CTDS11B			CTDS12B			CTDS13B		
		HF Capacity	SPF Capacity	Component	HF Capacity	SPF Capacity	Component	HF Capacity	SPF Capacity	Component
One	Incremental Bearing Capacity (lb)	6830	7165	ATS-N5 ATS-BP5-3X5.5	10175	10675	ATS-N7 DW7 ATS-BP10-3X9	13820	14500	ATS-N9 DW9 ATS-BP10-3X12
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C55	11905 / 15875		ATS-SR7 ATS-C77	19680 / 26240		ATS-SR9 ATS-C99
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB5	See page 17 for min. embedment and edge distance		ATS-AB7	See page 17 for min. embedment and edge distance		ATS-AB9

1. See General Notes for additional information.
2. These tables provide the individual ASD capacities of the ATS components. The component capacities at each level must be considered by the Designer. See the design example on pages 19 & 20 for more information.



Typical CTDS Run

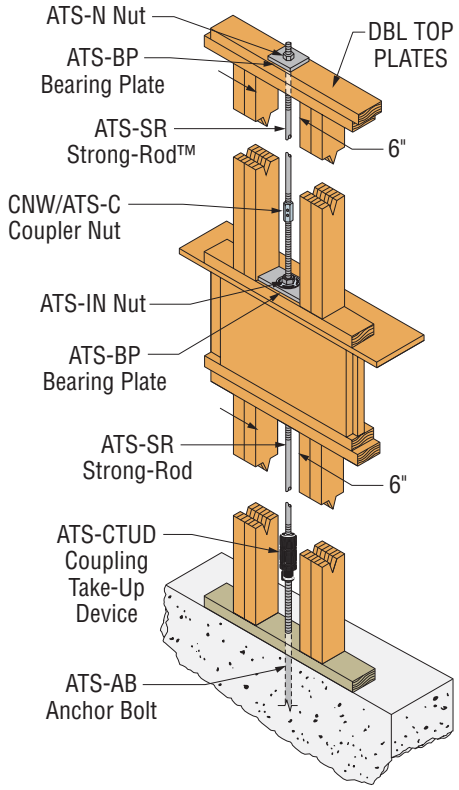
TWO STORY SYSTEMS

SIMPSON Strong-Tie®

ATS Load Capacities for Two Story Applications: Douglas Fir & Southern Pine

Level	Two Story Systems	CTDS21			CTDS22			CTDS23		
		DF	SP	Component	DF	SP	Component	DF	SP	Component
		Capacity			Capacity			Capacity		
Two	Incremental Bearing Capacity (lb)	10540	9530	ATS-N5 ATS-BP5-3X5.5	10540	9530	ATS-N5 ATS-BP5-3X5.5	10280	9290	ATS-N7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C55	6075 / 8100		ATS-SR5 ATS-C75	11905 / 15875		ATS-SR7 ATS-C97
One	Incremental Bearing Capacity (lb)	6775	6125	ATS-IN5 ATS-BP5-3X3.5	10280	9290	ATS-IN7 ATS-BP7-3X5.5	9950	8995	ATS-IN9 ATS-BP9-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-CTUD55	11905 / 15875		ATS-SR7 ATS-CTUD77	19680 / 26240		ATS-SR9 ATS-CTUD99
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB5	See page 17 for min. embedment and edge distance		ATS-AB7	See page 17 for min. embedment and edge distance		ATS-AB9

1. See General Notes for additional information.
2. These tables provide the individual ASD capacities of the ATS components. The component capacities at each level must be considered by the Designer. See the design example on pages 19 & 20 for more information.



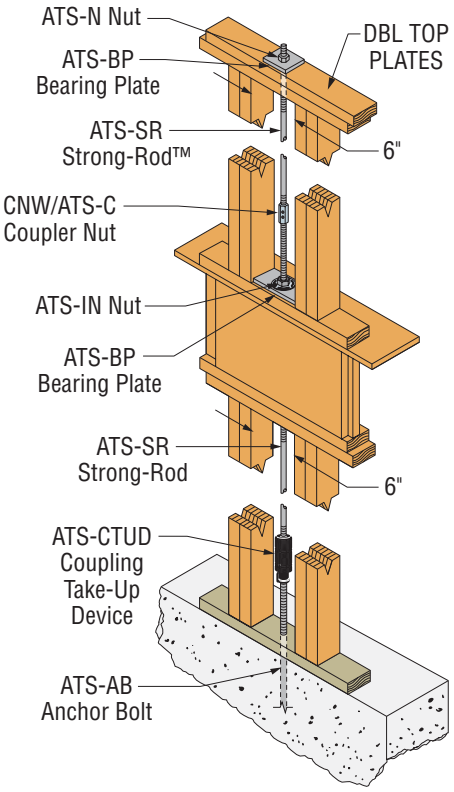
Typical CTDS2 Run

TWO STORY SYSTEMS

ATS Load Capacities for Two Story Applications: Hem Fir & Spruce Pine Fir

Level	Two Story Systems	CTDS21B			CTDS22B			CTDS23B		
		HF	SPF	Component	HF	SPF	Component	HF	SPF	Component
		Capacity			Capacity			Capacity		
Two	Incremental Bearing Capacity (lb)	6830	7165	ATS-N5 ATS-BP5-3X5.5	6830	7165	ATS-N5 ATS-BP5-3X5.5	10175	10675	ATS-N7 DW7 ATS-BP10-3X9
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C55	6075 / 8100		ATS-SR5 ATS-C75	11905 / 15875		ATS-SR7 ATS-C97
One	Incremental Bearing Capacity (lb)	4390	4605	ATS-IN5 ATS-BP5-3X3.5	6660	6990	ATS-IN7 ATS-BP7-3X5.5	6450	6765	ATS-IN9 ATS-BP9-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-CTUD55	11905 / 15875		ATS-SR7 ATS-CTUD77	19680 / 26240		ATS-SR9 ATS-CTUD99
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB5	See page 17 for min. embedment and edge distance		ATS-AB7	See page 17 for min. embedment and edge distance		ATS-AB9

1. See General Notes for additional information.
2. These tables provide the individual ASD capacities of the ATS components. The component capacities at each level must be considered by the Designer. See the design example on pages 19 & 20 for more information.



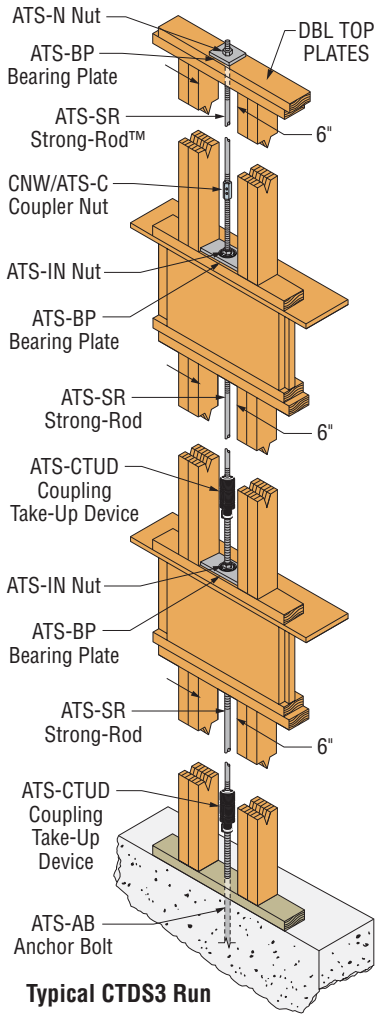
Typical CTDS2 Run

THREE STORY SYSTEMS

SIMPSON Strong-Tie®

ATS Load Capacities for Three Story Applications: Douglas Fir & Southern Pine

Level	Three Story Systems	CTDS31			CTDS32		
		DF Capacity	SP Capacity	Component	DF Capacity	SP Capacity	Component
Three	Incremental Bearing Capacity (lb)	10540	9530	ATS-N5 ATS-BP5-3X5.5	10540	9530	ATS-N5 ATS-BP5-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C55	6075 / 8100		ATS-SR5 ATS-C55
Two	Incremental Bearing Capacity (lb)	6775	6125	ATS-IN5 ATS-BP5-3X3.5	6775	6125	ATS-IN5 ATS-BP5-3X3.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-CTUD55	6075 / 8100		ATS-SR5 ATS-CTUD75
One	Incremental Bearing Capacity (lb)	6775	6125	ATS-IN5 ATS-BP5-3X3.5	10280	9290	ATS-IN7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-CTUD55	11905 / 15875		ATS-SR7 ATS-CTUD77
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB5	See page 17 for min. embedment and edge distance		ATS-AB7



Typical CTDS3 Run

Level	Three Story Systems	CTDS33			CTDS34			CTDS35		
		DF Capacity	SP Capacity	Component	DF Capacity	SP Capacity	Component	DF Capacity	SP Capacity	Component
Three	Incremental Bearing Capacity (lb)	10540	9530	ATS-N5 ATS-BP5-3X5.5	10280	9290	ATS-N7 ATS-BP7-3X5.5	10280	9290	ATS-N7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C75	11905 / 15875		ATS-SR7 ATS-C77	11905 / 15875		ATS-SR7 ATS-C77
Two	Incremental Bearing Capacity (lb)	10280	9290	ATS-IN7 ATS-BP7-3X5.5	10280	9290	ATS-IN7 ATS-BP7-3x5.5	10280	9290	ATS-IN7 ATS-BP7-3x5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD97	23810 / 31745		ATS-SR7H ATS-CTUD77	23810 / 31745		ATS-SR7H ATS-CTUD97
One	Incremental Bearing Capacity (lb)	9950	8995	ATS-IN9 ATS-BP9-3X5.5	10280	9290	ATS-IN7 ATS-BP7-3x5.5	9950	8995	ATS-IN9 ATS-BP9-3x5.5
	Allowable Tension Capacity (100/133) (lb)	19680 / 26240		ATS-SR9 ATS-CTUD99	23810 / 31745		ATS-SR7H ATS-CTUD77	39365 / 52485		ATS-SR9H ATS-CTUD99
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB9	See page 17 for min. embedment and edge distance		ATS-AB7H	See page 17 for min. embedment and edge distance		ATS-AB9H

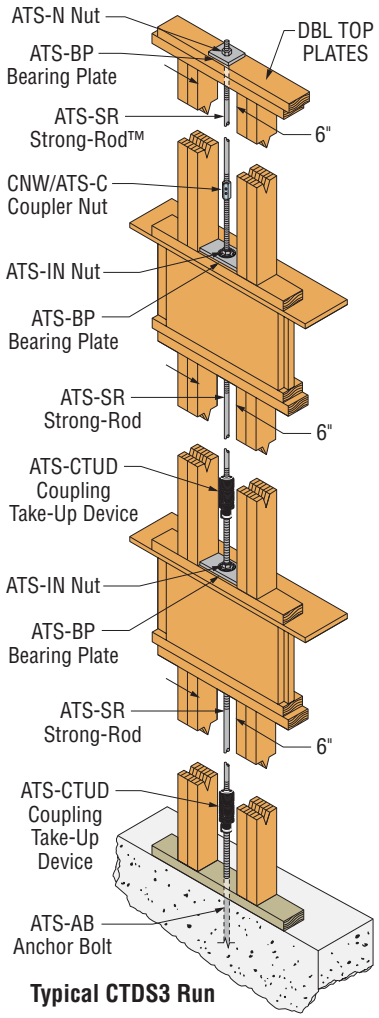
1. See General Notes for additional information.
2. These tables provide the individual ASD capacities of the ATS components. The component capacities at each level must be considered by the Designer. See the design example on pages 19 & 20 for more information.

