CANADIAN LUMBER STANDARDS ACCREDITATION BOARD

REGULATIONS

Effective
January 15, 2026

These Regulations are issued under authority of the Directors of the Canadian Lumber Standards Accreditation Board (CLSAB)

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for the Regulations of the
Canadian Lumber Standards Accreditation Board

1.0 **INTERPRETATION**

1.1 These Regulations, in accordance with the By-laws, apply to:

1.1.1 the accreditation or de-accreditation of Agencies;

1.1.2 the approval or disapproval of grading rules and/or product standards utilized by accredited Agencies; and

1.2 These Regulations establish the procedures to be followed by:

1.2.1 CLSAB in assuring conformance by accredited Agencies with the various accreditation requirements contained herein;

1.2.2 accredited Agencies in assuring conformance to the requirements for the Classes of Accreditation contained herein; and

1.2.3 accredited Agencies in assuring conformance by their Members to the Agency's Grade Stamp License Agreement.

1.3 Unless otherwise defined in these Regulations, all terms defined in the By-laws shall be incorporated in and form part of these Regulations.

1.4 The following words, when used herein, shall have the following meanings:

"**Agency**"	means a lumber grading agency accredited by the CLSAB pursuant to these regulations;
"**Board**"	means the Board of Directors of CLSAB;
"**By-law**"	means the By-laws of CLSAB, as may be amended from time to time;
"**CSA O-141**"	means the latest edition of CAN/CSA O-141;
"**CLSAB**"	means the Canadian Lumber Standards Accreditation Board, and any action to be taken by the CLSAB herein, shall be effective if taken by the President & CEO;
President & CEO	means the President & Chief Executive Officer (CEO) of CLSAB, as appointed from time to time, or any person or body corporate authorized by the Chairman of the Members, the Board or the President & CEO to fulfill the obligations, or assume the responsibilities of the President & CEO;
"**grade stamping**"	means the identification of lumber by an approved certification mark;
"**HT**"	Heat Treated - means to a minimum core temperature of 56^{o}C for a minimum of 30 minutes;
"**item**"	means consisting of a grade and size, without reference to lengths;
"**NLGA**"	means the National Lumber Grades Authority, as such organization may be constituted from time to time;

1.5 The following schedules are attached to these regulations and incorporated for reference and form a part of these regulations:

Schedule A	CLSAB Policy for Product Standards Approval

Schedule B	CLSAB Policy for Lumber Grading Machine Approval
Schedule C	CLSAB Policy for Grading Agency Verification of Heat Chambers
Schedule D	CLSAB “KD-HT” Check List
Schedule E	CLSAB Policy for Grading Agency Verification of Kiln Drying Chambers for Option 1
Schedule F	CLSAB “KD-HT” Check List for Option 1
Schedule G	CLSAB Policy for the approval of Moisture Content Correction Factors for Temperature and Species that were developed using a “Resistance-Type” Meter with Insulated Pins
Schedule H	CLSAB Policy for Grading Agency Verification of Kiln Drying Chambers using Wood Core Probes

1.6 Words importing the singular include the plural and vice versa, and words importing gender include all genders, unless the context otherwise requires.

1.7 Should the period of time permitted under these regulations to perform any obligation or take any action required by these regulations terminate on a Sunday or a holiday, then such period shall be extended to the next day.

2.0 GRADING RULES, PRODUCT STANDARDS AND/OR CORRECTION FACTORS FOR TEMPERATURE AND SPECIES APPROVAL REQUIREMENTS

2.1 Where an accredited Agency wishes to use grading rules or product standards under the CLSAB accreditation procedures, the rules or standards shall first be approved by the CLSAB. Supplements or revisions to approved grading rules and/or product standards shall not take effect until approved by the CLSAB. Grading rules and product standards, including supplements or revisions may be submitted for approval by any CLSAB accredited Agency on behalf of the rules-writing or standards-writing organization.

2.2 Grading rules and/or product standards submitted for approval shall conform to or exceed the requirements of the CLSAB, CSA O-141, and the National Grading Rule unless specific to an approved grading rule and/or standard where CLSAB recognition is required for export. If the Board in its review finds the rules and/or product standards do not conform, the deficiencies therein shall be called to the attention of the applicant, who shall be afforded the opportunity of either amending the rules and/or product standards so that they do comply, or if dissatisfied with the decision of the Board, request a hearing.

2.3 The Board shall not approve grading rules and/or product standards for any species in any region if approved and published rules and/or product standards are adequate and already fully and fairly available to all Agencies, facilities, producers, distributors and consumers of such lumber on equal terms and conditions without discrimination.

2.4 Any Agency submitting, for consideration by CLSAB, grading rules, product standards, supplements or revisions, must submit such documents to the CLSAB office at least thirty (30) calendar days prior to a scheduled meeting of the Board. CLSAB shall advise all accredited Agencies of the Board meeting at least forty-five (45) calendar days prior to the meeting. Where it is deemed appropriate, approval of grading rules, product standards, supplements or revisions thereto may be undertaken by unanimous written resolution of the Directors.

2.5 Grading rules and/or product standards shall include provisions for reinspection.

2.6 The publisher of grading rules and/or product standards shall agree that all rules and/or standards approved by the Board bear specific reference as having been approved by CLSAB.

2.7 The publisher of grading rules and/or product standards may to the extent allowed by law

agree to permit reprinting of the approved grading rules and/or product standards with or without charge by anyone desiring to do so in whole or in part, including all applicable provisions with all quoted sections clearly indicated, provided such publication makes reference to the source of the rules and/or product standards and their effective date and the date of any revision.

2.8 Technical data included in grading rules and/or product standards may be subject to verification by such means as shall be determined by the Directors. Expenses incurred by CLSAB to have the technical data verified shall be the responsibility of the organization making submission.

2.9 The publisher of the CLSAB approved grading rules and/or product standards shall ensure that the grading rules and/or product standards are made fully and fairly available to all Agencies, facilities, distributors, users and consumers of lumber on equal terms and conditions and without discrimination.

2.10 Schedule "A" to these Regulations makes reference to the "CLSAB Policy for Product Standards Approval." This policy, as amended from time to time, forms part of these Regulations.

2.11 No grading system (either manual or machine-based) shall be designed, calibrated or administered in such a fashion that off-grade or excess moisture pieces will be intentionally included as on-grade pieces or as meeting the moisture requirements.

2.12 Schedule “G” to these Regulations makes reference to the “CLSAB Policy for the approval of Moisture Content Correction Factors for Temperature and Species that were developed using a “Resistance-Type” Meter with Insulated Pins.” This policy, as amended from time to time, forms part of these Regulations.

3.0 ACCREDITATION REQUIREMENTS FOR LUMBER GRADING AGENCIES

3.1 General

The initial and continuing accreditation of an Agency to provide lumber inspection services as a Member of the CLSAB shall be contingent upon the Agency providing competent, reliable, and adequate inspection services in compliance with these Regulations, the By-laws, and CSA O-141, and ISO/IEC 17065. It is implicit in the accreditation requirements for all Agencies, that they demonstrate organizational capabilities to operate and maintain bona fide grade stamping services for the class(es) of accreditation applied for.

3.2 Eligibility

Any Agency which maintains inspection services covering the various softwood and/or hardwood lumber species and is able to demonstrate compliance with the requirements for accreditation as provided in these Regulations may apply for accreditation. In making such application, the Agency shall agree to abide by the criteria, procedures and requirements established by the Canadian Lumber Standards Accreditation Board as specified in these Regulations and as amended from time to time by the Board.

3.2.1 The Agency shall not be controlled by any person or facility whose products are subject to its inspections and/or certification; nor shall its' inspectors be employed by any such entities or any lumber manufacturers, heat treatment facilities, wood packaging heat treatment facilities, wood packaging facilities providing heat treated lumber, custom kilns, manufactured home producers, planer mills, re-manufacturing facilities, brokers, shippers, facilities consolidating heat treated wood products, buyers, or wholesalers. The Agency shall not engage in any other undertakings which may conflict with their independent position as an inspection Agency.

3.2.2 The Agency shall have a Certification Mark duly registered in accordance with the Trademarks Act of Canada.

3.2.3 Whether an Agency operates on a "Profit" or "Not for Profit" basis shall not be a consideration for the purpose of determining eligibility to apply for accreditation.

3.3 Classes of Accreditation

An Agency may apply to be accredited to supervise and grade stamp in one or more of the following classes:

3.3.1 visually graded lumber
3.3.2 agency certified lumber
3.3.3 machine graded lumber (MSR/MEL)
3.3.4 fingerjoined lumber (FJ)
3.3.5 “HT” Programs - a heat treatment program
3.3.6 other special product standards (applicant agency to specify)
3.3.7 other programs where CLSAB has been provided the delegated authority to administer such programs

3.4 Application Requirements

3.4.1 An applicant requesting accreditation shall apply in writing to the President & CEO in such form as may from time to time be prescribed by the President & CEO. The application shall include detailed information sufficient to establish that the applicant meets the requirements contained in these Regulations, the By-laws and CSA O-141. The application shall also include the following information:

(a) the form and structure of organization making the application;
(b) the qualifications of the applicant's management and inspection staff;
(c) the monthly and/or annual volume of expected lumber grade stamped, and/or certified by the applicant;
(d) the species of lumber for which inspection services are offered;
(e) the facilities for which inspection, grade stamping, and/or certification services are offered;
(f) the facsimile of the registered certification mark for each class of accreditation being applied for;
(g) an agreement to pay all fees fixed or otherwise assessed by the CLSAB, and/or President & CEO including an agreement to provide a Bond or Letter of Credit in the amount fixed by the Board to be executed immediately upon accreditation;
(h) an agreement to pay all expenses incurred by CLSAB in processing the application; and
(i) a completed application for membership in the National Lumber Grades Authority.

3.4.2 An accredited Agency shall have the capability to keep appropriate records and to facilitate the inspection and certification of lumber by its inspection staff or its agents, and for the issuance of an Agency certificate as it pertains to a shipment, or for the grade stamping of the lumber so inspected and certified. Certification work shall be carried out by the accredited Agency's inspection staff or by competent lumber graders specifically designated and authorized by the Agency to act as their agent in performing certificate work.

3.4.3 Upon receipt, the application shall be reviewed by the President & CEO for compliance with these Regulations, the By-laws and CSA O-141. The applicant may at any point during the processing of the application be required to provide additional

information, material or clarification pertaining to the application.

3.4.4 In order to assess the application, the Board may require that the applicant attend a hearing and present evidence to demonstrate that the application for accreditation should be granted.

3.4.5 In order to assist the Board in assessing the application, the President & CEO may visit the applicant's office and prepare a report for the Board concerning that visit. The visit shall be arranged with the applicant and shall be scheduled during normal business hours of the applicant. A copy of the report shall be provided to the applicant.

