



PACIFIC LUMBER INSPECTION BUREAU

WEST COAST LUMBER INSPECTION BUREAU • AMERICAN INSTITUTE OF TIMBER CONSTRUCTION

TECHNICAL NOTE – MACHINE STRESS-RATED LUMBER

A brief summary of the manufacturing process and how it compares to visually graded lumber

Machine stress-rated (MSR) lumber is structural lumber that has been sorted by a machine that non-destructively measures one or more mechanical properties which are then related to other structural properties. Visual overrides are applied to the final product and daily quality control is performed as part of the manufacturing process. MSR lumber was first produced in the 1960s.

In structural applications, MSR lumber is an appropriate substitute for visually graded lumber when the design values are equal to, or greater than, corresponding design values for the visual grade it is compared to.

The following table compares design values of three sets of 2 x 4 and 2 x 6 species/grade combinations. MSR lumber grades may be produced for any softwood species.

Species	Grade	Nom. Width	Fb, psi	Ft, psi	Fc, psi	E, psi
MSR ¹	1350f-1.4E	4"	1,350	750	1,600	1,400,000
SPF	No. 1/No. 2	4"	1,313	675	1,323	1,400,000
SYP	No. 2	4"	1,100	675	1,450	1,400,000
MSR ¹	1200f-1.4E	6"	1,200	600	1,400	1,400,000
SPF	No. 1/No. 2	6"	1,138	585	1,265	1,400,000
SYP	No. 2	6"	1,000	600	1,400	1,400,000

¹ MSR lumber grades are not species or species group specific.

The Modulus of elasticity (E) is the most common property that is measured and used to sort MSR lumber. Once the piece is evaluated by the machine, it is typically marked with a paint color that corresponds to a specific E classification based on the MSR lumber grade(s) being produced. As a final step in the evaluation process, each piece is visually graded for edge knots and non-strength reducing characteristics according to the Standard Grading Rules No. 17, paragraph 206.

Each species, size, and grade of MSR lumber produced using Standard Grading Rules No. 17, paragraph 206 is qualified by testing a minimum of 106 pieces, with a minimum of 53 pieces tested in both edge bending and full-size tension. Approval is based on the pieces meeting specific stiffness (E) values as well as bending (Fb) and tension (Ft) strength requirements. Each qualified grade of MSR lumber is subject to daily quality control testing to verify that at least one strength property and the E meet the performance requirements of the MSR lumber grade on the stamp. Since each piece has been non-destructively measured and sorted, the assigned coefficient of variation (COV) for E is lower than lumber that has only been visually graded.

Contact one of our offices for additional information about MSR lumber.

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