THREE STORY SYSTEMS

SIMPSON Strong-Tie®

ATS Load Capacities for Three Story Applications: Hem Fir & Spruce Pine Fir

Level	Three Story Systems	CTDS31B			CTDS32B		
		HF Capacity	SPF Capacity	Component	HF Capacity	SPF Capacity	Component
Three	Incremental Bearing Capacity (lb)	6830	7165	ATS-N5 ATS-BP5-3X5.5	6830	7165	ATS-N5 ATS-BP5-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C55	6075 / 8100		ATS-SR5 ATS-C55
Two	Incremental Bearing Capacity (lb)	4390	4605	ATS-IN5 ATS-BP5-3X3.5	4390	4605	ATS-IN5 ATS-BP5-3X3.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-CTUD55	6075 / 8100		ATS-SR5 ATS-CTUD75
One	Incremental Bearing Capacity (lb)	4390	4605	ATS-IN5 ATS-BP7-3X3.5	6660	6990	ATS-IN7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-CTUD55	11905 / 15875		ATS-SR7 ATS-CTUD77
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB5	See page 17 for min. embedment and edge distance		ATS-AB7



Typical CTDS3 Run

Level	Three Story Systems	CTDS33B			CTDS34B			CTDS35B		
		HF Capacity	SPF Capacity	Component	HF Capacity	SPF Capacity	Component	HF Capacity	SPF Capacity	Component
Three	Incremental Bearing Capacity (lb)	6830	7165	ATS-N5 ATS-BP5-3X5.5	10175	10675	ATS-N7 DW7 ATS-BP10-3X9	10175	10675	ATS-N7 DW7 ATS-BP10-3X9
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C75	11905 / 15875		ATS-SR7 ATS-C77	11905 / 15875		ATS-SR7 ATS-C77
Two	Incremental Bearing Capacity (lb)	6660	6990	ATS-IN7 ATS-BP7-3X5.5	6660	6990	ATS-IN7 ATS-BP7-3X5.5	6660	6990	ATS-IN7 ATS-BP7-3x5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD97	23810 / 31745		ATS-SR7H ATS-CTUD77	23810 / 31745		ATS-SR7H ATS-CTUD97
One	Incremental Bearing Capacity (lb)	6450	6765	ATS-IN9 ATS-BP9-3X5.5	6660	6990	ATS-IN7 ATS-BP7-3X5.5	6450	6765	ATS-IN9 ATS-BP9-3x5.5
	Allowable Tension Capacity (100/133) (lb)	19680 / 26240		ATS-SR9 ATS-CTUD99	23810 / 31745		ATS-SR7H ATS-CTUD77	39365 / 52485		ATS-SR9H ATS-CTUD99
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB9	See page 17 for min. embedment and edge distance		ATS-AB7H	See page 17 for min. embedment and edge distance		ATS-AB9H

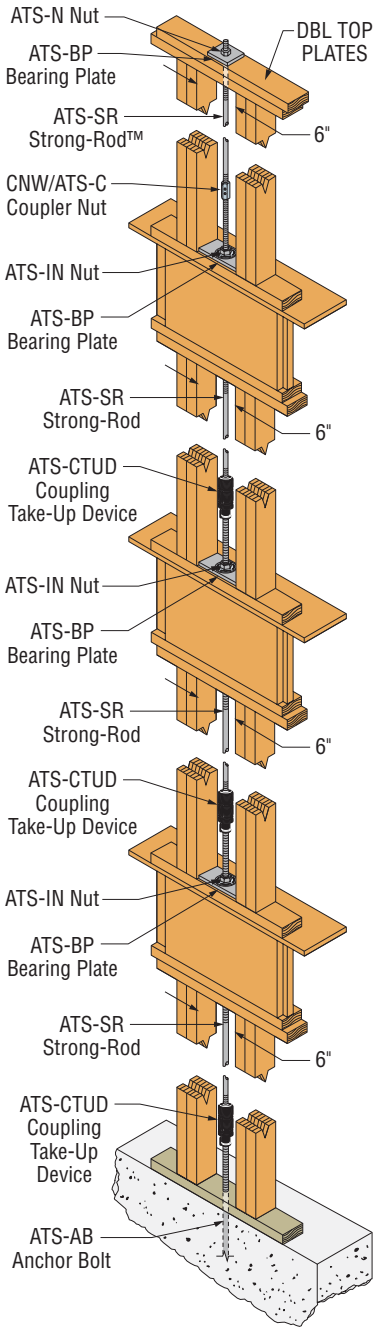
1. See General Notes for additional information.
2. These tables provide the individual ASD capacities of the ATS components. The component capacities at each level must be considered by the Designer. See the design example on pages 19 & 20 for more information.

FOUR STORY SYSTEMS

ATS Load Capacities for Four Story Applications: Douglas Fir & Southern Pine *(Continued on next page)*

Level	Four Story Systems	CTDS41			CTDS42		
		DF Capacity	SP Capacity	Component	DF Capacity	SP Capacity	Component
Four	Incremental Bearing Capacity (lb)	10540	9530	ATS-N5 ATS-BP5-3X5.5	10540	9530	ATS-N5 ATS-BP5-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C55	6075 / 8100		ATS-SR5 ATS-C55
Three	Incremental Bearing Capacity (lb)	6775	6125	ATS-IN5 ATS-BP5-3X3.5	6775	6125	ATS-IN5 ATS-BP5-3X3.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-CTUD55	6075 / 8100		ATS-SR5 ATS-CTUD55
Two	Incremental Bearing Capacity (lb)	6775	6125	ATS-IN5 ATS-BP5-3X3.5	6775	6125	ATS-IN5 ATS-BP5-3X3.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-CTUD55	6075 / 8100		ATS-SR5 ATS-CTUD75
One	Incremental Bearing Capacity (lb)	6075	8100	ATS-IN5 ATS-BP5-3X3.5	10280	9290	ATS-IN7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-CTUD55	11905 / 15875		ATS-SR7 ATS-CTUD77
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB5	See page 17 for min. embedment and edge distance		ATS-AB7

Level	Four Story Systems	CTDS43			CTDS44		
		DF Capacity	SP Capacity	Component	DF Capacity	SP Capacity	Component
Four	Incremental Bearing Capacity (lb)	10540	9530	ATS-N5 ATS-BP5-3X5.5	10540	9530	ATS-N5 ATS-BP5-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C55	6075 / 8100		ATS-SR5 ATS-C75
Three	Incremental Bearing Capacity (lb)	6775	6125	ATS-IN5 ATS-BP5-3X3.5	10280	9290	ATS-IN7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-CTUD75	11905 / 15875		ATS-SR7 ATS-CTUD77
Two	Incremental Bearing Capacity (lb)	10280	9290	ATS-IN7 ATS-BP7-3X5.5	10280	9290	ATS-IN7 ATS-BP7-3x5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD97	23810 / 31745		ATS-SR7H ATS-CTUD77
One	Incremental Bearing Capacity (lb)	9950	8995	ATS-IN9 ATS-BP9-3X5.5	10280	9290	ATS-IN7 ATS-BP7-3x5.5
	Allowable Tension Capacity (100/133) (lb)	19680 / 26240		ATS-SR9 ATS-CTUD99	23810 / 31745		ATS-SR7H ATS-CTUD77
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB9	See page 17 for min. embedment and edge distance		ATS-AB7H



Typical CTDS4 Run

1. See General Notes for additional information.
2. These tables provide the individual ASD capacities of the ATS components. The component capacities at each level must be considered by the Designer. See the design example on pages 19 & 20 for more information.