3.4.6 When, in the opinion of the President & CEO, the application contains the required information, it shall be forwarded to the CLSAB Operations Committee.

3.4.7 If the CLSAB Operations Committee is satisfied the application contains the required information, it shall be forwarded to the Board with an appropriate recommendation. Such recommendation shall include a condition that the new member be on probation for one year.

3.4.8 The decision of the Directors shall be disclosed to the applicant in writing.

a) If the application is approved it shall contain a condition that the new member be on probation for one year or on such further conditions as a Review Panel could order pursuant to 14.9.1 to 14.9.7

b) In the event an application is declined, the reasons shall be divulged in writing to the applicant and the applicant may request:

(a) hearing before the Board to reconsider; or
(b) the opportunity to make a new application.

3.4.9 The Board shall determine its own process for any hearing held pursuant to section 3.4.8.2.(a) and the applicant shall pay all costs incurred by the Board associated with the holding of such a hearing.

3.5 **Agency Criteria**

The inspection services of an Agency shall include but are not necessarily restricted to the following minimum requirements.

3.5.1 The Agency's policies and procedures for inspection in the class of accreditation applied for shall conform to:
a) these Regulations, the By-laws, CSA-O141, applicable grading rules, and/or product standards, and/or
b) the CLSAB Operating Plan.

3.5.2 The Agency shall not be controlled by any facility or person whose own products are subject to its inspection and/or certification. The Agency shall not engage in any undertakings that may conflict with its independent position as an inspection Agency, nor shall its inspectors be under the employ, contract or agreement by lumber manufacturers (facilities) buyers, wholesalers or users.

3.5.3 The Agency shall preserve a bona fide lumber grade stamping service for each class of accreditation applied for and approved by the Board.

3.5.4 The Agency shall ensure consistent application of:

a) the applicable grading rules, product standards and interpretations, and/or
b) the CLSAB Operating Plan,
and shall preserve the integrity of its registered Certification Mark ("Logo").

3.5.5 The Agency shall maintain sufficient qualified staff to conduct inspections and other functions as may be prescribed in these Regulations. All changes to inspection staff shall be reported to the CLSAB President & CEO within fourteen (14) days.

3.5.6 The Agency inspection staff shall be under the direct control of a Chief Inspector, Manager or Supervisor who is thoroughly knowledgeable in:
a) the manufacture and grading of lumber, these Regulations, CSA-O141, applicable grading rules and/or product standards, and/or
b) the CLSAB Operating Plan,
and shall be held accountable for the appropriate supervision of inspection staff.

3.5.7 The Agency shall demonstrate to the satisfaction of the Board that its designated inspectors are fully qualified in the:
a) grading of lumber to the applicable grading rules and/or product standards and the species for which inspection services are being extended, and/or
b) CLSAB Operating Plan.

3.5.8 The Agency shall agree that at the sole discretion of the Board any member of its inspection staff may be tested at its cost to determine the extent of proficiency in the:
a) application of the applicable grading rules, product standards and interpretations, and/or
b) CLSAB Operating Plan.

3.5.9 The Agency shall require that when its grade stamp together with its registered Logo is placed upon a piece of lumber, each piece so grade stamped shall conform to the requirements of the applicable grading rules and/or product standard.

3.5.10 The Agency or its authorized representatives shall be capable of providing reinspection services in accordance with the provisions set forth in the applicable grading rules and/or product standards or phytosanitary treatment requirements.

3.5.11 The Agency shall enter into a Grade Stamping Licensing Agreement with any facility for which it is going to provide lumber inspection services. The Agency shall submit a copy of its Grade Stamping Licensing Agreement with the facility to CLSAB. The agency shall review its Grade Stamping Licensing Agreement(s) annually and report the results to the CLSAB in accordance with Section 3.5.25. The agreement shall contain provisions for, among other things:

(a) grader training and licensing program;
(b) a requirement that a licensed grader qualified for the program related to the lumber being produced on a shift be employed and present to monitor all production in the shift;
(c) warnings, suspensions, revocation and reinstatement which are satisfactory to CLSAB;
(d) giving CLSAB authority to check lumber wherever it may be located;
(e) giving authority to review the use of the Mark exercised in accordance with an Authorized Representation Agreement executed by CLSAB; and
(f) requiring the registered facility to lend assistance to and provide samples of production of grades and sizes of lumber produced to the NLGA or its Agent for the purpose of resource monitoring or in-grade testing as described in ASTM D-1990 or its successor document.

3.5.11.1 The Agency shall enter into a Licensing Agreement with any facility for

which it is going to provide oversight pursuant to the CLSAB Operating Plan. The Agency shall submit a copy of its Licensing Agreement with the facility to CLSAB. The agency shall review its Licensing Agreement(s) annually and report the results to the CLSAB in accordance with Section 3.5.25. The Licensing Agreement shall contain provisions for, among other things:

a) facility staff training program;
b) a requirement that staff qualified for the program related to the lumber being produced on a shift be employed and present to monitor all production in the shift;
c) warnings, suspensions, revocation and reinstatement which are satisfactory to CLSAB;
d) giving CLSAB authority to check lumber wherever it may be located.

3.5.12 The Agency shall provide reports as required by the Board. It shall immediately notify the Board of any violations of the Agency's agreement with the facility including the Agency's action in this regard.

3.5.13 CLSAB shall be authorized to inspect at: facilities; destination points; or at any other location,
a) lumber bearing Agency grade stamps or certificates in accordance with these Regulations and the applicable grading rules and/or product standards, and/or
b) material produced in accordance with the CLSAB Operating Plan.

3.5.14 The Agency shall cooperate fully by taking appropriate steps to eliminate or minimize a recurrence of improper labelling of lumber where requested by CLSAB.

3.5.14.1 The Agency shall cooperate fully by taking appropriate steps to eliminate or minimize non-conformance with the CLSAB Operating Plan.

3.5.15 The Agency's policies and procedures shall clearly define the course of action for the withdrawal of:
a) grade stamping privileges and disciplinary actions as amended from time to time, and/or
b) oversight for the CLSAB Operating Plan
including among other things:

i) Warnings;
ii) Suspension;
iii) Termination;
iv) Reinstatement.

3.5.16 The Agency shall perform a minimum of twelve (12) inspections per calendar year at approximately monthly intervals at each facility for each class of accreditation for which the facility is registered. When a facility is not operating or when grade stamped lumber is not available for inspection, the Agency shall maintain on file a nil inspection report for each class of accreditation for which the facility is registered. For facilities which have three (3) consecutive nil (not operating) or attempted inspections (product not available), the Agency shall have on file evidence that it reviewed at least every three (3) months:
a) the grading rules with the qualified grader(s), and/or
b) the CLSAB Operating Plan.
Exceptions to the minimum of twelve (12) inspections per calendar year at approximately monthly intervals at each facility for each class of accreditation for which the facility is registered are as follows:

3.5.16.1 The Agency shall perform a minimum of four (4) inspections per calendar year at approximately quarterly intervals at each Broker, Shipper or Wholesaler that is registered as a shipper in the HT Program and/or Canadian Debarking Program and/or Canadian Sawn Wood Certification Program providing that the Broker, Shipper or Wholesaler does not mark or re-grade mark or certify the compliance with KD-HT, HT and/or ISPM No. 15 treatment programs, and is only consolidating individual certificates provided to them.

3.5.16.2 The Agency shall perform inspections of facilities that do not possess heat treating capabilities and do not stamp HT and only handle heat-treated wood products, or produce ISPM 15 compliant Wood Packaging Material, a minimum of six (6) times per calendar year at approximately bi-monthly (every two months) intervals.

3.5.16.3 The Agency may perform a minimum of six (6) inspections per calendar year at approximately bi-monthly (every two months) intervals at each portable sawmill facility issued grade stamps that:

a) has been registered and producing lumber for at least six (6) months,
b) produces less than 75,000 FBM of lumber/year,
c) submits monthly production data to their Agency for review and verification, and
d) notifies the Agency in a timely manner when grade stamping, to permit inspection by the agency on site or at destination.

3.5.17 The Agency shall provide reports at such times as CLSAB deems necessary, including, among other things, report of re-inspections of the Agency's grade stamped lumber including all pertinent information.

3.5.18 The Agency shall maintain for a period of at least six (6) years records of all inspections made, including nil and attempted reports, copies of all certificates and reports from all inspectors. These records shall be made available to authorized representatives of CLSAB for examination at any time during normal business hours. In the case of the CLSAB Operating Plan, records shall be maintained for a period of at least two (2) years.

3.5.19 The Agency shall submit to CLSAB on a quarterly basis, a performance summary report of its inspection results of its member facilities for that quarter, including:

(a) Quantity inspected;
  i. Average Percent Below Grade; and
  ii. Average Percent Excess Moisture.
(b) HT Inspections:
  i. Minor non-compliances

3.5.20 The Agency shall, in addition to complying with the criteria established for the class(es) of accreditation approved, agree to adhere to all of the requirements prescribed in:
a) these Regulations, the By-laws, CSA-O141 and the applicable CLSAB approved grading rules and/or product standards, and/or
b) the CLSAB Operating Plan.

3.5.21 The Agency shall agree to advise CLSAB immediately when licensees/Members are added or deleted from their roster.

3.5.22 The Agency shall pay all such dues and fees as assessed by the Board in

accordance with the By-laws and these Regulations.

3.5.23 The Agency shall execute an agreement with CLSAB in such form and containing such conditions as the Board may from time to time decide. The Agency shall agree to comply and operate in a method consistent with the provisions contained in any such agreement.

3.5.24 The Agency shall immediately notify CLSAB when it makes any changes/revisions/amendments to its policies and procedures in matters pertaining to the requirements contained in these Regulations.

3.5.25 The Agency shall execute a completed copy of the Annual Verification of Agency Activities Report.

3.5.26 No agreements between buyer and seller or any other interested parties shall justify an Agency not meeting these minimum requirements.

3.5.27 The Agency shall maintain membership in the National Lumber Grades Authority for all accreditations related to the NLGA Rules and/or Product Standards including but not limited to all accreditations in respect of Classes of Accreditation as listed in sections 3.3.1 to 3.3.7 of the Regulations.

3.5.28 The Agency shall have adequate arrangements to address liabilities arising from its operations.

3.5.29 The Agency shall have the financial stability and resources required for its operations.

3.5.30 The policies and procedures under which the Agency operates, and the administration of them, shall be non-discriminatory and shall not impede or inhibit access by applicants.

3.5.31 The Agency shall be responsible, through legally enforceable commitments, for the management of all information obtained or created during the performance of inspection activities.

