

# Fire Engineering®

## Parallel Strand Lumber

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Most ordinary sawn lumber today comes from tree farms or second-growth timber. If boards or beams can be found that are longer than 16 feet, they are often not straight enough or strong enough to use for floor joists, rafters, or load-bearing studs. Parallel-Strand Lumber (PSL) is one of the types of engineered or manufactured wood that was developed in the late 20<sup>th</sup> century. PSLs are usually used in wood-framed construction for girders to support smaller beams of laminated veneer lumber (LVL), wood trusses, or wood I-beams. PSL columns are also available.

PSLs are made of long, thin strips of wood (usually Douglas fir or hemlock) that are coated with high-strength waterproof resin glue; aligned so that the strips are parallel; formed into large billets that are pressed to their proper thickness; and heated to cure the glue. One manufacturer uses microwaves to cure the PSL instead of heat from conventional fuel. The billets of PSL are then sawn to form beams in the same dimensions as those sawn from logs. The result is straight, stable beams that can be purchased in lengths as long as 44 feet. These are of uniform strength and density throughout. The manufacturing process reduces the waste from each log to less than 1/3 of its volume.

Photo 1 is a view of the end, edge, and face of a 2 x 8 PSL. It shows the parallel alignment of the strands in the end, the parallel alignment of the strands in the edge, and the shape of the strands on the face.



Photo 2 (below) shows a 40-foot PSL girder supporting the end of a PSL beam in a galvanized steel stirrup. This beam supports a laminated veneer lumber (LVL) joist on one side and several doubled wood I-beams on the other in galvanized steel joist hangers. Both stirrups and joist hangers are attached with nails. This framing will support a plywood deck, and a radiant heat floor panel embedded in lightweight concrete topped with ceramic tile.

PSLs are advertised to be straighter and stronger than either sawn lumber or laminated veneer lumber of the same dimensions. One manufacturer's engineering tables show PSLs of standard sizes supporting clear spans of 44 feet. They are available with coatings or pressure treatment to make them moisture, fungus, and insect resistant, for use in locations exposed to weather.



One manufacturer will allow holes to be cut horizontally through PSL girders and beams only if they are in the center 1/3 of the vertical dimension and only in the center 1/3 of the span. Only round holes are allowed. If there are multiple holes, they must be spaced so that there is at least twice the diameter of the largest hole between them. Square or rectangular holes or edge notches are not allowed.

One manufacturer's warranty for PSLs is for the life of the structure provided that they are installed properly; that they are not exposed to weather; and that they are kept dry. If they are pressure-treated and exposed to the weather, the warranty is for 30 years.

Use of parallel-strand lumber in new buildings and in remodeling should be noted by firefighters. They allow longer clear spans than other types of wood beams and girders, and are used to support lightweight components like wood trusses and wood I-beams. Like any wood product, they can be weakened and rot from constant or repeated exposure to moisture. Like any manufactured wood product, they can be weakened and burn in a fire, especially if the wood strands on the surface are loosened by the heat.

An internet search for "PSL beams" or "Parallel Strand Lumber" will provide detailed information from manufacturers and research organizations. Also, visit the Engineered Wood Association (formerly the American Plywood Association) Web site at <http://www.apawood.org>

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