

## LOG TECH NOTE 02-02

### **Fasteners for Log Homes**

You have looked at a number of log home companies. Each uses a different fastening system to attach their logs. Each has told you that theirs is better. Well, guess what? They all work. Buying from a Log Homes Council member company assures you that each fastening system has been engineered and designed to ensure structurally sound home construction.

One may ask why the fastening system is so critical. There are many reasons why a company has selected their particular system and why that system is best for their log wall system. Factors include alignment of logs, management of settling due to seasoning and/or compression, length of logs, corner detail, and others, not to mention resistance of lateral load in order to meet seismic and wind design/code criteria. It is very important that you follow the log home manufacturer's specifications regarding both installation and fastener spacing. Spacing of fasteners will vary depending on the system used, and it is possible that attention must be paid to insure that one fastener is never on top of another.

The codes and standards governing wood construction specify requirements for installation of various fasteners (e.g., minimum length of fastener in the log holding the point, drilling lead holes, edge and end distances, etc.). These requirements are addressed when a fastening system is applied to the log wall system, with lead holes either pre-drilled by the manufacturer or by the builder at the jobsite.

Please check with the log home manufacturer for engineering and technical specifications. This information will be available in the company's construction manual and/or in the construction plan set. Most companies include the fasteners in your log home package.

**SPIKE** – Spikes are the largest size of nails, usually 3/16" to 3/8" in diameter. They can come in lengths anywhere from 3" to 12". Different kinds of spikes are available, including smooth shank, spiral shank, and ring shank. Most spikes are made of steel, but aluminum screw shank nails are also used.

Driven into the log, the spike head is set below the log surface by using a ballpeen hammer or pieces of rebar.

**LAG SCREW** – Lag screws are simply pointed bolts. They will come in varying diameters; 3/8" is the most popular, but they are also available in 1/4", 5/16", and 1/2" as well.

Lag screws also need to be installed in pre-drilled holes in the logs (NDS). Counter-boring allows the lag head and washer (recommended) to be recessed below the surface of the log.

**THROUGH BOLTS** - Through bolts are exactly as it sounds -- a threaded rod that runs down through the entire wall system. Bolt diameters range from 1/2" to 1-1/2". For easier wall assembly, shorter lengths of bolt are typically joined with threaded couplings to attain the required wall height. The top of the bolt assembly is often threaded so that a washer and nut can be tightened down over the bolt and atop the last log course. The bolts are often located near the ends of walls, at openings, and otherwise commonly spaced from 4 to 8 feet on center. The logs are typically pre-drilled in compliance with the NDS.

There is a level of maintenance on the homeowners' part to tighten these bolts regularly during the first year or two in the home. The log home manufacturer will determine how often this would need to be done. Through bolts can also be used in conjunction with 1000# tension springs to aid in the settling of a log home and reduce the need for the homeowner to tighten the bolting system.

**THREADED LOG HOME SCREW** – Introduced to the log home industry in 1995, these screws use advanced technology to self-drill and countersink their head in order to reduce installation time. Dense wood species may still require pre-drilling.

Although smaller in diameter than other fasteners, most are heat-treated for equal or greater strength. They are available in lengths from 2-1/2" to 16". Check with the screw manufacturer for all engineering and technical data.

**DRIFT PINS** – Used in stacked log wall systems to resist lateral loads parallel to the axis of the log, pins are typically galvanized pipe or rebar that are set in predrilled holes with a minimum of 5" embedded into the log below. In high seismic areas, the pins can be as close as 8" on center, but are typically placed at 4' centers and at each side of cut openings where they can also assist in preventing rollout.

**WOOD DOWELS** – Dowels, usually of hardwood (oak), may be used to peg a log wall to hold corners, limit twisting, or prevent logs from shifting out of alignment as the logs are set. Different types of wood pegs, pins, and dowels used for reinforcement are well established in our log building heritage.

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Developed for the Log Homes Council by Bill Moffatt, Olympic Fasteners and Rob Pickett, RobPickett & Associates. Published by the Technical Committee of the Log Homes Council, Building Systems Councils, National Association of Home Builders, ©2003.

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