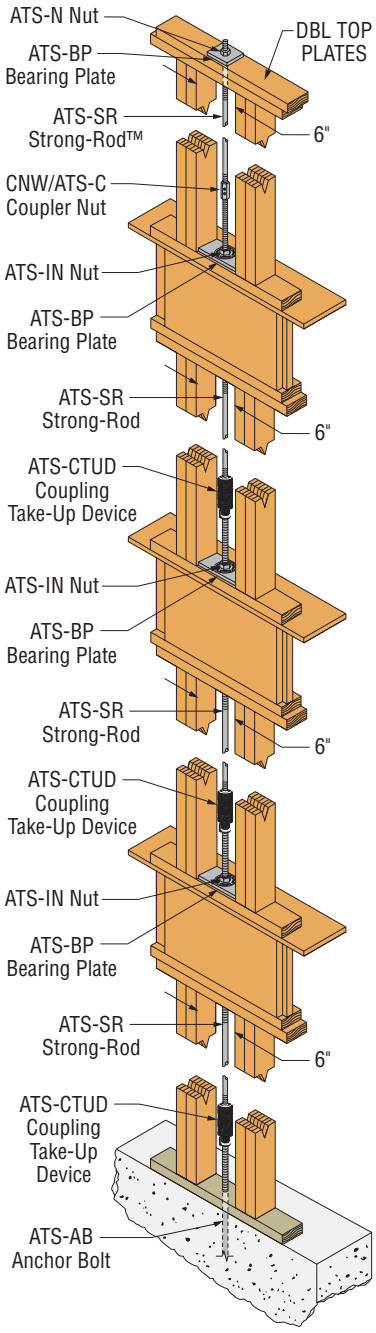
FOUR STORY SYSTEMS

ATS Load Capacities for Four Story Applications: Douglas Fir & Southern Pine

(Continued from previous page)

Level	Four Story Systems	CTDS45		
		DF	SP	Component
		Capacity		
Four	Incremental Bearing Capacity (lb)	10280	9290	ATS-N7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-C77
Three	Incremental Bearing Capacity (lb)	10280	9290	ATS-IN7 ATS-BP7-3x5.5
	Allowable Tension Capacity (100/133) (lb)	23810 / 31745		ATS-SR7H ATS-CTUD77
Two	Incremental Bearing Capacity (lb)	10280	9290	ATS-IN7 ATS-BP7-3x5.5
	Allowable Tension Capacity (100/133) (lb)	23810 / 31745		ATS-SR7H ATS-CTUD97
One	Incremental Bearing Capacity (lb)	9950	8995	ATS-IN9 ATS-BP9-3X5.5
	Allowable Tension Capacity (100/133) (lb)	39365 / 52485		ATS-SR9H ATS-CTUD99
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB9H

1. See General Notes for additional information.
2. These tables provide the individual ASD capacities of the ATS components. The component capacities at each level must be considered by the Designer. See the design example on pages 19 & 20 for more information.



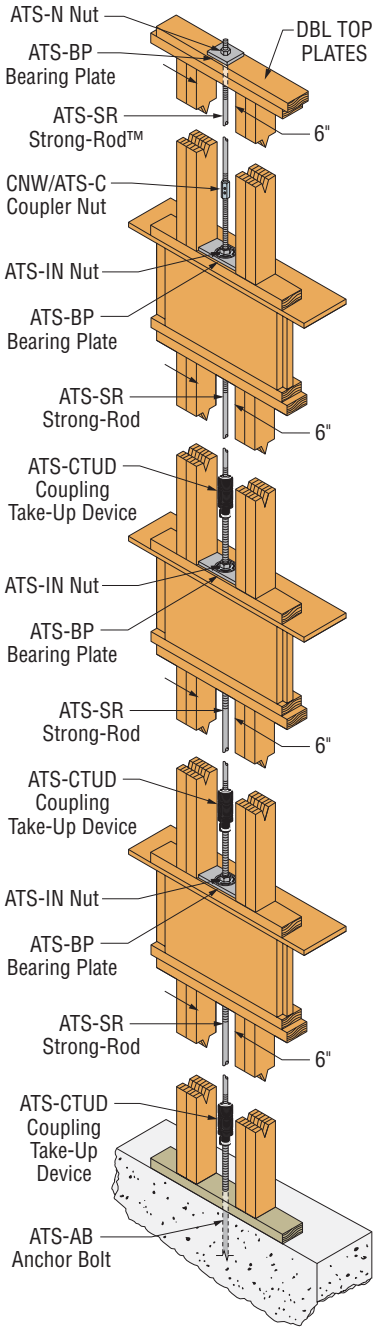
Typical CTDS4 Run

FOUR STORY SYSTEMS

ATS Load Capacities for Four Story Applications: Hem Fir & Spruce Pine Fir *(Continued on next page)*

Level	Four Story Systems	CTDS41B			CTDS42B		
		HF Capacity	SPF Capacity	Component	HF Capacity	SPF Capacity	Component
Four	Incremental Bearing Capacity (lb)	6830	7165	ATS-N5 ATS-BP5-3X5.5	6830	7165	ATS-N5 ATS-BP5-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C55	6075 / 8100		ATS-SR5 ATS-C55
Three	Incremental Bearing Capacity (lb)	4390	4605	ATS-IN5 ATS-BP5-3X3.5	4390	4605	ATS-IN5 ATS-BP5-3X3.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-CTUD55	6075 / 8100		ATS-SR5 ATS-CTUD55
Two	Incremental Bearing Capacity (lb)	4390	4605	ATS-IN5 ATS-BP5-3X3.5	4390	4605	ATS-IN5 ATS-BP5-3X3.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-CTUD55	6075 / 8100		ATS-SR5 ATS-CTUD75
One	Incremental Bearing Capacity (lb)	4390	4605	ATS-IN5 ATS-BP5-3X3.5	6660	6990	ATS-IN7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-CTUD55	11905 / 15875		ATS-SR7 ATS-CTUD77
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB5	See page 17 for min. embedment and edge distance		ATS-AB7

Level	Four Story Systems	CTDS43B			CTDS44B		
		HF Capacity	SPF Capacity	Component	HF Capacity	SPF Capacity	Component
Four	Incremental Bearing Capacity (lb)	6830	7165	ATS-N5 ATS-BP5-3X5.5	6830	7165	ATS-N5 ATS-BP5-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C55	6075 / 8100		ATS-SR5 ATS-C75
Three	Incremental Bearing Capacity (lb)	4390	4605	ATS-IN5 ATS-BP5-3X3.5	6660	6990	ATS-IN7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-CTUD75	11905 / 15875		ATS-SR7 ATS-CTUD77
Two	Incremental Bearing Capacity (lb)	6660	6990	ATS-IN7 ATS-BP7-3X5.5	6660	6990	ATS-IN7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD97	23810 / 31745		ATS-SR7H ATS-CTUD77
One	Incremental Bearing Capacity (lb)	6450	6765	ATS-IN9 ATS-BP9-3X5.5	6660	6990	ATS-IN7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	19680 / 26240		ATS-SR9 ATS-CTUD99	23810 / 31745		ATS-SR7H ATS-CTUD77
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB9	See page 17 for min. embedment and edge distance		ATS-AB7H



Typical CTDS4 Run

1. See General Notes for additional information.
2. These tables provide the individual ASD capacities of the ATS components. The component capacities at each level must be considered by the Designer. See the design example on pages 19 & 20 for more information.

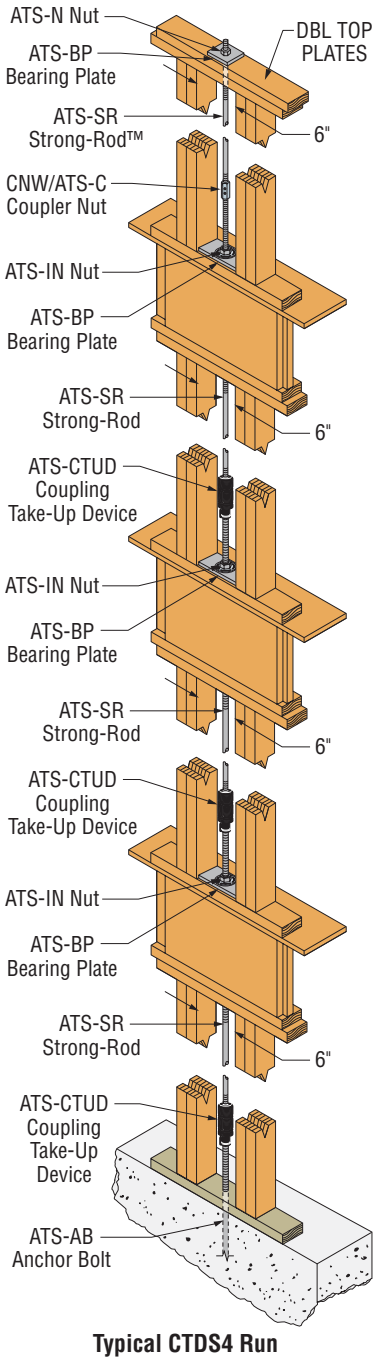
FOUR STORY SYSTEMS

ATS Load Capacities for Four Story Applications: Hem Fir & Spruce Pine Fir

(Continued from previous page)

Level	Four Story Systems	CTDS45B		
		HF Capacity	SPF Capacity	Component
Four	Incremental Bearing Capacity (lb)	10175	10675	ATS-N7 DW7 ATS-BP10-3X9
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-C77
Three	Incremental Bearing Capacity (lb)	6660	6990	ATS-IN7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	23810 / 31745		ATS-SR7H ATS-CTUD77
Two	Incremental Bearing Capacity (lb)	6660	6990	ATS-IN7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	23810 / 31745		ATS-SR7H ATS-CTUD97
One	Incremental Bearing Capacity (lb)	6450	6765	ATS-IN9 ATS-BP9-3X5.5
	Allowable Tension Capacity (100/133) (lb)	39365 / 52485		ATS-SR9H ATS-CTUD99
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB9H

1. See General Notes for additional information.
2. These tables provide the individual ASD capacities of the ATS components. The component capacities at each level must be considered by the Designer. See the design example on pages 19 & 20 for more information.