4.0 ADDITIONAL AGENCY ACCREDITATION REQUIREMENTS FOR AN AGENCY TO CERTIFY LUMBER

4.1 Qualifications and Status of Inspectors

4.1.1 The Agency shall establish policies and procedures to ensure that its inspectors are fully experienced and qualified to inspect items on which such inspectors are authorized to issue certificates of inspection. The Agency shall maintain an experience record file for each inspector on whose inspection work it issues certificates. The Agency shall agree to make these files available to CLSAB staff at any time during normal business hours for the purpose of verifying compliance. Each Agency's inspector shall have available a qualification card, or letter from the Agency and shall present it upon request by any CLSAB supervisor or yield it on demand to the Agency.

4.1.2 Agency Certificate inspections shall only be performed by qualified inspectors in the employ of the Agency or by facility employees specifically authorized and designated as an agent of the Agency. The agent shall possess a current Agency inspectors' certificate and shall demonstrate reliability to independently act as a representative of the Agency. Employees or agents of an accredited Agency shall only be authorized by the Agency to perform certificate inspections in compliance with Section 3.4.2 of

these Regulations.

4.1.3 If it is determined that an Agency inspector is not maintaining the required proficiency on any of the items appearing on their qualification list, the Agency shall immediately withdraw the inspector's authorization to perform such certificate work and shall not issue certificates on that inspector's work.

4.1.4 Agency inspectors' or their agents' authorization to perform certificate inspection work shall be immediately cancelled upon termination of employment. The inspector's qualification card, list or letter shall be surrendered to the Agency.

4.2 Procedures for Certificate of Inspection for facilities with a Grade Stamp and License Agreement

4.2.1 The inspector's copy of the order or written instructions together with the tally shall be made available to the Agency's office. The Agency's staff shall verify, countersign and issue the certificate. At the option or discretion of the Agency, and provided the facility has adequate office facilities and staff, the certificate may first be completed (typed) in the facility's office. The certificate shall then be forwarded to the Agency's office for issuance as prescribed herein.

4.2.2 The Agency shall maintain a file on each certificate of inspection issued including a copy of the certificate, the tally, and the inspector's copy of the order or written instructions. These files shall be maintained in accordance with Section 3.5.18 of these Regulations.

4.2.3 CLSAB may require reports from an Agency, at such times as it deems necessary, which may include among other things the following:

(a) the number of certificate of inspection for a particular period and the volume of lumber involved; and
(b) the number of re-inspections involving certificate lumber for a specific period including all pertinent information.

4.3 Procedures for Certificate Inspection for facilities without a Grade Stamp and License Agreement

4.3.1 An agency shall notify CLSAB of all certificate inspection it has been requested to perform in a timely manner prior to such inspection. Such notice shall include the time and place of the inspection.

4.3.2 An Agency's supervisor shall approve the working conditions prior to the inspection of lumber for the purposes of certification.

4.3.3 Prior to performing an inspection, the inspector shall be provided with a copy of the order or written instructions detailing all specifications necessary for certification of the item.

4.3.4 If someone other than the authorized inspector tallies the lumber, that person shall co-sign the tally together with the inspector. In every case, the inspector shall be held responsible and accountable for the tally.

4.3.5 All pieces accepted by an inspector on a certificate inspection shall be so identified by the inspector's identifying mark or brand which shall be shown on the certificate. An identifying mark may include a hammer brand.

4.3.6 The Agency shall maintain a file on each certificate inspection issued including a

copy of the certificate, the tally, and the inspector's copy of the order or written instructions. These files shall be maintained in accordance with Section 3.5.18 of these Regulations.

4.3.7 CLSAB may require reports from an Agency, at such times as it deems necessary, which may include among other things the following:

(a) the number of certificate inspection for a particular period and the volume of lumber involved; and
(b) the number of re-inspections involving certificate lumber for a specific period including all pertinent information.

4.4 Information Required on Inspection Certificates

4.4.1 Certificates issued by the Agency shall be subject to the approval of the CLSAB and shall contain at least the following information:

(a) a number unique to each certificate;
(b) identification of the accredited Agency (registered Trademark or Logo);
(c) identification of facility/applicant to which the certificate applies - usually by a number and/or name;
(d) identification of the grade of the lumber;
(e) identification of the grade rule(s) used;
(f) identification of species or species combination;
(g) identification of dry or green seasoning condition at time of grade stamping on lumber under five-inch nominal thickness;
(h) identification of other information as may be required by the applicable grading rules and/or product standards as approved by CLSAB;
(i) a facsimile of the identity mark applied for the grade of lumber;
(j) the tally, which shall include the
  i) size;
  ii) length;
  iii) number of pieces; and
  iv) volume of lumber.
(k) date of inspection; and
(l) name and signature of authorized person.

5.0 ADDITIONAL AGENCY ACCREDITATION REQUIREMENTS TO GRADE MACHINE GRADED LUMBER

5.1 Board Authorization

5.1.1 An Agency's accreditation to supervise grading by machine methods shall be limited to machines approved by the Board. All pertinent sections of these Regulations shall apply to both visual and machine grading.

5.1.2 Schedule "B" of these Regulations makes reference to the "CLSAB Policy for Lumber Grading Machine Approval". This policy, as amended from time to time, forms part of these Regulations.

5.1.3 The Board is authorized to determine the competency, reliability, and adequacy of Agencies that apply for accreditation as an inspection Agency for machine graded lumber.

5.2 Application Requirements

5.2.1 Prior to an Agency being accredited to extend supervisory services for machine

grading, the Agency, in accordance with these Regulations, shall submit to CLSAB the following documentation:

(a) completed "Application for Agency Approval to Supervise the Grading of Lumber by Machine Methods;"
(b) a complete list of the types of machines, including make and model, for which supervisory services are being offered;
(c) a complete list of facilities for which supervisory services will be offered;
(d) a detailed set of quality control procedures to be used in determining conformance to the applicable CLSAB approved product standard;
(e) a copy of the proposed written agreement between the Agency and the facility pursuant to which the supervisory services of the Agency are offered to the facility. The agreement shall contain provisions for warning, suspension or revocation for cause; and
(f) a list of grade stamp facsimiles to be used on machine graded lumber. These stamps shall be readily distinguishable from visually graded lumber. MSR and MEL grade stamps shall be readily distinguishable from each other.

5.3 **Agency Requirements**

5.3.1 An Agency's accreditation to provide machine grading supervisory services shall be contingent upon the Agency demonstrating, among other things, that:

(a) the facility meets the requirements of these Regulations and the applicable CLSAB approved product standards and grading rules;
(b) facility staff qualifications and in-plant quality control requirements provide for product performance that conforms to the applicable CLSAB approved product standard;
(c) the facility's test equipment used in the monitoring of machine grading meets the requirements of the applicable CLSAB approved product standards;
(d) a report has been prepared by an appropriate independent certification or testing organization which verifies the test equipment;
(e) sufficient periodic physical testing is conducted to verify continuing conformance of lumber output to the requirements of the applicable CLSAB approved product standards;
(f) all grade stamped machine graded lumber is graded and grade stamped in accordance with the CLSAB approved grading rule for machine lumber and the applicable CLSAB product standard;
(g) frequency of inspections shall be in compliance with Section 3.5.16 of these Regulations; and
(h) the Agency has provisions for re-grading when one or more lots of machine graded lumber are rejected by the facility's quality control procedures.

5.4 **General Requirements**

5.4.1 An Agency shall require facility test records to be retained in accordance with Agency policies and in no case for less than six (6) years.

5.4.2 An Agency which does not have qualified staff technicians to provide tests may be required by the Board to provide documentary evidence that the certification requirements are being met and/or to utilize the services of consultants satisfactory to the Board.

5.4.3 In the event there is joint ownership of the grading machine, or if the facility which owns the machine wishes to perform machine grading services for other producers of lumber of the same species on a custom/contract basis, the supervision of the grading Agency shall extend only to the facility and location where the machine is

installed as provided in the Agency's agreement with the facility. This facility shall be held responsible for the proper adjustment and operation of the machine. The Agency shall require the machine grading facility to maintain records of lumber produced by the machine and that the Agency have copies of such information.

5.4.4 CLSAB may employ consultants to assist in its evaluation of an Agency's application for accreditation. The applicant Agency shall be responsible for all expenses and fees incurred by such consultants.

5.4.5 Residual lumber from a machine grading process that requires bending strength qualification may be placed in the highest visual grade for which the piece qualifies, provided:

(a) the equivalent size-adjusted design value in bending (F_b) for the visual grade is lower than the machine grade design value from which it was rejected; and
(b) the visual grade Modulus of Elasticity (E) value rounded to the nearest 100,000 psi is lower than the **process average E value** for the lowest MSR grade from which it was rejected, or alternatively is shown that it can be maintained at the visual grade level.

5.4.6 Residual lumber from a machine grading process that requires qualification in both bending and tension may be placed in the highest visual grade for which the piece qualifies, provided;

(a) the equivalent size-adjusted design values in bending (F_b) and tension (F_t) for the visual grade are lower than the machine grade design values from which it was rejected; and
(b) the visual grade Modulus of Elasticity (E) value rounded to the nearest 100,000 psi is lower than the **process average E value** for the lowest MSR grade from which it was rejected, or alternatively is shown it can be maintained at the visual grade level.

5.4.7 Visually graded lumber that is pulled without consideration of the MSR grading process need not comply with the residual lumber requirements identified in Sections 5.4.5 and 5.4.6. In such cases, the MSR grading process shall be qualified with due regard for exclusion of lumber being pulled.

5.4.8 Residual lumber products shall be grade stamped at the production site in accordance with the existing CLSAB provisions or, if shipped not grade stamped, marked in a fashion to indicate the lumber has been passed through machine grading equipment.

5.5 CLSAB Monitoring Criteria for Machine Grading.

5.5.1 CLSAB has established criteria for monitoring Agencies accredited to provide services for machine graded lumber, including, but not limited to:

(a) CLSAB may inspect machine graded lumber bearing Agency grade stamps at facilities, destination points, or at any other location to determine if the lumber meets the visual requirements in accordance with these Regulations and the applicable grading rules and product standards;
(b) CLSAB may review Agency inspection records at any time during normal Agency business hours to determine whether sufficient visual inspections and physical tests are being performed;
(c) CLSAB shall be authorized to review facility records at any time during normal facility business hours to determine whether the facilities are maintaining records in accordance with its Agency's requirements; and

(d) CLSAB may at its discretion request that physical tests be performed on grade stamped machine graded lumber for any reason.

6.0 ADDITIONAL AGENCY ACCREDITATION REQUIREMENTS TO GRADE FINGERJOINED LUMBER

6.1 Board Authorization.

6.1.1 The Board shall be authorized to determine the competency, reliability and adequacy of Agencies that apply for accreditation as an inspection Agency to supervise fingerjoined lumber. All pertinent sections of these Regulations shall apply to the visual grading.

