

AMERICAN LUMBER STANDARD COMMITTEE, INCORPORATED®

MACHINE GRADED LUMBER POLICY November 15, 2019

A) General

- 1) The Board of Review is authorized to determine the competency, reliability and adequacy of agencies that apply for accreditation as an agency to supervise machine grading of lumber products.
- 2) The Board is also authorized to monitor the proficiency of accredited agency's supervision of the machine grading of lumber products where such products are grade stamped as conforming to the American Lumber Standard.
- 3) In its monitoring of agency supervision of machine grading of lumber, the Board is authorized to utilize appropriate and recognized test procedures and criteria in determining that specific machines and methods of machine graded lumber products are in compliance with:
 - a) approved grading rules;
 - b) product standards; and
 - c) grade stamp requirements
- 4) The Board is authorized to require an agency, which does not employ staff technicians, to utilize services of consultants satisfactory to the Board for the purpose of verifying compliance to this policy.
- 5) The Board may employ consultants to review evidence and data submitted pertaining to this policy.
- 6) All consultants' expenses shall be borne by the applicant agency.

B) Machine Approval

The American Lumber Standard Committee (ALSC) has established the following criteria for approval of machines used for machine grading:

- 1) An applicant agency shall provide the Board with an explanation of the type of machine(s) for which approval is desired and shall include a general description of the theoretical and practical basis on which the machine(s) operate(s).

- 2) An applicant agency shall provide the Board with evidence that the machine(s) is capable of measuring the physical or mechanical property used by the machine for the classification or segregation of lumber. The evidence provided shall include determination of measurement accuracy, including appropriate statistical analysis, relative to an accepted consensus standard. The report shall provide information listing the manufacturer's recommended operational limits including information on machine measurement repeatability, variability, and recommended limits for the machine environment such as temperature, operational speed, and humidity, as well as lumber conditions such as temperature, moisture content, warp, etc.

C) Agency Accreditation

The American Lumber Standard Committee has established the following criteria for accreditation of an agency to conduct an on-going quality control and grade stamping program for machine graded lumber:

- 1) All agencies shall provide ALSC with certification and quality control procedures to be utilized in authorizing mills to grade stamp machine graded lumber.
- 2) Non-rules-writing agencies shall utilize qualification and in-plant quality control procedures that provide product performance at least equivalent to the requirements of rule-writing agencies.

Note: This may be demonstrated through a documented comparison of qualification and quality control procedures using standard statistical methodology and analysis.

- 3) Rules-writing and non-rules-writing agencies shall conduct a minimum of 12 inspections per year, at approximately monthly intervals, of the visual grading accuracy of grade stamped machine graded lumber at each mill or facility under its supervision. When a mill or facility is inactive for at least one month, an inspection shall be required for each month the mill or facility is actively producing machine graded lumber.
- 4) Rules-writing and non-rules-writing agencies shall review the mill or facility quality control records as part of the inspection. The agency inspection reports shall note any deficiencies found and corrective actions taken.
- 5) Rules-writing and non-rules-writing agencies shall require in-plant test records to be retained for at least one year.

- 6) Rules-writing and non-rules-writing agencies shall provide for regrading of lumber when production lots are rejected as a result of the in-plant quality control process.
- 7) Rules-writing and non-rules-writing agencies shall require periodic, at least monthly, calibration of in-plant test equipment by mill or facility personnel, and third party calibration (NIST traceable) at least annually.
- 8) Grade marks on machine graded lumber shall be distinguishable from grade marks of visually graded lumber. Facsimiles of marks shall be on file with the Board of Review.
- 9) Rules-writing agencies shall provide re-inspection procedures for machine graded lumber.

D) Qualification Procedures of a Mill or Facility by the Agency

- 1) Prior to qualification of a machine grade, the agency shall verify that:
 - a) The mill or facility is using an ALSC approved grading machine; and
 - b) The in-plant grading process (combined machine and visual) is capable of producing lumber grades which meet all of the requirements stipulated in the applicable grade rules, product standards or equivalent procedures.
- 2) Agency qualification of a machine grade(s) shall verify that the qualification sample for the grade being qualified meets the following minimum criteria:
 - a) Visual: All pieces in the qualification sample meet the visual requirements of the applicable grading rule.
 - b) For MSR:
 - i) Average edge modulus of elasticity (MOE) equal to or greater than the assigned average E;
 - ii) 95% of pieces have edge MOE greater than 82% of assigned average E;
 - iii) 95% of pieces have a modulus of rupture (MOR) greater than 2.1 times the assigned F_b .
 - c) For MEL:
 - i) Average edge MOE equal to or greater than the assigned average E;
 - ii) 95% of pieces have an edge MOE greater than 75% of assigned average E;
 - iii) 95% of pieces have a MOR greater than 2.1 times the assigned F_b ;

- iv) 95% of pieces have an ultimate tensile strength (UTS) greater than 2.1 times the assigned F_t .

E) Agency Requirements for Mill Quality Control

The agency shall require that mills or facilities which grade machine graded lumber conduct daily quality control of the machine graded output. As a minimum, the quality control procedures shall include the following components:

- 1) Offline measurement of MOE;
- 2) Offline strength testing to verify assigned F_b and /or F_t . Testing may be conducted by proof testing using appropriate proof loading equipment. Proof loading equipment is defined as equipment capable of imposing a stress on the test specimen of at least 2.1 times the assigned property value.

Note: This requirement may be waived for MSR mills manufacturing lumber from a clearly identified uniform timber resource (from a definable and sampled timber source).

- 3) Verification of daily test results to the quality control requirements established by the agency.
- 4) Procedures for regrading of lumber identified by the quality control procedures as non-conforming with the grade specifications.
- 5) All agencies shall conduct periodic physical tests of at least one grade, one size and one species to check lumber output criteria specified in D) 2). Semi-annual tests are deemed adequate where CUSUM quality control is used. For machine stress rated lumber, lumber is tested for both MOE and MOR on edge or MOE and UTS. For mechanically evaluated lumber, lumber is tested for MOE and MOR as well as UTS.

F) Residual Production

- 1) Residual lumber is lumber which has passed through the machine grading process and was rejected from the minimum selection criteria for the lowest machine grade being produced.
- 2) Residual lumber may be placed in the highest visual grade for which it qualifies, provided that the design values assigned to the visual grade meets the following condition:

- a) MSR and MEL residual – Fiber stress in bending (F_b) of visual grade is lower than F_b assigned to the machine grade from which the piece was rejected.
- 3) Residual lumber products shall be grade stamped at the production site in accordance with existing ALS provisions or, if shipped not grade stamped, marked in a fashion to indicate the lumber has been passed through machine grading equipment.

G) ALSC Monitoring of Agencies

The American Lumber Standard Committee has established the following policies for the Board in carrying out its responsibility to monitor agencies for the supervision of the machine grading of lumber:

- 1) ALSC may inspect grade stamped machine graded lumber to determine if it meets visual grade requirements.
- 2) ALSC may review mill or facility records to determine if producers are maintaining records required by their agencies.
- 3) ALSC may review agency records to determine if monthly inspections are being performed.
- 4) ALSC may require physical tests to be performed on already grade stamped machine graded lumber production if there is reason to believe an agency's on-going procedures are not resulting in conformance of lumber output to the criteria specified in grade certification. ANSI/ASQC Z1.4 Standard may be used as a guide for sampling procedures.