Typical CTDS4 Run

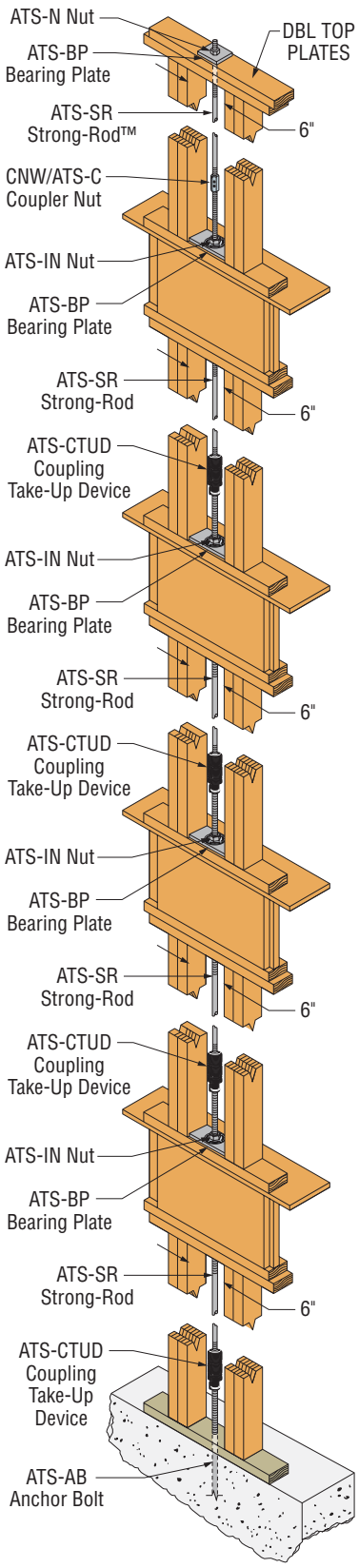
FIVE STORY SYSTEMS

SIMPSON Strong-Tie®

ATS Load Capacities for Five Story Applications: Douglas Fir & Southern Pine *(Continued on next page)*

Level	Five Story Systems	CTDS51			CTDS52		
		DF Capacity	SP Capacity	Component	DF Capacity	SP Capacity	Component
Five	Incremental Bearing Capacity (lb)	10540	9530	ATS-N5 ATS-BP5-3X5.5	10540	9530	ATS-N5 ATS-BP5-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C75	6075 / 8100		ATS-SR5 ATS-C75
Four	Incremental Bearing Capacity (lb)	10280	9290	ATS-IN7 ATS-BP7-3X5.5	10280	9290	ATS-IN7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD77	11905 / 15875		ATS-SR7 ATS-CTUD77
Three	Incremental Bearing Capacity (lb)	10280	9290	ATS-IN7 ATS-BP7-3X5.5	10280	9290	ATS-IN7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD77	11905 / 15875		ATS-SR7 ATS-CTUD97
Two	Incremental Bearing Capacity (lb)	11905	15875	ATS-IN7 ATS-BP7-3X5.5	9950	8995	ATS-IN9 ATS-BP9-3X5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD77	19680 / 26240		ATS-SR9 ATS-CTUD99
One	Incremental Bearing Capacity (lb)	10280	9290	ATS-IN7 ATS-BP7-3X5.5	9950	8995	ATS-IN9 ATS-BP9-3X5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD77	19680 / 26240		ATS-SR9 ATS-CTUD99
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB7	See page 17 for min. embedment and edge distance		ATS-AB9

1. See General Notes for additional information.
2. These tables provide the individual ASD capacities of the ATS components. The component capacities at each level must be considered by the Designer. See the design example on pages 19 & 20 for more information.



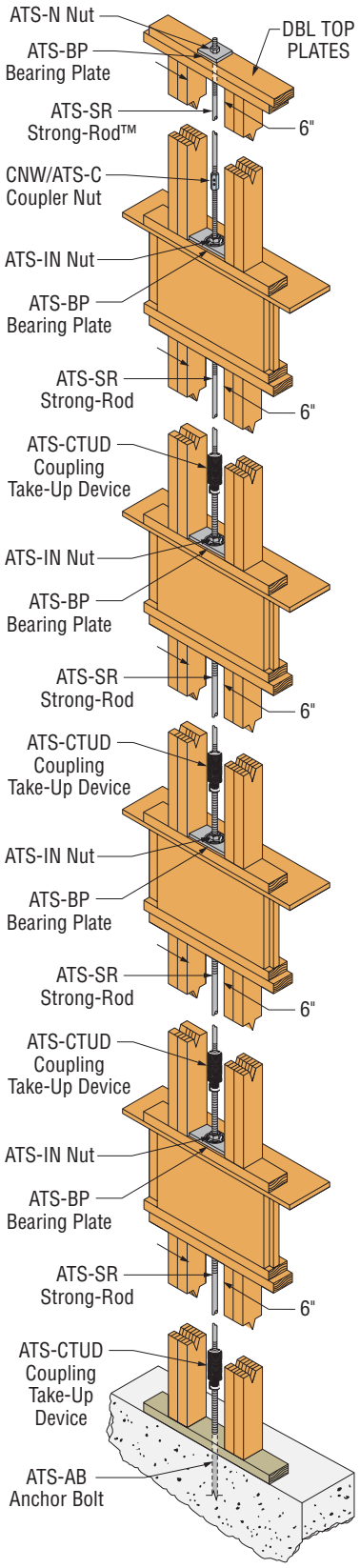
Typical CTDS5 Run

FIVE STORY SYSTEMS

ATS Load Capacities for Five Story Applications: Douglas Fir & Southern Pine *(Continued from previous page)*

Level	Five Story Systems	CTDS53			CTDS54		
		DF Capacity	SP Capacity	Component	DF Capacity	SP Capacity	Component
Five	Incremental Bearing Capacity (lb)	10540	9530	ATS-N5 ATS-BP5-3X5.5	10280	9290	ATS-N7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C75	11905 / 15875		ATS-SR7 ATS-C77
Four	Incremental Bearing Capacity (lb)	10280	9290	ATS-IN7 ATS-BP7-3X5.5	10280	9290	ATS-IN7 ATS-BP7-3x5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD77	23810 / 31745		ATS-SR7H ATS-CTUD77
Three	Incremental Bearing Capacity (lb)	10280	9290	ATS-IN7 ATS-BP7-3X5.5	10280	9290	ATS-IN7 ATS-BP7-3x5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD77	23810 / 31745		ATS-SR7H ATS-CTUD97
Two	Incremental Bearing Capacity (lb)	10280	9290	ATS-IN7 ATS-BP7-3x5.5	9950	8995	ATS-IN9 ATS-BP9-3X5.5
	Allowable Tension Capacity (100/133) (lb)	23810 / 31745		ATS-SR7H ATS-CTUD77	39365 / 52485		ATS-SR9H ATS-CTUD99
One	Incremental Bearing Capacity (lb)	10280	9290	ATS-IN7 ATS-BP7-3x5.5	9950	8995	ATS-IN9 ATS-BP9-3X5.5
	Allowable Tension Capacity (100/133) (lb)	23810 / 31745		ATS-SR7H ATS-CTUD77	39365 / 52485		ATS-SR9H ATS-CTUD99
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB7H	See page 17 for min. embedment and edge distance		ATS-AB9H

1. See General Notes for additional information.
2. These tables provide the individual ASD capacities of the ATS components. The component capacities at each level must be considered by the Designer. See the design example on pages 19 & 20 for more information.



Typical CTDS5 Run

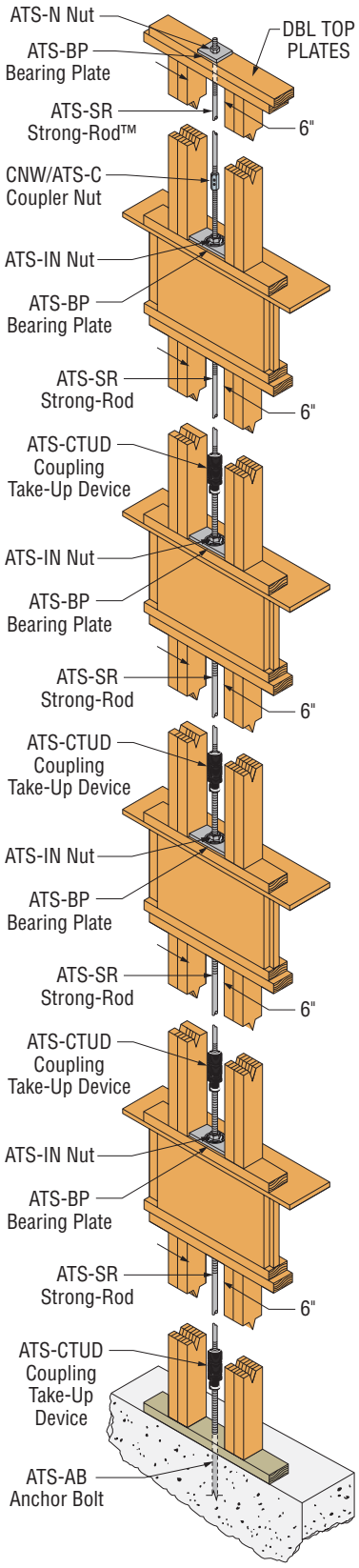
FIVE STORY SYSTEMS

SIMPSON Strong-Tie®

ATS Load Capacities for Five Story Applications: Hem Fir & Spruce Pine Fir *(Continued on next page)*

Level	Five Story Systems	CTDS51B			CTDS52B		
		HF Capacity	SPF Capacity	Component	HF Capacity	SPF Capacity	Component
Five	Incremental Bearing Capacity (lb)	6830	7165	ATS-N5 ATS-BP5-3X5.5	6830	7165	ATS-N5 ATS-BP5-3X5.5
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C75	6075 / 8100		ATS-SR5 ATS-C75
Four	Incremental Bearing Capacity (lb)	6660	6990	ATS-IN7 ATS-BP7-3X5.5	6660	6990	ATS-IN7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD77	11905 / 15875		ATS-SR7 ATS-CTUD77
Three	Incremental Bearing Capacity (lb)	6660	6990	ATS-IN7 ATS-BP7-3X5.5	6660	6990	ATS-IN7 ATS-BP7-3X5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD77	11905 / 15875		ATS-SR7 ATS-CTUD97
Two	Incremental Bearing Capacity (lb)	6660	6990	ATS-IN7 ATS-BP7-3X5.5	6450	6765	ATS-IN9 ATS-BP9-3X5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD77	19680 / 26240		ATS-SR9 ATS-CTUD99
One	Incremental Bearing Capacity (lb)	6660	6990	ATS-IN7 ATS-BP7-3X5.5	6450	6765	ATS-IN9 ATS-BP9-3X5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD77	19680 / 26240		ATS-SR9 ATS-CTUD99
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB7	See page 17 for min. embedment and edge distance		ATS-AB9

1. See General Notes for additional information.
2. These tables provide the individual ASD capacities of the ATS components. The component capacities at each level must be considered by the Designer. See the design example on pages 19 & 20 for more information.