6.2 Application Requirements.

6.2.1 Prior to an Agency's accreditation to extend supervisory services for grading fingerjoined lumber, the Agency, in accordance with these Regulations, shall submit to CLSAB documentation including, but not necessarily restricted to:

(a) a completed "Application for Agency Approval to Supervise the Grading of Fingerjoined Lumber";
(b) a complete list of facilities for which supervisory services will be offered, including the process to be used by identifying the product standard;
(c) a detailed set of quality control procedures to be used in determining conformance to the applicable CLSAB approved product standard;
(d) a copy of the proposed written agreement between the Agency and the facility pursuant to which the supervisory services of the Agency are offered to a facility. The agreement shall contain provisions for warning, suspension or revocation for cause; and
(e) a list of grade stamp facsimiles to be used on fingerjoined lumber. These stamps shall be readily distinguishable from visually graded non-fingerjoined lumber. Grade stamps for each product standard process shall also be readily distinguishable from each other.

6.3 Agency Requirements.

6.3.1 An Agency's accreditation to provide fingerjoining supervision shall be contingent upon the Agency demonstrating among other things, that:

(a) the facility meets the requirements of these Regulations and the applicable CLSAB approved product standards and grading rules;
(b) facility staff qualifications and in-plant quality control requirements provide for product performance that conforms to the applicable CLSAB approved product standards;
(c) the facility's test equipment used in the monitoring of fingerjoined lumber meets the requirements of the applicable CLSAB approved product standards;
(d) a report is prepared by an appropriate independent certification or testing organization which verifies the test equipment;
(e) sufficient periodic physical testing is conducted to verify continuing conformance of lumber output to the requirements of the applicable CLSAB approved product standards;
(f) all grade stamped fingerjoined lumber shall be graded and grade stamped in accordance with the CLSAB approved grading rules for fingerjoined lumber and the applicable CLSAB product standards; and
(g) frequency of inspections shall be in compliance with Section 3.5.16 of these Regulations.

6.4 **General Requirements**

6.4.1 An Agency shall require facility test records to be retained in accordance with Agency policies and in no case for less than six (6) years.

6.4.2 An Agency which does not have qualified staff technicians to provide tests may be required by the Board to provide documentary evidence that the certification requirements are being met and/or to utilize the services of consultants satisfactory to the Board.

6.4.3 In the event there is joint ownership of the fingerjoining facility, or if the owner of the fingerjoining facility wish to perform fingerjoining services for other producers of lumber of the same species on a custom/contract basis, the supervision of the fingerjoining process shall extend only to the facility and location where the fingerjoining equipment is installed as provided in the Agency's agreement with the facility and this facility shall be held responsible for the proper operation of the process. The Agency shall require the fingerjoining facility to maintain records of lumber produced for others serviced by the fingerjoining facility and that the Agency is provided copies of such information.

6.4.4 CLSAB may employ consultants to assist in its evaluation of an Agency's application for accreditation. The applicant Agency shall be responsible for all expenses and fees incurred by such consultants.

6.5 **CLSAB Monitoring Criteria for Fingerjoined Lumber**

6.5.1 CLSAB has established criteria for monitoring Agencies accredited to provide services for grading fingerjoined lumber, including but not limited to:

(a) CLSAB may inspect fingerjoined lumber bearing Agency grade stamps at facilities' destination points, or at any other location to determine if the lumber meets the visual requirements in accordance with these Regulations and the applicable grading rules and product standards;
(b) CLSAB may review Agency inspection records at any time during normal Agency business hours to determine whether sufficient visual inspections and physical tests are being performed;
(c) CLSAB shall be authorized to review facility records at any time during normal facility business hours to determine whether the facilities are maintaining records in accordance with its Agency's requirements; and
(d) CLSAB may at its discretion request that physical tests be performed on grade stamped fingerjoined lumber for any reason.

7.0 AGENCY PROCEDURES FOR GRADE STAMPING LUMBER

7.1 Grade stamps of accredited Agencies shall be subject to approval of CLSAB and shall provide information in the grade stamps as follows:

7.1.1 identification of the accredited Agency (registered Trademark or Logo);
7.1.2 identification of facility - usually by a number and/or name;
7.1.3 identification of the grade of the lumber;
7.1.4 identification of species or species combination;
7.1.5 identification of dry or green seasoning condition at time of grade stamping on lumber under five-inch nominal thickness;
7.1.6 identification of NLGA on grade stamps when lumber is graded to the NLGA rules;
7.1.7 identification of other information as may be required by the applicable grading rules and/or product standards as approved by CLSAB.
7.1.8 HT Program: Product under the provisions of the HT Programs and bearing the

Agency Trademark shall provide information on the stamp as follows:

(a) agency registered Logo;
(b) identification of facility - usually by number and/or name;
(c) HT or KD-HT;
(d) Identification of other information as may be required by the applicable grading rules and/or product standards as approved by CLSAB.

7.2 An Agency shall require from its member facilities that each piece be properly grade stamped in all shipments of grade stamped lumber. Grade stamped and non-grade stamped lumber shall be segregated and not included in the same package.

7.2.1 Except as provided below, when the KD-HT or HT mark of an agency is used, each piece shall be marked and lumber bearing a KD-HT or HT mark shall not be mixed with non-marked product.

7.2.2 Lumber that is altered from its original form is required to have the grade stamp removed, except under those circumstances described in Section 8.10. In addition, to provide KD-HT or HT traceability for the original producer to the re-manufacturer and/or wood packaging producer, when lumber bearing the grade stamp and the KD-HT or HT mark of an agency is being pre-cut into lengths four feet or less or into boards less than 1” in thickness for use in packaging components, it is not required to have the pre-existing grade stamp removed or obliterated. The agency is required to ensure that pre-cut material will be used for the manufacture of wood packaging material.

7.2.3 When pieces are marked KD-HT or HT only, with no reference to grade, and the size of individual pieces is:

(a) 762mm (30") or less in length; or
(b) 12.7mm (1/2”) nominal or less in thickness; or
(c) 50.8mm (2") nominal or less in width;

the KD-HT or HT mark shall be applied by stamping not less than 25% of the pieces in a unit. Units that are partially marked shall also be stenciled with the same information as indicated by the agency KD-HT or HT stamp.

7.3 It is CLSAB policy not to permit a facility's grade stamps to be deceptively similar to grade stamps of another Agency.

7.3.1 Logos and markings that are not part of the CLSAB approved grade stamp must be placed at least six (6) inches away from the grade stamp; and

7.3.2 All facility grade stamps, HT stamps and other non-agency stamps that are under their direct supervision are to be verified by each Accredited Agency prior to issuing them to registered facilities.

7.4 The identification assigned by an Agency to a facility or location shall not be used at any other location except in special or exceptional circumstances. If the Agency determines that special or exceptional circumstances exist, and authorizes the use of grade stamps at another location, a copy of the written authority shall be submitted to CLSAB.

7.5 Agencies that permit facilities to incorporate the Agency identification, logo, or trademark into grade stamps of grading rules and/or product standards or “HT” Programs not approved by CLSAB shall ensure that such grade stamps are clearly and readily distinguishable from grade stamps used in conjunction with CLSAB approved grading rules and/or product standards. An Agency shall submit facsimiles of such grade stamps to CLSAB for

assessment.

7.6 An Agency may assign grade stamps to an Agency office and/or to each of its inspectors, and upon doing so shall provide CLSAB with an identification list of these grade stamps.

7.7 An Agency wishing to change the formatting of its grade stamps shall notify CLSAB and NLGA of such changes.

7.8 Every Agency shall be accountable for the control of its grade stamps, and shall ensure that:

(a) all facilities provide care and security of the Agency grade stamps;
(b) the Agency grade stamps are only used by authorized personnel approved by the Agency;
(c) a record is kept of facsimiles of all grade stamps that have been issued;
(d) each facility adopts a policy for the secure replacement and storage of worn-out or discarded grade stamps;
(e) each facility has the obligation to immediately notify the Agency in the case of missing or stolen grade stamps;
(f) the Agency immediately reports to CLSAB any missing, stolen or misused grade stamps;
(g) agencies immediately report to the CLSAB any detected grade mark which has not been authorized by the CLSAB and which may cause confusion in the marketplace or otherwise looks suspicious; and
(h) All facility grade stamps, HT stamps and other non-agency stamps that are under their direct supervision are to be verified by each Accredited Agency prior to issuing them to registered facilities.

8.0 GRADE STAMPING AND/OR RE-GRADE STAMPING

8.1 The grade stamping and/or re-grade stamping of lumber shall only be performed by:

8.1.1 approved/authorized facility employees under the supervision of the accredited Agency;
8.1.2 employees or agents of the accredited Agency.

8.2 The Agency grade stamps shall only be applied to lumber after a piece-by-piece examination of the lumber has been performed and the requirements for the grade or product standard have been met as provided in the applicable CLSAB approved grading rules and/or product standards or such other rules or product standards CLSAB authorizes grade stamping in respect of.

8.3 Grade stamps shall be applied on lumber in such a manner that the grade stamp imprint on each piece is clearly legible. The maximum size of a grade stamp shall be approximately 102mm x 153mm (4"x6").

8.4 The Agency in determining conformance of a facility to the applicable CLSAB approved grading rules and/or product standards shall perform a piece-by-piece examination of lumber previously graded (post grade stamped) by the facility's inspector, or by employees or agents of the accredited Agency.

8.4.1 In the case of lumber produced in accordance with the HT Programs, the agency shall determine conformance of the facility by conducting its inspection based upon the requirements set forth in these Regulations including, frequency of inspection requirements, CLSAB Schedule “C” and “D” or CLSAB Schedule “E” and “F”.

8.5 No Agency representative, grader, inspector, facility representative, or organization shall grade stamp or re-grade stamp lumber installed or previously installed in a structure, and no Agency or organization shall certify the lumber in the structure or lumber previously installed

in a structure as conforming to the applicable specifications.

8.5.1 When Agency representatives issue a letter of opinion for the lumber, it shall not state that published design values apply.

8.6 The grade stamping and/or re-grade stamping of lumber shall be permitted when the species can be positively identified. When the species cannot be positively identified, the grade stamping and/or re-grade stamping shall only be authorized when the grade stamp signifies the lowest design value species group as listed in the applicable CLSAB approved grading rules.

8.7 Mixed grades, other than the two highest recognized grades for each grading rule category, shall not be grade stamped with a combination grade designation. If grade stamping is required, each piece of a grade shall be stamped as its actual grade.