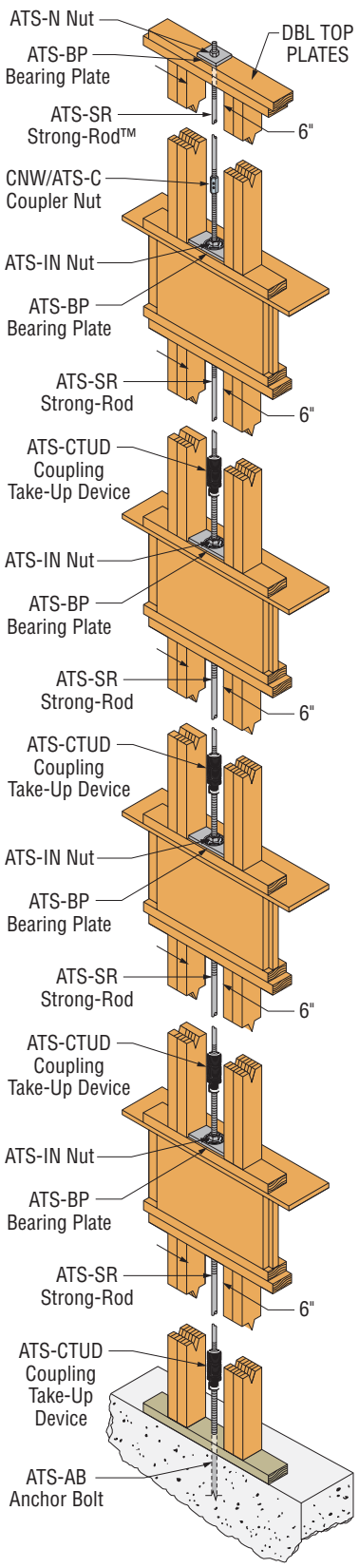
Typical CTDS5 Run

FIVE STORY SYSTEMS

ATS Load Capacities for Five Story Applications: Hem Fir & Spruce Pine Fir *(Continued from previous page)*

Level	Five Story Systems	CTDS53B			CTDS54B		
		HF Capacity	SPF Capacity	Component	HF Capacity	SPF Capacity	Component
Five	Incremental Bearing Capacity (lb)	6830	7165	ATS-N5 ATS-BP5-3X5.5	10175	10675	ATS-N7 DW7 ATS-BP10-3X9
	Allowable Tension Capacity (100/133) (lb)	6075 / 8100		ATS-SR5 ATS-C75	11905 / 15875		ATS-SR7 ATS-C77
Four	Incremental Bearing Capacity (lb)	6660	6990	ATS-IN7 ATS-BP7-3X5.5	6660	6990	ATS-IN7 ATS-BP7-3x5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD77	23810 / 31745		ATS-SR7H ATS-CTUD77
Three	Incremental Bearing Capacity (lb)	6660	6990	ATS-IN7 ATS-BP7-3X5.5	6660	6990	ATS-IN7 ATS-BP7-3x5.5
	Allowable Tension Capacity (100/133) (lb)	11905 / 15875		ATS-SR7 ATS-CTUD77	23810 / 31745		ATS-SR7H ATS-CTUD97
Two	Incremental Bearing Capacity (lb)	6660	6990	ATS-IN7 ATS-BP7-3x5.5	6450	6765	ATS-IN9 ATS-BP9-3X5.5
	Allowable Tension Capacity (100/133) (lb)	23810 / 31745		ATS-SR7H ATS-CTUD77	39365 / 52485		ATS-SR9H ATS-CTUD99
One	Incremental Bearing Capacity (lb)	6660	6990	ATS-IN7 ATS-BP7-3x5.5	6450	6765	ATS-IN9 ATS-BP9-3X5.5
	Allowable Tension Capacity (100/133) (lb)	23810 / 31745		ATS-SR7H ATS-CTUD77	39365 / 52485		ATS-SR9H ATS-CTUD99
Anchorage	Anchor Bolt Grade and Size	See page 17 for min. embedment and edge distance		ATS-AB7H	See page 17 for min. embedment and edge distance		ATS-AB9H

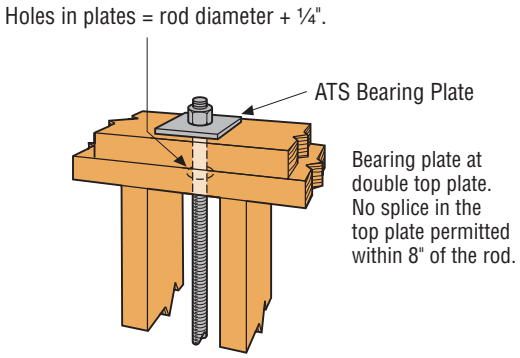
1. See General Notes for additional information.
2. These tables provide the individual ASD capacities of the ATS components. The component capacities at each level must be considered by the Designer. See the design example on pages 19 & 20 for more information.