8.8 Incorrect grade stamping refers to lumber that is not grade stamped in accordance with the requirements of Section 7.1, the applicable CLSAB approved grading rules and/or product standards or when the grade stamp is illegible.

8.9 If incorrectly grade stamped lumber is encountered, the grade stamp shall be obliterated.

8.10 When the original form of the piece(s) of grade stamped lumber is altered, re-graded and/or re-grade stamped by an entity other than:

(1) the originating facility which grade stamped the lumber; or
(2) a facility under the ownership and control of the originating facility;

the original grade stamp on each piece in the original item(s) shall be obliterated, and if re-stamped, each piece in the item shall be re-grade stamped

8.10.1 The exceptions to the requirements contained in 8.10 (1) and (2) for the obliteration and re-grade stamping of altered, re-graded, re-grade stamped and/or re-sorted grade stamped lumber do not apply to machine graded lumber as per NLGA SPS2.

8.10.2 Pieces of lumber which have been altered in cross-section for purpose of remanufactured pre-cut components for HT or KDHT compliance are not required to have the pre-existing mark removed or obliterated.

8.10.3 Dimension lumber which is trimmed not more than two feet in length, but otherwise unmodified in cross-section need not have the existing grade stamp obliterated.

8.10.4 When grade stamped lumber is re-sorted by an entity other than the originating facility which grade stamped the lumber, or a facility under the ownership and control of the originating facility, the original grade stamp on each piece in the original item(s) shall be obliterated and if re-stamped, each piece in the item(s) shall be re-grade stamped.

8.11 It is the obligation of the Agency to supervise the facility grading and moisture content requirements on a regular basis and it is the obligation of the Facility to maintain the on grade and moisture content requirements.

8.11.1 A maximum of five percent below grade is the maximum allowable variation between graders, in recognition that the grading of lumber cannot be considered an exact science because it is based on either a visual inspection of each piece and the judgement of each grader, or on the results of a method of machine stress grading determining the strength characteristics of structural lumber and the visual inspection of that piece and the judgement of the grader.

8.11.2 Samples of previously graded lumber, when available, shall be taken as part of the Agency supervision for both types of service referenced above (grading by facility employees and grading by Agency employees). The Agency shall sample a sufficient number of grades, sizes and quantities to adequately evaluate the grading proficiency of the facility or Agency employee graders, and to check the moisture content requirements.

8.11.3 When any item sampled is found to be 7.5 percent or greater below grade or 7.5 percent or greater excess moisture content, the item shall be held for non-compliance. The Agency shall verify that the held item is in compliance prior to authorizing release of the lumber. The Agency shall increase its inspections and take such other action as it deems necessary to prevent recurrences until all grade stamped lumber sampled averages 5 percent or less below grade or 5 percent or less excess moisture content with no item equal to or more than 7.5 percent below grade or equal to or more than 7.5 percent excess moisture content.

8.11.4 When a facility has at least three items sampled for that month and the average of the items sampled is over 5 percent below grade or over 5 percent excess moisture content, the Agency shall increase its inspections and take such other action as it deems necessary to prevent recurrences until all grade stamped lumber sampled averages 5 percent or less below grade or 5 percent or less excess moisture content with no item equal to or more than 7.5 percent below grade or equal to or more than 7.5 percent excess moisture content.

8.11.5 When a facility has less than three items sampled each month, and when the rolling average of the items sampled for the most recent three inspections exceed 5 percent below grade or exceed 5 percent excess moisture content, the Agency shall increase its inspections and take such other action as it deems necessary to prevent recurrences until all grade stamped lumber sampled averages 5 percent or less below grade or 5 percent or less excess moisture content with no item equal to or more than 7.5 percent below grade or equal to or more than 7.5 percent excess moisture content.

8.11.6 Any item sampled found to contain 7.5 percent or more pieces mislabelled for species shall be held for re-grade stamping and be correctly grade stamped for species before release for shipment.

8.11.7 Any item containing 10 percent or more pieces with grade stamps deemed to be illegible or incomplete shall be held for re-grade stamping. For the purpose of calculating the 10 percent, the number of illegible marks, whether actual grade stamps, other certification marks or unmarked pieces shall be done on a cumulative basis and not calculated separately by mark or grade stamp.

a) Provided an attempt to mark all pieces is present, as evidenced by ink from the stamp on each piece, any item containing 25 percent or more of the pieces with HT or KDHT marking (no reference to grade) deemed to be illegible or in-complete shall be held for remarking.

8.11.8 Any item containing ten (10) percent or more of the pieces inspected with Certification Marks deemed to be illegible or incomplete shall be held for re-marking.

a) "An item" in the context of WPM and Dunnage refers to materials that have been marked by the facility for use in the assembly of WPM or as Dunnage, and is not limited to species, size or length.

b) Inspection of an item shall be defined as a physical piece by piece examination

of the legibility of the Mark of approximately 200 pieces or more of dunnage or 200 units or more of WPM. If the number of pieces inspected contain ten (10) percent or more pieces with illegible Marks, the entire item shall be held for further inspection by the Agency.

8.11.9 When any item sampled with certification marks is found to have 7.5 percent or greater excess tolerances for bark, the item shall be held for non-compliance. The Agency shall verify that the held item is in-compliance prior to authorizing the release of the item for shipment. The Agency shall take whatever steps it deems necessary to prevent recurrences and at least monthly the Agency shall review the performance of each facility and take whatever corrective action is warranted.

8.11.10 When any item sampled for the Canadian Sawn Wood Certification Program is found to have 2.0 percent or greater non-conforming product, the item shall be held for non-compliance. The Agency shall verify that the held item is in compliance prior to authorizing release of the lumber. The Agency shall increase its inspections and take such other action as it deems necessary to prevent recurrences until all program lumber sampled averages less than 2.0 percent for non-conforming product with no item equal to or more than 2.0 percent for non-conforming product.

9.0 AGENCY ENFORCEMENT ACTIONS

9.1 The policies and procedures of an Agency shall contain provisions for warning and suspension of facilities satisfactory to the Board.

9.2 An Agency shall immediately notify the President & CEO by letter when it warns, suspends or withdraws its grade stamping services from a facility for cause, furnishing all relevant details. Upon receipt of the notification CLSAB shall immediately notify by letter all accredited Agencies.

9.3 A facility's grade stamp and/or HT Programs privileges shall be reinstated only after the management of the facility demonstrates its ability and willingness to maintain the CLSAB requirements on a continuing basis. The Agency shall then submit to the President & CEO a detailed report outlining the corrective action taken to prevent recurrences.

9.4 When a facility has had its grade stamping services suspended or withdrawn, no other Agency shall extend grade stamping or certificate services to that facility for a period of one-hundred eighty (180) calendar days after the date of the letter of notice in the case of suspension or withdrawal of services, or sixty (60) calendar days after the date of the letter of notice in the case of a warning, unless the facility has been reinstated by the Agency which suspended, withdrew or warned, or the retaining of the other Agency by the facility has been supervised by CLSAB and it is determined by CLSAB that the facility has demonstrated its ability and willingness to comply with the requirements on a continuing basis and that the changing of Agencies by the facility is not for the purpose of evading the suspension, withdrawal or warning.

9.5 Whenever one grading Agency commences performing inspection services for a facility under contract with another grading Agency, the new Agency shall notify the previous Agency and ascertain the status of any outstanding re-grades or other lumber quality issues. Any such outstanding issues shall be reported to the President & CEO of CLSAB and the new Agency shall resolve them to the satisfaction of the President & CEO of CLSAB.

9.6 Agency enforcement actions with respect to the Relevant Policy Directives approved pursuant to the Agreement between The Canadian Food Inspection Agency and Canadian Lumber Standards Accreditation Board shall comply with these Regulations. The CLSAB may have regard to and follow the requirements of the Agreement between The Canadian

Food Inspection Agency and Canadian Lumber Standards Accreditation Board and other relative documents in determining the appropriate enforcement action.

10.0 CLSAB FIELD INSPECTIONS

10.1 As a condition of accreditation, Agencies shall agree that CLSAB shall have the right to examine lumber that has been graded, grade stamped or certified at facilities or destination points for the purpose of reviewing the performance of Agency inspection staff and the competency of the services provided. For the purpose of reviewing the competency of Agency staff and the services the Agency is providing, Agency staff shall be required, when notified by the CLSAB to accompany CLSAB on its field inspection of the Agency at facilities or destination points and to grade lumber or otherwise certify it as part of the audit.

10.2 If at any time lumber which has been graded, grade stamped or certified, is found to be incorrectly graded or certified, the Agency shall cooperate fully in taking the necessary steps to eliminate or minimize the chance of recurrence of such improper grading or certification by the facility and/or inspector.

10.3 The Agency shall agree that if serious mis-grading as determined by CLSAB is found, CLSAB may request a complete re-inspection of the shipment. The Agency shall be given at least three business days' notice as to when the re-inspection will be conducted and shall be afforded the privilege of having a representative present during the re-inspection.

11.0 CLSAB RANDOM SAMPLE INSPECTIONS

11.1 When the Board deems it necessary, the President & CEO shall conduct on a random sampling basis periodic inspections of grade stamped or certified lumber at facilities utilizing the services of a CLSAB accredited Agency.

11.2 An Agency's member facilities shall be randomly selected and shall be of sufficient number to be deemed representative of the total shipments of lumber as declared in the Agency's Verification of Activities Report.

11.3 The random sample inspections shall be conducted on lumber representing, as near as practicable, the cross section of the facility's grade stamped or certified production.

11.4 The results of the random sample inspections shall be used by the Board as a measure of determining the competency and reliability of the accredited Agency.

12.0 AGENCY FOLLOW-UP

12.1 Unsatisfactory CLSAB Reports

12.1.1 When a CLSAB inspection report reveals a serious infraction, the President & CEO shall promptly notify the Agency of the infraction, provide a copy of the inspection report to the Agency and request that the Agency take whatever corrective action is necessary with the facility or Agency staff involved in order to prevent a recurrence.

12.1.2 The Agency shall reply to CLSAB within thirty (30) calendar days or such other period of time deemed appropriate by the President & CEO after receipt of the notice, reporting in detail the corrective action taken (including pertinent correspondence, telephone conversations or other appropriate materials). The Agency shall continue to file such reports until such time as the Agency has been advised by the President & CEO that CLSAB is satisfied that a recurrence of the infraction is unlikely.

12.1.3 The President & CEO shall from time to time determine the effectiveness of an Agency's follow-up by verifying, to the extent possible, that the corrective action

represented to have been taken was in fact carried out.

12.1.4 The President & CEO shall maintain records of the Agency's follow-up performance. Such records shall be used by the Board as a measure of determining the competency and reliability of the accredited Agency.

13.0 CLSAB REQUESTED RE-GRADING AND/OR REINSPECTION

13.1 The CLSAB inspector shall immediately advise the CLSAB office upon finding grade stamped and/or certified lumber at the point of origin that is seriously mis-graded. The CLSAB in turn shall immediately notify the Agency whose Trademark (Logo) appears on the lumber. The Agency shall then immediately notify the facility management to hold such lumber in inventory at the facility for prompt regrading. The Agency shall either regrade or supervise the regrading of the held lumber at the facility. Any facility failing to hold such lumber for regrade shall be subject to disciplinary action by the Agency including but not limited to the immediate suspension of its grade stamping, “HT” and/or certificate privileges.

13.2 The CLSAB inspector shall immediately advise CLSAB upon finding a given shipment of grade stamped and/or certified lumber at destination which appears to be seriously mis-graded. The CLSAB shall not divulge any detailed information as to the condition of the lumber to the customer. The CLSAB shall immediately contact the Agency whose mark appears on the lumber. The Agency shall in turn immediately advise the customer holding the lumber that a prompt re-inspection is to be made by the Agency at no cost to the customer, provided the customer will hold the stock, provide labour (for which the customer will be reimbursed by the Agency) and not assess holding charges or fees for the lumber held in inventory.

13.3 The Agency shall provide the results of the reinspection to the CLSAB and all parties involved in the transaction, and the CLSAB may provide the results to the appropriate authorities.

13.4 The costs of such re-inspection shall be funded by CLSAB except when the lumber is found to be more than five percent below grade in which case the facility shall be found responsible to the Agency for the cost of the re-inspection.

13.5 The results of CLSAB destination check inspections shall be used by the Board as a means of determining the Agency's follow-up performance to correct any indicated mis-grading. Destination check results are not intended to be the sole measure of an Agency's competency or reliability.

14.0 ENFORCEMENT

14.1 Operations Committee Review

14.1.1 The Operations Committee shall be responsible for monitoring the ongoing performance of the member Agencies of the CLSAB. If at any time the Operations Committee deems it to be necessary for the proper enforcement of these Regulations and the By-laws, it may establish a review panel ("Review Panel") to review an Agency's file.

14.2 Composition of Review Panel

14.2.1 The Review Panel shall be made up of three or more members of the Operations Committee, appointed by the Chairman of the Operations Committee from time to time subject to the requirement that no-one shall serve on a Review Panel who is connected with an Agency which is either under review, or in direct competition with the Agency under review.

(a) Once appointed to the Review Panel, a member of the Panel may complete the Panel's mandate despite no longer being a member of the Operations Committee.
(b) If for any reason a member of the Review Panel is physically unable to complete their term on a Panel, the remaining members of the Panel may complete the Panel's mandate on their own.

14.3 **Authority of Review Panel**

14.3.1 The Review Panel may review an Agency's compliance with the requirements of these Regulations and the By-laws, as amended from time to time by the CLSAB Board of Directors. The Review Panel, upon examining the Agency's performance and compliance, may take any or all of the following actions ("Enforcement Actions") as it determines necessary to uphold the integrity and standards of the CLSAB system:

(a) issue mandatory orders on such terms as the Review Panel deems appropriate;
(b) fine an Agency in an amount the Review Panel deems appropriate;
(c) place an Agency on probation on such terms as the Review Panel deems appropriate;
(d) suspend an Agency's accreditation pending review by the Review Panel;
(e) suspend an agency in such terms as the Review Panel deems appropriate; or
(f) recommend de-accreditation of the Agency by the Board.

14.4 **Review Panel Consideration**

14.4.1 In its deliberations concerning whether to take Enforcement Action against an Agency, the Review Panel may examine any information at its disposal including, but not limited to:

(a) CLSAB's random sample inspection results;
(b) information contained in Agency reports to CLSAB;
(c) follow-up performance by an Agency in cases of non-conformance by any of its member facilities;
(d) CLSAB checks of the Agency's records; and/or
(e) any other information kept by the CLSAB which the Review Panel considers may be relevant.

14.5 **Review Panel Procedures**

14.5.1 Prior to the Review Panel taking any Enforcement Action against an Agency, the Review Panel shall provide reasonable advance written notice to that Agency of any decision to take Enforcement Action against the Agency ("the Notification").

14.5.2 The Notification shall include sufficient particulars of the allegation of non-compliance to enable the Agency to respond, including copies of all materials reviewed by the Review Panel in issuing the Notification and shall specify the time period within which the Agency must respond.

14.5.3 The Agency may file with the Review Panel a written response ("Response") to the Notification within the time specified in the Notification. The Response shall provide reasons for any non-compliance and detail the steps being taken by the Agency to ensure future compliance with the Regulations and By-laws. The Agency shall also respond to any other specific request made by the Review Panel as set out in the Notification.

14.5.4 The Review Panel shall review the Response and, if in the opinion of the Review

Panel, the Response is satisfactory, the matter may be held in abeyance until such time as the next CLSAB Agency performance report results are available to all parties concerned.

14.5.5 Provided the Agency files the Response within the specified time, or within such additional time as the Review Panel may allow, the Agency may, at the sole discretion of the Review Panel, be afforded the opportunity to make further written representations or appear before the Review Panel in person and by counsel for the purpose of making representations concerning the Notification. All such representations shall be made and/or hearings shall be conducted in accordance with procedures established by the Review Panel.

14.6 **Hearing Procedures**

14.6.1 The Review Panel may establish its own procedures for any hearings and may require CLSAB members to produce any and all relevant documentation. The Review Panel may also require a member or its employees to attend at and provide evidence at a hearing into the competency or performance of a member.

14.7 **Mandatory Orders**

14.7.1 The Review Panel may issue a mandatory order it deems necessary in respect of any aspect of the conduct, procedures or operations of the Agency, designed to bring the Agency in compliance with the Regulations and/or the By-laws.

14.7.2 Any Agency which received a mandatory order from the Review Panel shall forthwith upon receipt of the order take steps to comply with the order, and shall, subject to the terms of the order, prepare and deliver a report to the Review Panel outlining the steps taken to comply with the order and identifying and justifying any continued deficiency.

14.7.3 The Review Panel may meet at any time and in any event shall meet within the later of sixty (60) calendar days of issuing a mandatory order or such time specified in the order, to review the Agency's compliance with the mandatory order. The Review Panel shall give ten (10) calendar day’s notice to the Agency of such meeting, and an Agency may submit further materials for consideration by the Review Panel. Upon deliberation, the Review Panel may issue and deliver to the Agency a notice of satisfaction of the terms of the mandatory order, or the Review Panel may take any other action available to it.

14.8 **Fines**

14.8.1 The Review Panel may impose a fine on an Agency in such amount and on such terms of payment as the Review Panel deems appropriate.

14.8.2 Without limiting the generality of the foregoing provision, the Review Panel may make a fine due upon occurrence of some event or failure to comply with the provisions of the Regulations or the By-laws or with a mandatory order of the Review Panel.

14.9 **Probation**

14.9.1 The Review Panel may place an Agency on probation for such period as it considers necessary to ensure the Agency is capable of maintaining compliance with the Regulations and applicable grade rule requirements and/or product standards.

14.9.2 As part of any probation order, the Review Panel may require the Agency to provide the CLSAB with a Monthly Summary Report detailing the following:

(a) facilities inspected - including number of visits to each facility within the month;
(b) item(s) inspected;
(c) below grade/excess moisture results per item on each inspection;
(d) lumber held for re-grade, identify the facility;
(e) corrective action taken with a facility in non-compliance; and
(f) any additional information the Review Panel may deem relevant in the Review Panel's assessment of an Agency's ability to maintain compliance with the Regulations, the By-laws and/or applicable grading rules.

14.9.3 Additional Surveys - the Review Panel, as part of any probation order, may require that the CLSAB, in addition to its usual semi-annual performance survey, perform at least one additional performance survey, during the course of the probation period.

14.9.4 Costs of Administering Probationary Action - the Review Panel may order that the Agency on probation shall pay, in whole or in part, all costs incurred by the CLSAB and the Review Panel in administering the probationary orders of the Review Panel.

14.9.5 Probation Assessment - the Review Panel may at any time during the probationary period, review the performance of the Agency subject to a probation order and make judgement as to the Agency's compliance.

14.9.6 When, in the judgement of the Review Panel, assessment of the Agency's performance verifies that the Agency remains in noncompliance with these Regulations and the By-laws, the Review Panel may take any further Enforcement Action it deems necessary.

14.9.7 The Review Panel shall, upon expiration of the extended probationary period, re-examine the Agency's performance for the entire probationary period. If in the judgement of the Review Panel, the Agency has returned to compliance with these Regulations, no further action shall be taken by the Review Panel. If in the judgement of the Review Panel, the Agency remains in non-compliance, the Review Panel may take any further Enforcement Action it deems necessary.

14.10 **Suspension**

14.10.1 "Suspension" shall in these Regulations refer to a temporary period, as described by the Review Panel, whereby the Review Panel revokes the Agency's privilege to supervise, grade stamp or perform other functions associated with the accreditation under review.

14.10.2 When, after reviewing an Agency's file, the Review Panel decides to suspend an Agency, it shall notify the Agency in writing of its decision to suspend an Agency's accreditation and shall advise the Agency of the classes of accreditation under suspension and the length of suspension. In addition, the Review Panel shall advise the Agency of any requirements it must meet in order to have its accreditation reinstated at the expiry of the period of suspension.

14.10.3 Suspension Assessment - the Review Panel shall, at the completion of the suspension period, review the competency, reliability and adequacy of the Agency to recommence supervisory services within specific grade classification and/or item within the classification and/or product standards in the class in relation to which the suspension order was made. Where the Review Panel deems it appropriate, it may, after such review, reinstate the Agency's accreditation, extend the period of suspension or place the Agency on probation as a condition of the reinstatement of any accreditation, or where the Review Panel considers it to be in the public interest, revoke all or any of the Agency's accreditation.

14.10.4 During the suspension period, and in any case no later than thirty (30) calendar days prior to the expiry of the suspension period, the Agency shall provide the Review Panel with a written report detailing:

(a) evidence that it has taken corrective action to comply with these Regulations;
(b) evidence of re-training or attendance at applicable courses or seminars;
(c) results of any testing by CLSAB to determine proficiency;
(d) and any other evidence relevant to the Review Panel's determination of whether to re-instate the Agency.

14.10.5 Cost of Administering Suspension Action - the Review Panel may order that the Agency under suspension shall bear, in whole or in part, all costs incurred by the CLSAB and the Review Panel in administering the suspension orders of the Review Panel.

14.11 **De-accreditation**

14.11.1 Where after reviewing the Agency's file, the Review Panel determines that an Agency should be de-accredited, it shall report its recommendation and the reasons for it to the Board. The Board shall then consider whether the Agency should be de-accredited.