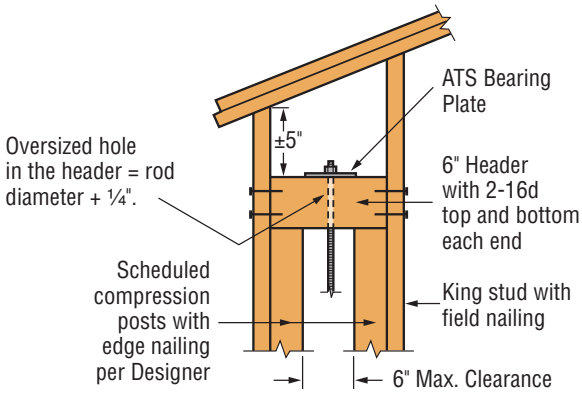
Typical CTDS5 Run

INSTALLATION DETAILS

RUN TERMINATION DETAILS

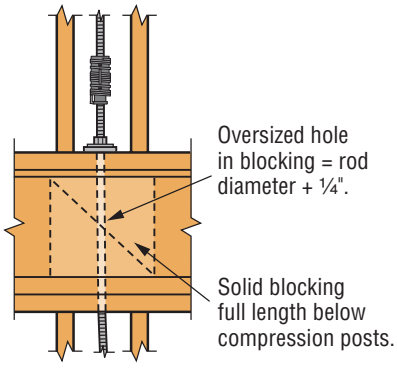


Top Plate Detail

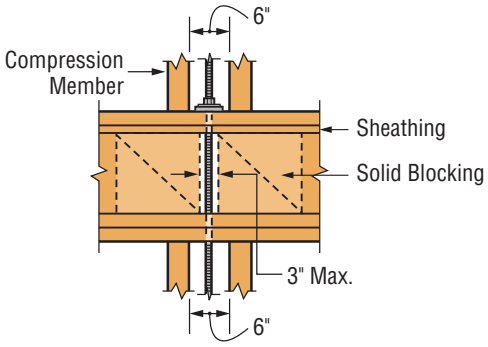


Bridge Block Detail

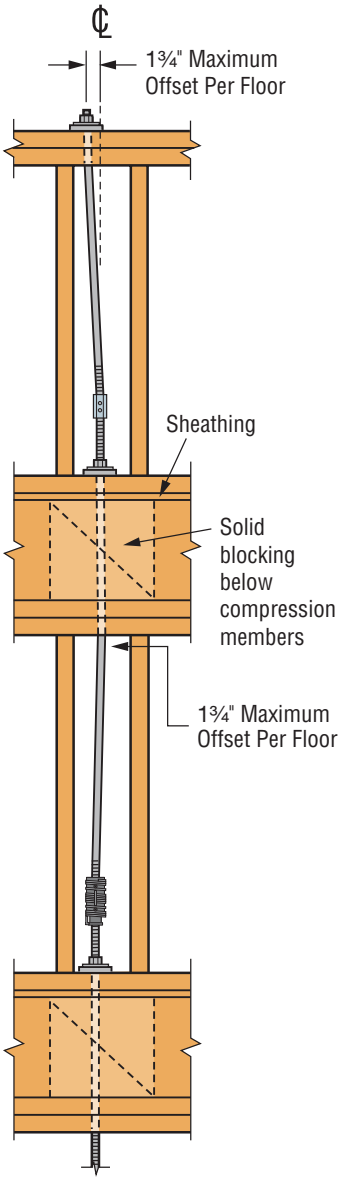
FLOOR SYSTEM BLOCKING DETAILS



Blocking Detail

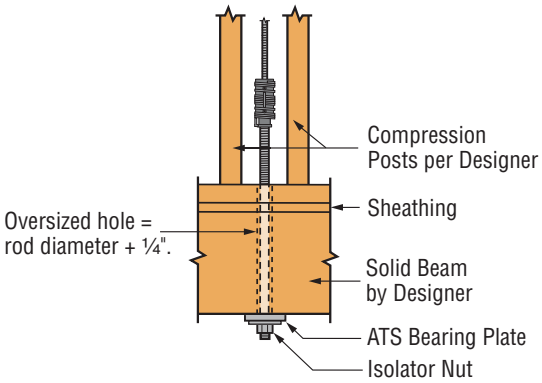


Alternate Blocking Detail

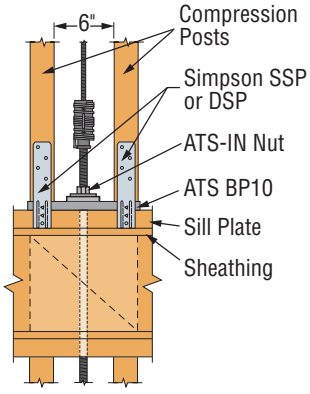


Allowable Rod Offset From Centerline: 1¾" maximum per floor

ADDITIONAL DETAILS



Wood Beam Detail

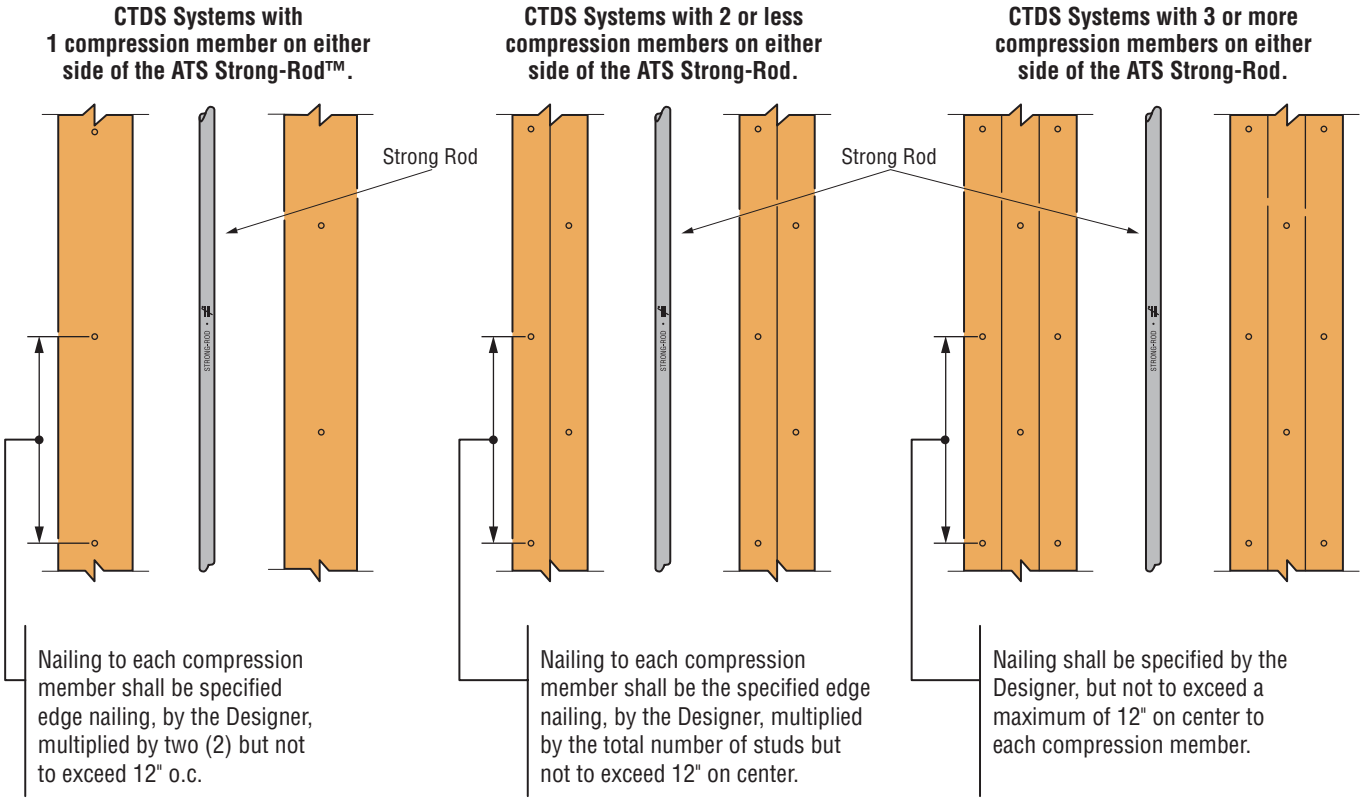


Studs over ATS-BP10 Bearing Plates

INSTALLATION DETAILS (CONT.)

SHEARWALL EDGE NAILING

Edge nailing and compression members size shall be specified by the Designer.



Example: (4) total compression members: 2" o.c. edge nailing x 4 = 8" o.c. nailing at each compression member.

COMPRESSION MEMBERS: GENERAL NOTES

1. Studs, posts and blocking details are specified by the Designer and are not shipped with the Anchor Tiedown System.
2. With the Anchor Tiedown System, it is not necessary to design the lumber in tension. See the Compression Member Selection Tables on pages 36–41 for compression member allowable capacities and additional design assumptions.
3. The compression capacity of the lumber listed in the tables are based on the 2005 National Design Specification (NDS) for the plate heights, wall plate and compression member species specified.
4. Wall plates and stud species are assumed to be the same as specified in the Compression Member Selection Tables (UNO). The Designer must review the compression members for variation of species, or unsupported heights other than those listed in the tables.
5. Allowable perpendicular to grain stress for D.Fir-L lumber based on 625 psi, Southern Pine lumber based on 565 psi, Spruce-Pine-Fir lumber based on 425 psi, and Hem-Fir lumber based on 405 psi. Parallam lumber based on 625 psi or 565 psi as it will bear on solid sawn lumber.
6. 2x and 3x based on # 2 grade, 4x and 6x lumber based on #1 grade.
7. Bearing area factor Cb not included in lumber values.
8. Perpendicular to grain capacities listed in the Compression Member Selection Tables may be multiplied by C_b for bearings not nearer than 3" to the end of the horizontal member. T is the width of the compression member.

T (in)	1.50	2.50	3.50	5.50	≥ 6.00
C_b	1.25	1.15	1.11	1.07	1.0

9. Effective length of lumber (l_e) equal to plate height, less (3) 2x wall plates (i.e. 4½").
10. Capacities shown, assume K_e = 1.0.

COMPRESSION MEMBER SELECTION

SIMPSON Strong-Tie®

Column Perpendicular and Parallel to Grain Capacities for D.Fir-L (Solid Lumber Sizes)

Framing	Lumber Size (Each Side of ATS Rod)	Perp. To Grain, $P_{c\perp}$	Parallel to Grain, P_c Lbs.									
			Plate Height (ft)									
			8		9		10		11		12	
			(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)
4-Inch Wall	1-2x4	6,563	6,767	6,887	5,409	5,478	4,408	4,449	3,653	3,681	3,074	3,092
	1-3x4	10,938	11,279	11,479	9,015	9,129	7,346	7,416	6,089	6,134	5,123	5,154
	1-4x4	15,313	16,856	17,136	13,455	13,616	10,954	11,053	9,075	9,139	7,633	7,676
	2-3x4	21,875	22,557	22,957	18,031	18,259	14,692	14,831	12,178	12,269	10,247	10,308
	1-4x6	24,063	26,365	26,832	21,074	21,341	17,171	17,335	14,233	14,339	11,976	12,048
	1-4x8	31,719	34,574	35,228	27,677	28,050	22,573	22,800	18,722	18,869	15,760	15,859
	1-4x10	40,469	43,855	44,745	35,167	35,673	28,711	29,020	23,830	24,029	20,069	20,203
	2-4x6	48,125	52,729	53,663	42,148	42,681	34,343	34,669	28,467	28,678	23,952	24,095
	1-4x12	49,219	53,337	54,419	42,771	43,386	34,919	35,294	28,982	29,224	24,408	24,571
	2-4x8	63,438	69,147	70,455	55,355	56,100	45,145	45,601	37,444	37,738	31,519	31,718
6-Inch Wall	1-2x6	10,313	21,013	22,543	17,969	18,879	15,279	15,831	13,019	13,368	11,160	11,390
	1-3x6	17,188	35,022	37,571	29,948	31,465	25,465	26,386	21,699	22,280	18,601	18,983
	1-4x6	22,688	50,043	53,462	42,562	44,575	36,056	37,274	30,649	31,417	26,230	26,736
	1-6x6	37,813	62,298	69,542	56,150	61,130	49,771	53,048	43,700	45,842	38,252	39,673
	1-6x8	49,844	82,120	91,668	74,016	80,581	65,608	69,928	57,605	60,428	50,423	52,297
	1-6x10	63,594	104,774	116,956	94,434	102,810	83,706	89,218	73,496	77,097	64,332	66,724
	1-6x12	77,344	127,428	142,244	114,852	125,039	101,805	108,508	89,387	93,767	78,242	81,150

Column Perpendicular and Parallel to Grain Capacities for D.Fir-L (Multiple 2x Sizes)

Framing	Lumber Size (Each Side of ATS Rod)	Perp. To Grain, $P_{c\perp}$	Parallel to Grain, P_c Lbs.									
			Plate Height (ft)									
			8		9		10		11		12	
			(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)
4-Inch Wall	1-2x4	6,563	6,767	6,887	5,409	5,478	4,408	4,449	3,653	3,681	3,074	3,092
	2-2x4	13,125	13,534	13,774	10,819	10,955	8,815	8,899	7,307	7,361	6,148	6,185
	3-2x4	19,688	20,302	20,661	16,228	16,433	13,223	13,348	10,960	11,042	9,222	9,277
	4-2x4	26,250	27,069	27,548	21,637	21,911	17,630	17,798	14,614	14,722	12,296	12,370
	5-2x4	32,813	33,836	34,436	27,046	27,388	22,038	22,247	18,267	18,403	15,370	15,462
	6-2x4	39,375	40,603	41,323	32,456	32,866	26,445	26,697	21,921	22,083	18,444	18,555
	7-2x4	45,938	47,370	48,210	37,865	38,344	30,853	31,146	25,574	25,764	21,518	21,647
	8-2x4	52,500	54,138	55,097	43,274	43,822	35,260	35,596	29,227	29,445	24,592	24,739
	9-2x4	59,063	60,905	61,984	48,684	49,299	39,668	40,045	32,881	33,125	27,666	27,832
6-Inch Wall	1-2x6	10,313	21,013	22,543	17,969	18,879	15,279	15,831	13,019	13,368	11,160	11,390
	2-2x6	20,625	42,027	45,086	35,938	37,758	30,558	31,663	26,039	26,736	22,321	22,780
	3-2x6	30,938	63,040	67,629	53,907	56,637	45,837	47,494	39,058	40,105	33,481	34,170
	4-2x6	41,250	84,054	90,171	71,876	75,516	61,115	63,326	52,077	53,473	44,641	45,560
	5-2x6	51,563	105,067	112,714	89,845	94,395	76,394	79,157	65,097	66,841	55,802	56,950
	6-2x6	61,875	126,080	135,257	107,814	113,274	91,673	94,989	78,116	80,209	66,962	68,340
	7-2x6	72,188	147,094	157,800	125,783	132,153	106,952	110,820	91,135	93,578	78,123	79,730

1. See Compression Members: General Notes page 35 for additional information.
2. Shaded columns are limited by Parallel to Grain loads.

Refer to the ATS Selector software for alternate grade capacities.