14.11.2 De-accreditation shall in these Regulations refer to the Board revoking all or any classes of any Agency accreditation.

14.11.3 Where the Board makes a de-accreditation order against an Agency, that Agency shall discontinue the use of its specific certification mark as recognized by the duly executed agreement between the Agency and CLSAB in those classes of accreditation that have been revoked.

14.11.4 An Agency may not re-apply for accreditation until at least thirty (30) calendar days have elapsed since the de-accreditation order.

14.11.5 Agencies re-applying for accreditation in the class desired shall make an application in accordance with these Regulations.

14.11.6 In addition to the provisions of the CLSAB By-laws and these Regulations when considering the appropriate level of enforcement action to order, the CLSAB and/or Review Panel may have regard to the requirements of the Relevant Policy Directives approved pursuant to the Agreement between The Canadian Food Inspection Agency and Canadian Lumber Standards Accreditation Board and other relevant documents.

15.0 **APPEALS**

A decision of the Review Panel to fine, place on probation or suspend the accreditation of an Agency may be appealed to the Executive Committee within thirty (30) calendar days of the making of the Review Panel's decision. An appeal from a decision of the Board to revoke the accreditation of an Agency may be made to the Board within thirty (30) calendar days of the Board making the de-accreditation decision.

16.0 **LAPSE OF ACCREDITATION**

If a CLSAB accredited Agency shall not have graded, grade stamped, or supervised the grading, or grade stamping of any lumber for a period of two years, the accreditation of the Agency shall thereupon lapse and terminate, unless the Agency establishes grounds for the continuance of its

accreditation. Lapse and termination of accreditation shall not prejudice subsequent application by the Agency for re-application.

Schedules to the CLSAB Regulations

Schedule A: CLSAB Policy for Product Standards Approval

GENERAL

Responsibility for this policy is vested in the Board of Directors of the CLSAB. Revisions may be recommended by the Canadian Lumber Standards Operations Committee (CLSOC) or any other duly appointed committee of the CLSAB.

Responsibility for the evaluation, application and interpretation of this policy is vested in the CLSOC or any other committee so appointed by the Board of Directors of CLSAB. This policy is for use in approving Product Standards that are utilized by CLSAB accredited Grading Agencies as provided for in the CLSAB Regulations - Section 2.

For the purpose of this document a Product Standard is a prescribed set of performance requirements or combination thereof that describes or define a given product. Present examples of approved CLSAB Product Standards are:

- SPS 1: NLGA Special Products Standard for Fingerjoined Structural Lumber
- SPS 2: NLGA Special Products Standard for Machine Graded Lumber
- SPS 3: NLGA Special Products Standard for Fingerjoined “Vertical Stud Use Only” Lumber
- SPS 4: NLGA Special Products Standard for Fingerjoined Machine Graded Lumber
- SPS 5: NLGA Special Products Standard for Face-Glued Fingerjoined Lumber – Vertical Stud Use Only
- SPS 6: NLGA Special Products Standard for Structural Face-Glued Lumber

APPLICATION

The application for CLSAB approval of a Product Standard shall be submitted to the President & CEO of the CLSAB. The application shall include the following:

i) A statement indicating the means of financing the continued maintenance of the Product Standard.
ii) Provisions for periodic review, revision, renewal or withdrawal of the Product Standard.
iii) An indication that the Product Standard will be made available at a reasonable cost to anyone desiring a copy.
iv) A description of how the Product Standard was prepared and how it represents a consensus as to the best available current information.
v) An indication of any other similar or related Product Standards including identification of differences and or similarities.
vi) An explanation of the National Status of the Product Standard such as extent of the need and use in Canada.

REQUIREMENTS OF PRODUCT STANDARDS

The Product Standard shall include the following:

a) A statement of the objective and use of the Product Standard.
b) A reference to the approval of the CLSAB.
c) Clearly stated and explicit requirements that can be readily enforced.
d) Provisions for certification and product marking or identification.
e) Provisions for re-inspection
f) An explanation of the procedure for obtaining interpretations.
g) The reference date of acceptance of the last revision and identification of any and all previous editions.

FORMAT OF PRODUCT STANDARDS

1) The Product Standard shall be structured in general conformance with the following:
2) Title
3) Approval - Date, CLSAB
4) Scope
5) Terminology
6) Specifications - Product, Equipment
7) Procedures for - Qualification, Quality Control
8) Provisions for - Grade Stamping or other Certification marking, Reinspection
9) Referenced Documents - List
10) Annexes and Appendices

COMMENTARY (RATIONALE)

The inclusion of a commentary or rationale section is required to ensure that brief and concise documentation is available to the user to provide traceability of the Product Standard and clarification of past commentary. This shall include:

i) brief history of the development of a new Product Standard or revision to an existing standard including when and why the endeavor was initiated; and
ii) reasons and justification for various requirements. Most important is detailing the basis of technical requirements.

Schedule B: CLSAB Policy for Lumber Grading Machine Approval

1.0 GENERAL

1.1 Responsibility for this Policy is vested in the Board of Directors of the CLSAB.
1.2 Revisions may be recommended by the Canadian Lumber Standards Operations Committee (CLSOC) or any other appointed committee of the CLSAB.
1.3 Additional or modified requirements may be recommended by the CLSOC or any other appointed committee of the CLSAB to ensure consistent application of:

a) The intent of this Policy to novel grading machines, and
b) The intent of the CLSAB approved product standard for mechanically graded lumber.[1]

Note [1]: CLSAB may employ consultants to assist in evaluating the application for approval of machines. The applicant Agency will be responsible to CLSAB for any fees and expenses incurred by the consultant(s).

1.4 Responsibility for evaluation, application and interpretation of this Policy is vested in the CLSOC or any other committee duly appointed by the Board of Directors.

2.0 SCOPE

2.1 This Policy outlines CLSAB criteria for approving mechanical devices (hereinafter referred to as "machine(s)") used in a lumber grading process that is under the supervision of a CLSAB accredited grading agencies (hereinafter referred to as the "Agency").
2.2 This Policy outlines performance requirements for machines that operate by measuring one or more mechanical or physical wood properties (hereinafter referred to as “indicating properties”), which are used to segregate lumber into classes for purposes of assigning characteristic strength values.
2.3 This Policy and the machines approved under this Policy are to be used only in conjunction with a CLSAB approved product standard for mechanically graded lumber (e.g. NLGA SPS2).
2.4 This Policy does not apply to mechanical devices used to apply visual grading rules (e.g. NLGA Standard Grading Rules Para. 124).

3.0 AGENCY RESPONSIBILITIES

3.1 The Agency shall be responsible for verifying that the testing and evaluation are carried out as described in the application for approval and in accordance with the requirements of this Policy.
3.2 The Agency, upon machine approval, shall ensure that:

a) each machine is installed and operated in accordance with the manufacturer’s specifications, and
b) any additional requirements identified by this Policy.

3.3 Machines shall only be operated in association with a quality control program approved by the Agency for the specified facility and machine.

4.0 APPLICATION - (Applications may be obtained by contacting a CLSAB Accredited Agency)

4.1 Application for machine approval shall only be submitted to the CLSAB by an Agency.
4.2 The application shall include the following:

a) An explanation of the type of machine(s) for which approval is desired and a description of how the machine operates including:
   i. installation requirements;

ii. maintenance and operating instructions;
iii. the frequency, extent and procedures for calibration;
iv. property compensating devices or algorithms[2]; and
v. the environmental conditions in which the machine will be operating.

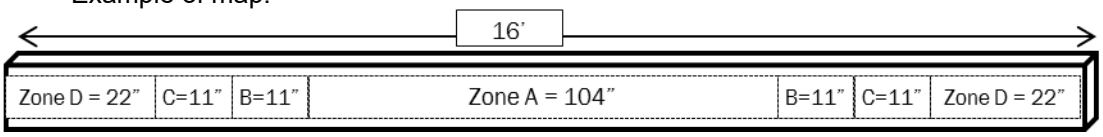
NOTE[2]: These include mechanical and electrical devices used to adjust, for example, the measured property for feed speed, temperature, moisture content, or lumber orientation.

b) The operating range of lumber physical properties, including:
i. strength,
ii. stiffness,
iii. density,
iv. sizes (thickness, width and length),
v. surface finish,
vi. temperature vs moisture content, and
vii. dimensional variations (i.e. warp).
Over which the machine is capable of consistently segregating with the stated precision.

c) For the range of lumber lengths stated in 4.2.b), a plot shall be prepared showing the frequency at which each cross-section in a piece of lumber appears in the measurement region[3] that is tested for the indicating properties. The test frequency zones[4], designated as A to D, shall be identified.

NOTE[3]: The "measurement region" is the length, area or volume of lumber that is in the test zone when the indicating properties are determined. For example, in the case of bending type machines, the measurement region is the test span.

Example of map:



NOTE[4]: This map shall be used to define the "Untested" and "Partially Tested" portions in a piece, and will be used with the "Visual Grading of Untested Portions". For a given length,

Zone "A" is defined as those portions tested at the maximum frequency;
Zone "D" as those portions that are not tested;
Zone "B" as partially tested areas with test frequency at 50% or more of Zone "A"; and
Zone "C" as partially tested areas with test frequency between that of Zone "B" and "D".

d) Evidence that the machine's throughput process will not alter the mechanical and physical properties of the lumber.

e) A detailed report of the testing program,

i. quality and condition of the sample(s) used, and
ii. how the results are interpreted to establish the accuracy and precision of the machine within the operating range stated in 4.2.b).[5]

NOTE[5]: The lumber sample should be representative of or cover the range of lumber quality and characteristics normally processed in a mill. Consideration should

be given to the wood species mix, temperature, moisture content variations within and between pieces, and wood density. It may be necessary to develop a matrix of subsamples that covers the range of lumber quality and characteristics.

f) A machine specific operations Guide developed in accordance with the requirements of and for use in conjunction with the CLSAB approved standard (e.g. NLGA SPS2).[6]

The Guide shall provide, if applicable:

i. Additional visual grading requirements;
ii. Additional restrictions to qualification and quality control procedures[7]; and
iii. Other information necessary to apply the product standard.[8]

NOTE[6]: The guide shall form part of the facilities plant standard
NOTE[7]: This may include, for example, a restriction on the range of lumber length that can be covered in a single qualification test. Traditionally, an "Item" is defined as lumber of a given grade, size, species group and moisture content without reference to length.
NOTE[8]: This may include, for example, a description of “Fine-tuning" that is consistent with the intent of the CLSAB approved product standard for mechanically graded lumber.

g) The manufacturer’s procedures for:

i. Documenting and releasing updates/upgrades to the equipment, and
ii. Operating and maintenance procedures.