COMPRESSION MEMBER SELECTION

SIMPSON Strong-Tie®

Column Perpendicular and Parallel to Grain Capacities for Spruce-Pine-Fir (Solid Lumber Sizes)

Framing	Lumber Size (Each Side of ATS Rod)	Perp. To Grain, $P_{c\perp}$	Parallel to Grain, P_c Lbs.									
			Plate Height (ft)									
			8		9		10		11		12	
			(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)
4-Inch Wall	1-2x4	4,463	5,904	6,013	4,723	4,785	3,851	3,888	3,193	3,217	2,687	2,704
	1-3x4	7,438	9,840	10,021	7,872	7,975	6,418	6,481	5,321	5,362	4,479	4,506
	1-4x4	10,413	13,776	14,029	11,021	11,165	8,985	9,073	7,450	7,507	6,270	6,309
	2-3x4	14,875	19,680	20,042	15,744	15,950	12,835	12,961	10,643	10,725	8,957	9,012
	1-4x6	16,363	21,536	21,959	17,256	17,496	14,080	14,227	11,682	11,777	9,836	9,900
	1-4x8	21,569	28,226	28,818	22,654	22,990	18,504	18,709	15,363	15,496	12,942	13,031
	1-4x10	27,519	35,781	36,586	28,772	29,228	23,530	23,807	19,551	19,729	16,477	16,598
	2-4x6	32,725	43,073	43,917	34,511	34,991	28,161	28,454	23,365	23,554	19,672	19,801
	1-4x12	33,469	43,517	44,496	34,993	35,548	28,617	28,954	23,778	23,995	20,040	20,187
	2-4x8	43,138	56,452	57,636	45,308	45,979	37,009	37,418	30,727	30,991	25,883	26,062
6-Inch Wall	1-2x6	7,013	18,173	19,546	15,592	16,415	13,289	13,789	11,341	11,657	9,732	9,940
	1-3x6	11,688	30,289	32,576	25,987	27,358	22,148	22,982	18,902	19,429	16,220	16,567
	1-4x6	15,428	39,981	43,001	34,303	36,112	29,235	30,337	24,950	25,646	21,410	21,868
	1-6x6	25,713	45,750	51,779	42,017	46,447	37,923	40,995	33,802	35,875	29,927	31,325
	1-6x8	33,894	60,307	68,254	55,386	61,226	49,990	54,039	44,557	47,290	39,449	41,293
	1-6x10	43,244	76,943	87,083	70,664	78,116	63,780	68,947	56,849	60,335	50,331	52,684
	1-6x12	52,594	93,579	105,912	85,943	95,006	77,571	83,854	69,140	73,380	61,214	64,075

Column Perpendicular and Parallel to Grain Capacities for Spruce-Pine-Fir (Multiple 2x Sizes)

Framing	Lumber Size (Each Side of ATS Rod)	Perp. To Grain, $P_{c\perp}$	Parallel to Grain, P_c Lbs.									
			Plate Height (ft)									
			8		9		10		11		12	
			(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)
4-Inch Wall	1-2x4	4,463	5,904	6,013	4,723	4,785	3,851	3,888	3,193	3,217	2,687	2,704
	2-2x4	8,925	11,808	12,025	9,446	9,570	7,701	7,777	6,386	6,435	5,374	5,407
	3-2x4	13,388	17,712	18,038	14,170	14,355	11,552	11,665	9,579	9,652	8,061	8,111
	4-2x4	17,850	23,615	24,050	18,893	19,141	15,402	15,554	12,771	12,869	10,749	10,815
	5-2x4	22,313	29,519	30,063	23,616	23,926	19,253	19,442	15,964	16,087	13,436	13,519
	6-2x4	26,775	35,423	36,075	28,339	28,711	23,103	23,331	19,157	19,304	16,123	16,222
	7-2x4	31,238	41,327	42,088	33,063	33,496	26,954	27,219	22,350	22,522	18,810	18,926
	8-2x4	35,700	47,231	48,100	37,786	38,281	30,804	31,108	25,543	25,739	21,497	21,630
	9-2x4	40,163	53,135	54,113	42,509	43,066	34,655	34,996	28,736	28,956	24,184	24,334
6-Inch Wall	1-2x6	7,013	18,173	19,546	15,592	16,415	13,289	13,789	11,341	11,657	9,732	9,940
	2-2x6	14,025	36,346	39,092	31,184	32,829	26,577	27,579	22,682	23,315	19,464	19,880
	3-2x6	21,038	54,519	58,638	46,776	49,244	39,866	41,368	34,023	34,972	29,196	29,820
	4-2x6	28,050	72,692	78,183	62,368	65,658	53,155	55,158	45,364	46,630	38,927	39,760
	5-2x6	35,063	90,866	97,729	77,960	82,073	66,443	68,947	56,705	58,287	48,659	49,700
	6-2x6	42,075	109,039	117,275	93,553	98,488	79,732	82,737	68,046	69,945	58,391	59,640
	7-2x6	49,088	127,212	136,821	109,145	114,902	93,021	96,526	79,387	81,602	68,123	69,580

1. See Compression Members: General Notes page 35 for additional information.
2. Shaded columns are limited by Parallel to Grain loads.

Refer to the ATS Selector software for alternate grade capacities.

COMPRESSION MEMBER SELECTION

SIMPSON Strong-Tie®

Column Perpendicular and Parallel to Grain Capacities for Hem-Fir (Solid Lumber Sizes)

Framing	Lumber Size (Each Side of ATS Rod)	Perp. To Grain, $P_{c\perp}$	Parallel to Grain, P_c Lbs.									
			Plate Height (ft)									
			8		9		10		11		12	
			(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)
4-Inch Wall	1-2x4	4,253	5,589	5,667	4,447	4,492	3,613	3,640	2,989	3,007	2,512	2,524
	1-3x4	7,088	9,315	9,445	7,411	7,486	6,021	6,067	4,981	5,012	4,186	4,206
	1-4x4	9,923	14,902	15,143	11,889	12,027	9,676	9,761	8,014	8,069	6,740	6,777
	2-3x4	14,175	18,629	18,890	14,822	14,972	12,042	12,135	9,963	10,023	8,372	8,413
	1-4x6	15,593	23,312	23,714	18,623	18,852	15,168	15,309	12,570	12,661	10,575	10,636
	1-4x8	20,554	30,575	31,137	24,460	24,781	19,941	20,137	16,535	16,662	13,916	14,002
	1-4x10	26,224	38,789	39,554	31,083	31,518	25,366	25,631	21,047	21,219	17,722	17,838
	2-4x6	31,185	46,624	47,427	37,245	37,704	30,336	30,618	25,140	25,322	21,149	21,273
	1-4x12	31,894	47,176	48,106	37,804	38,333	30,850	31,173	25,598	25,806	21,553	21,694
	2-4x8	41,108	61,150	62,275	48,921	49,561	39,882	40,274	33,069	33,323	27,832	28,003
6-Inch Wall	1-2x6	6,683	18,224	19,260	15,286	15,882	12,831	13,189	10,841	11,068	9,241	9,391
	1-3x6	11,138	30,373	32,100	25,476	26,470	21,385	21,982	18,069	18,446	15,402	15,651
	1-4x6	14,702	44,506	47,461	37,765	39,498	31,942	32,989	27,124	27,784	23,197	23,632
	1-6x6	24,503	52,081	57,878	46,660	50,567	41,137	43,673	35,968	37,613	31,388	32,476
	1-6x8	32,299	68,652	76,293	61,506	66,656	54,226	57,569	47,413	49,581	41,375	42,810
	1-6x10	41,209	87,590	97,340	78,473	85,044	69,185	73,450	60,492	63,258	52,788	54,619
	1-6x12	50,119	106,529	118,386	95,440	103,432	84,144	89,331	73,572	76,936	64,202	66,429

Column Perpendicular and Parallel to Grain Capacities for Hem-Fir (Multiple 2x Sizes)

Framing	Lumber Size (Each Side of ATS Rod)	Perp. To Grain, $P_{c\perp}$	Parallel to Grain, P_c Lbs.									
			Plate Height (ft)									
			8		9		10		11		12	
			(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)
4-Inch Wall	1-2x4	4,253	5,589	5,667	4,447	4,492	3,613	3,640	2,989	3,007	2,512	2,524
	2-2x4	8,505	11,178	11,334	8,893	8,983	7,225	7,281	5,978	6,014	5,023	5,048
	3-2x4	12,758	16,766	17,001	13,340	13,475	10,838	10,921	8,967	9,021	7,535	7,571
	4-2x4	17,010	22,355	22,668	17,786	17,967	14,451	14,562	11,955	12,028	10,046	10,095
	5-2x4	21,263	27,944	28,335	22,233	22,458	18,063	18,202	14,944	15,035	12,558	12,619
	6-2x4	25,515	33,533	34,002	26,680	26,950	21,676	21,843	17,933	18,042	15,069	15,143
	7-2x4	29,768	39,121	39,670	31,126	31,441	25,289	25,483	20,922	21,049	17,581	17,667
	8-2x4	34,020	44,710	45,337	35,573	35,933	28,902	29,124	23,911	24,056	20,092	20,190
	9-2x4	38,273	50,299	51,004	40,019	40,425	32,514	32,764	26,900	27,062	22,604	22,714
6-Inch Wall	1-2x6	6,683	18,224	19,260	15,286	15,882	12,831	13,189	10,841	11,068	9,241	9,391
	2-2x6	13,365	36,448	38,521	30,571	31,764	25,661	26,378	21,683	22,135	18,482	18,781
	3-2x6	20,048	54,672	57,781	45,857	47,646	38,492	39,568	32,524	33,203	27,723	28,172
	4-2x6	26,730	72,896	77,041	61,142	63,528	51,323	52,757	43,365	44,271	36,964	37,562
	5-2x6	33,413	91,120	96,301	76,428	79,410	64,154	65,946	54,206	55,338	46,205	46,953
	6-2x6	40,095	109,344	115,562	91,713	95,292	76,984	79,135	65,048	66,406	55,446	56,343
	7-2x6	46,778	127,568	134,822	106,999	111,174	89,815	92,325	75,889	77,473	64,687	65,734

1. See Compression Members: General Notes page 35 for additional information.
2. Shaded columns are limited by Parallel to Grain loads.

Refer to the ATS Selector software for alternate grade capacities.

COMPRESSION MEMBER SELECTION

SIMPSON Strong-Tie®

Column Perpendicular and Parallel to Grain Capacities for Southern Pine (Solid Lumber Sizes)

Framing	Lumber Size (Each Side of ATS Rod)	Perp. To Grain, $P_{c\perp}$	Parallel to Grain, P_c Lbs.									
			Plate Height (ft)									
			8		9		10		11		12	
			(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)
4-Inch Wall	1-2x4	5,933	6,810	6,921	5,434	5,497	4,422	4,461	3,663	3,688	3,081	3,098
	1-3x4	9,888	11,350	11,535	9,056	9,162	7,371	7,436	6,105	6,147	5,134	5,163
	1-4x4	13,843	16,970	17,226	13,520	13,667	10,994	11,085	9,101	9,160	7,650	7,690
	2-3x4	19,775	22,700	23,069	18,112	18,323	14,741	14,871	12,210	12,294	10,268	10,326
	1-4x6	21,753	26,526	26,958	21,166	21,413	17,227	17,379	14,270	14,368	12,001	12,067
	1-4x8	28,674	34,753	35,369	27,780	28,131	22,635	22,850	18,762	18,901	15,787	15,881
	1-4x10	36,584	44,190	45,008	35,358	35,823	28,827	29,112	23,904	24,089	20,119	20,244
	2-4x6	43,505	53,051	53,917	42,332	42,827	34,455	34,759	28,539	28,736	24,001	24,135
	1-4x12	44,494	53,745	54,739	43,003	43,569	35,060	35,406	29,073	29,297	24,469	24,621
	2-4x8	57,348	69,507	70,738	55,559	56,261	45,270	45,700	37,524	37,803	31,573	31,762
6-Inch Wall	1-2x6	9,323	21,664	23,081	18,361	19,191	15,518	16,019	13,171	13,487	11,260	11,468
	1-3x6	15,538	36,106	38,469	30,602	31,984	25,864	26,698	21,951	22,478	18,766	19,114
	1-4x6	20,510	51,202	54,414	43,254	45,123	36,477	37,603	30,914	31,625	26,404	26,873
	1-6x6	22,688	53,586	60,535	49,088	54,147	44,192	47,672	39,302	41,637	34,735	36,307
	1-6x8	29,906	70,636	79,796	64,707	71,376	58,253	62,840	51,807	54,886	45,787	47,859
	1-6x10	38,156	90,122	101,809	82,557	91,066	74,323	80,176	66,098	70,027	58,418	61,061
	1-6x12	46,406	109,608	123,822	100,408	110,756	90,393	97,511	80,390	85,167	71,049	74,264

Column Perpendicular and Parallel to Grain Capacities for Southern Pine (Multiple 2x Sizes)

Framing	Lumber Size (Each Side of ATS Rod)	Perp. To Grain, $P_{c\perp}$	Parallel to Grain, P_c Lbs.									
			Plate Height (ft)									
			8		9		10		11		12	
			(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)
4-Inch Wall	1-2x4	5,933	6,810	6,921	5,434	5,497	4,422	4,461	3,663	3,688	3,081	3,098
	2-2x4	11,865	13,620	13,842	10,867	10,994	8,845	8,923	7,326	7,377	6,161	6,195
	3-2x4	17,798	20,430	20,762	16,301	16,491	13,267	13,384	10,989	11,065	9,242	9,293
	4-2x4	23,730	27,240	27,683	21,734	21,988	17,690	17,845	14,652	14,753	12,322	12,391
	5-2x4	29,663	34,050	34,604	27,168	27,485	22,112	22,307	18,315	18,442	15,403	15,488
	6-2x4	35,595	40,860	41,525	32,602	32,982	26,534	26,768	21,978	22,130	18,483	18,586
	7-2x4	41,528	47,670	48,445	38,035	38,479	30,957	31,229	25,641	25,818	21,564	21,684
	8-2x4	47,460	54,480	55,366	43,469	43,976	35,379	35,691	29,304	29,506	24,644	24,781
	9-2x4	53,393	61,289	62,287	48,902	49,473	39,802	40,152	32,967	33,195	27,725	27,879
6-Inch Wall	1-2x6	9,323	21,664	23,081	18,361	19,191	15,518	16,019	13,171	13,487	11,260	11,468
	2-2x6	18,645	43,327	46,163	36,722	38,381	31,036	32,038	26,341	26,973	22,520	22,936
	3-2x6	27,968	64,991	69,244	55,083	57,572	46,554	48,057	39,512	40,460	33,779	34,404
	4-2x6	37,290	86,654	92,326	73,444	76,763	62,073	64,076	52,682	53,946	45,039	45,872
	5-2x6	46,613	108,318	115,407	91,805	95,953	77,591	80,095	65,853	67,433	56,299	57,341
	6-2x6	55,935	129,982	138,489	110,166	115,144	93,109	96,114	79,023	80,919	67,559	68,809
	7-2x6	65,258	151,645	161,570	128,527	134,334	108,627	112,132	92,194	94,406	78,819	80,277

1. See Compression Members: General Notes page 35 for additional information.
2. Shaded columns are limited by Parallel to Grain loads.

Refer to the ATS Selector software for alternate grade capacities.

COMPRESSION MEMBER SELECTION

SIMPSON Strong-Tie®

Column Perpendicular and Parallel to Grain Capacities for Parallam (PSL) with Douglas Fir Sill Plate

Framing	Lumber Size (Each Side of ATS Rod)	Perp. To Grain, $P_{c\perp}$	Parallel to Grain, P_c Lbs.									
			Plate Height (ft)									
			8		9		10		11		12	
			(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)
4-Inch Wall	1-3 1/2x3 1/2	15,313	26,249	26,513	20,779	20,922	16,819	16,904	13,876	13,930	11,636	11,672
	1-3 1/2x5 1/4	22,969	39,373	39,770	31,168	31,383	25,229	25,357	20,815	20,896	17,454	17,508
	1-3 1/2x7	30,625	52,498	53,027	41,558	41,845	33,638	33,809	27,753	27,861	23,272	23,344
6-Inch Wall	1-5 1/4x3 1/2	22,969	78,618	82,323	65,105	66,934	53,972	54,960	45,149	45,729	38,189	38,555
	1-5 1/4x5 1/4	34,453	117,926	123,484	97,657	100,401	80,957	82,439	67,723	68,594	57,284	57,832
	1-5 1/4x7	45,938	157,235	164,646	130,210	133,868	107,943	109,919	90,297	91,459	76,378	77,109

Column Perpendicular and Parallel to Grain Capacities for Parallam (PSL) with Southern Pine Sill Plate

Framing	Lumber Size (Each Side of ATS Rod)	Perp. To Grain, $P_{c\perp}$	Parallel to Grain, P_c Lbs.									
			Plate Height (ft)									
			8		9		10		11		12	
			(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)
4-Inch Wall	1-3 1/2x3 1/2	13,843	26,249	26,513	20,779	20,922	16,819	16,904	13,876	13,930	11,636	11,672
	1-3 1/2x5 1/4	20,764	39,373	39,770	31,168	31,383	25,229	25,357	20,815	20,896	17,454	17,508
	1-3 1/2x7	27,685	52,498	53,027	41,558	41,845	33,638	33,809	27,753	27,861	23,272	23,344
6-Inch Wall	1-5 1/4x3 1/2	20,764	78,618	82,323	65,105	66,934	53,972	54,960	45,149	45,729	38,189	38,555
	1-5 1/4x5 1/4	31,146	117,926	123,484	97,657	100,401	80,957	82,439	67,723	68,594	57,284	57,832
	1-5 1/4x7	41,528	157,235	164,646	130,210	133,868	107,943	109,919	90,297	91,459	76,378	77,109

1. See Compression Members: General Notes page 35 for additional information.
2. PSL Grade = 1.8E with Fc=2500 psi.
3. $F_{c\ perp}$=565 psi for Southern Pine and $F_{c\ perp}$=625 psi for Douglas-Fir Larch
4. Shaded columns are limited by Parallel to Grain loads.

Refer to the ATS Selector software for alternate grade capacities.

COMPRESSION MEMBER SELECTION

SIMPSON Strong-Tie®

Column Perpendicular and Parallel to Grain Capacities for Timberstrand (LSL) with Douglas Fir Larch Sill Plate

Framing	Lumber Size (Each Side of ATS Rod)	Perp. To Grain, $P_{c\perp}$	Parallel to Grain, P_c Lbs.									
			Plate Height (ft)									
			8		9		10		11		12	
			(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)
4-Inch Wall	1-3 1/2x3 1/2	15,313	18,582	18,870	14,809	14,960	12,032	12,120	9,950	10,005	8,356	8,392
	1-3 1/2x5 1/4	22,969	27,872	28,305	22,213	22,440	18,048	18,180	14,925	15,007	12,534	12,588
	1-3 1/2x7	30,625	37,163	37,740	29,618	29,920	24,064	24,239	19,900	20,009	16,713	16,784
6-Inch Wall	1-5 1/4x3 1/2	22,969	51,443	55,521	44,270	46,392	37,512	38,644	31,766	32,413	27,064	27,460
	1-5 1/4x5 1/4	34,453	77,164	83,281	66,405	69,588	56,268	57,966	47,649	48,619	40,596	41,191
	1-5 1/4x7	45,938	102,886	111,041	88,540	92,784	75,024	77,288	63,532	64,826	54,128	54,921

Column Perpendicular and Parallel to Grain Capacities for Timberstrand (LSL) with Southern Pine Sill Plate

Framing	Lumber Size (Each Side of ATS Rod)	Perp. To Grain, $P_{c\perp}$	Parallel to Grain, P_c Lbs.									
			Plate Height (ft)									
			8		9		10		11		12	
			(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)	(133)	(160)
4-Inch Wall	1-3 1/2x3 1/2	13,843	18,582	18,870	14,809	14,960	12,032	12,120	9,950	10,005	8,356	8,392
	1-3 1/2x5 1/4	20,764	27,872	28,305	22,213	22,440	18,048	18,180	14,925	15,007	12,534	12,588
	1-3 1/2x7	27,685	37,163	37,740	29,618	29,920	24,064	24,239	19,900	20,009	16,713	16,784
6-Inch Wall	1-5 1/4x3 1/2	20,764	51,443	55,521	44,270	46,392	37,512	38,644	31,766	32,413	27,064	27,460
	1-5 1/4x5 1/4	31,146	77,164	83,281	66,405	69,588	56,268	57,966	47,649	48,619	40,596	41,191
	1-5 1/4x7	41,528	102,886	111,041	88,540	92,784	75,024	77,288	63,532	64,826	54,128	54,921

1. See Compression Members: General Notes page 35 for additional information.
2. LSL Grade = 1.3E with Fc=1400 psi.
3. $F_{c\ perp}$=565 psi for Southern Pine and $F_{c\ perp}$=625 psi for Douglas-Fir Larch
4. Shaded columns are limited by Parallel to Grain loads.

Refer to the ATS Selector software for alternate grade capacities.

NOTES

NOTES

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Fax: 209/234-3868

Southwest USA
260 N. Palm Street
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