5.0 VERIFICATION

5.1 The applicant shall provide evidence to support the following:

a) That the machine is capable of consistently sorting a lumber population described in 4.2.b) into grade classifications that will satisfy the requirements of the CLSAB approved standard (e.g. the NLGA SPS2) to which the lumber will be produced.

b) That the machine is capable of measuring the indicating property or properties with sufficient frequency over the length of the piece such that the stated accuracy and precision is maintained over the range of lumber sizes described in 4.2.b).

c) That visual grade rules have been provided to ensure strength-reducing grade characteristics found in the “Untested” (Zone D) or “Partially Tested” (Zones B and C) sections of the lumber piece described in 4.2c do not exceed those found in the “Fully-tested” portions (Zone A).

d) That the “untested” (Zone D) sections of any piece do not exceed 750 mm in length.

e) That the machine is capable of relating each of its indicating property measurements to pre-set boundary levels corresponding to individual stress grades, and how the system is marking and keeping track of the value of each piece.

f) That the machine measurements of each indicating property is within ±1% of the actual indicating property over the upper 95% of the operating range, and can be maintained within ±2% of the actual indicating property while in operation.[9]

NOTE[9]: For the indicating properties, the machine must be capable of being calibrated to within ±1% when installed and maintained at ±2% when in operation. These specifications are consistent with that of load cells used in bending proof-loading test equipment at MSR facilities.

g) That the standard properties predicted from the indicating properties are within

i. ±3% of the actual standard property[10] over the upper 95% of the operating range
ii. ±5% or
iii. ±10%

NOTE[10]: The "standard property" is the edgewise-bending modulus of elasticity at 15% moisture content and tested at a span-to-depth of 21:1. This definition may be extended to other relevant property such as modulus or rupture or ultimate tensile strength.

h) That the indicating property or properties recorded for any piece of lumber from within the operating range are within ±3% of the mean value for that indicating property and piece of lumber, with a minimum 95% confidence level when repeatedly passed through the machine.[11]

NOTE[11]: This clause assesses the repeatability and reproducibility of the machine (i.e. variations in results from using the same equipment in the same facility). Typically, fine-tuning based is limited to a ± 3% of the grade boundary settings.

5.2 CLSAB may employ consultants to assist in evaluating the application for approval of machines. The applicant Agency will be responsible to CLSAB for any fees and expenses incurred by the consultant(s).

Schedule C: CLSAB Policy for Grading Agency Verification of Heat Chambers

GENERAL

This policy establishes minimum criteria to be used by agencies to verify that equipment and heat treating schedules meet the minimum time and temperature requirements defined in the NLGA Standard Grading Rules for Canadian Lumber - Paragraph 715 HEAT TREATMENT.

Responsibility for this policy is vested in the Board of Directors of the CLSAB. Revisions may be recommended by the Canadian Lumber Standards Accreditation Board Operations Committee (CLSAB OC) or any other appointed committee of the CLSAB.

Responsibility for evaluation, application and interpretation of this policy is vested in the CLSAB OC or any other committee duly appointed by the Board of Directors.

1.0 Requirements for the Qualification of a Facility:

1.1 All equipment must be in proper working condition.

1.2 The agency shall verify that:

1.2.1 the heat treating schedules and heat treatment chambers meet the General Conditions of Section 3.0 and the Specific Heat Treatment Chamber Operating Conditions for Generic Schedules of Section 3.1 or Section 3.2 of this policy; or,
1.2.2 the specific schedule used by the facility achieves a minimum core temperature of 56^{o}C for a minimum of 30 minutes.
1.2.3 temperature sensors be properly located to accurately measure the temperature achieved in the heat chamber. Appendix A provides diagrams illustrating how to determine kiln length to assist in placement of temperature sensors.
1.2.4 the process for verifying the wood core temperature must be specified in the facility's quality manual and approved by CLSAB.

1.3 The agency shall require each facility with or without heat treatment chambers to develop a quality manual of the facility's quality system procedures and it shall review and approve each manual. The quality manual shall include:

1.3.1 a procedure that confirms proper operation of the treatment chamber during heat treatment.
1.3.2 procedures for dealing with failure or deficiencies in equipment operation including heat sensors, fans, etc.
1.3.3 procedures for segregation of non KD-HT and/or HT products for facilities without heat treatment chambers.
1.3.4 an approved method that verifies a sufficient volume of KD-HT or HT material was purchased from a registered facility for the volume of reworked material that is labelled as KD-HT or HT.
1.3.5 the Ramp-up Zone (RUZ) is the zone within a continuous kiln where the minimum heat treatment run starts; the Ramp-up Zone length (RUZL) is the distance from the beginning of the mid-third of the entering section of each track to the beginning of the heat treatment zone (HTZ); the Heat Treatment Zone (HTZ) is the zone within the main heating section of a continuous kiln where the heat treatment will be monitored based upon temperature sensor location(s); and the Heat Treatment Zone Length (HTZL) is determined by the location of the temperature sensors as outlined in Option A, B and D for each track. Appendix B provides diagrams illustrating the foregoing definitions for Option A, B, D and D-1.
1.3.6 the verification method where the option requires moisture reduction.

2.0 Monitoring

2.1 Agencies shall require facilities to monitor temperatures throughout the heat treatment cycle by any of the following options:

2.1.1 wet bulb for bi-directional continuous kilns
2.1.2 wet and dry bulb temperature
2.1.3 dry bulb only
2.1.4 direct measurement of wood core temperatures developed by a Heat Treatment Evaluator recognized by the Canadian Food Inspection Agency

2.2 If a facility is not in operation for a period of 6 months or longer, the facility must specify steps used in ensuring that the equipment is in normal operating condition before beginning treatments.

3.0 Heat Treatment Chamber Operating Conditions and Schedules

3.1 General Conditions - The following heat treatment chamber operating conditions apply to all generic schedules, Options A, B, C, D, E, F, G and H.

GENERAL HEAT TREATMENT CHAMBER OPERATING CONDITIONS

- A minimum air velocity of 0.5 meters/second (100 feet/ minute), (measured on the air exit side of the chamber of the load) is required. A zone is an area of 5m (16 feet) long by 2.5m (8 feet) high.
- The system should record temperatures at a minimum of every 30 minutes.
- Lumber must be stacked on stickers no less than 9.5mm (3/8 inches) in thickness and in a manner to provide adequate air flow. Wood packaging or other wood products may be piled in a manner to provide good air circulation through and over all wide surfaces of individual boards.
- For options A through G, H-1 and J the dry and wet bulb measuring system must accurately measure the temperature within 2.5^{o}C (4.5^{o}F). Verification of the measuring system will be required on an annual basis. This requirement may be removed where the temperature run time exceeds the requirement for option A, B, D, E, F and J by at least 5^{o}C and by at least 10^{o}C for option C, G and H-1.
- For option H-2 the dry bulb measuring system must accurately measure the temperature within 1.0^{o}C (1.8^{o}F). Verification of the measuring system will be required twice a year by an independent party.
- When wet bulb temperature is monitored, at least 1 wet bulb temperature sensor that directly measures wet bulb temperature or provides information from which wet bulb temperatures can be recorded must be present and in its appropriate location.

3.2 Specific Heat Treatment Chamber Operating Conditions for Generic Softwood Schedules, Options A, B, C & D

These schedules apply to all coniferous (softwood) species grown in Canada and the following deciduous (hardwood) genus/species grown in Canada:

- *aspen (Populus tremuloides),*
- *poplar (Populus spp.),*
- *Manitoba maple (Acer negundo),*
- *basswood (Tilia americana) and*
- *red alder (Alnus rubra).*

3.3 Specific Heat Treatment Chamber Operating Conditions for Generic Hardwood Schedules, Options E, F, G & H

These schedules apply to all deciduous (hardwood) genera grown in Canada including but not limited to:

- *maple (Acer spp.),*
- *alder (Alnus spp.),*
- *oak (Quercus spp.),*
- *birch (Betula spp.),*
- *ash (Fraxinus spp.) and*
- *beech (Fagus spp.).*

4.0 Verification of Compliance

4.1 LABELING

All softwood lumber which has been treated to meet the General Conditions of Section 3.0 and the specific conditions of one of the options in Section 3.1 or 3.2 may be identified as follows:

4.1.1 All pieces of lumber which have achieved both the required moisture content and undergone the appropriate heat treatment schedule may be affixed with a Grading Agency stamp approved by CLSAB bearing the letters KD-HT or HT. The KD-HT or HT stamp shall be positioned on each piece of lumber in accordance with the current CLSAB Regulations.

4.1.2 Lumber which has been heat treated without moisture content reduction but has undergone the required heat treatment schedule may be labeled as HT. The HT stamp shall designate the Agency and the Mill Number and shall be positioned on each piece of lumber in accordance with current CLSAB Regulations.

4.1.3 KILN WETS (Pieces of lumber that do not achieve the desired moisture content in the drying process). Randomly occurring pieces of lumber which have been processed in the same kiln drying charge, but do not achieve the desired moisture content of 19% or less may be marked with an HT stamp, which will designate that the lumber has undergone "Heat Treatment" in accordance with the NLGA Grading Rules Definition. The HT stamp shall designate the Agency and the Mill Number and shall be positioned on each piece of lumber in accordance with current CLSAB Regulations.

4.2 CERTIFICATE ISSUANCE

All softwood lumber which has been treated to meet the General Conditions of Section 3.0 and the specific conditions of one of the options in Section 3.1 or 3.2 may be identified by:

4.2.1 an industry issued certificate stating that material has met the requirements of the HT designation or,
4.2.2 a phytosanitary certificate issued by CFIA

In either case, the facility producing or certifying the material shall be under the jurisdiction of the CLSAB and its Accredited Agencies.

5.0 Records and Reporting

5.1 All records shall be in compliance with the general CLSAB “Regulations”.
5.2 An audit checklist, as shown in Schedule “D” shall be completed by the agency.
5.3 Agencies shall make their records available to CLSAB in compliance with CLSAB “Regulations” and as required by the Board.

6.0 Procedures for Monitoring of Bi-Directional Continuous Dry Kilns

The following information is for CLSAB Accredited Agencies to ensure heat treatment conditions are met as required by the CLSAB Regulations for Bi-Directional Continuous Dry Kilns (BDCK).

The CLSAB recognizes the following three methods for ensuring lumber has been heat treated (HT) in a closed chamber to achieve a minimum core temperature of 56°C for a minimum of 30 minutes.

Method 1 – Kiln Track Monitoring – Options A, B, D and D-1

A graph or table per track must show the push rate and the individual readings of the temperature sensors according to the selected heat treatment option. Temperatures must be recorded at a minimum of every 30 minutes.

Method 2 – Kiln Track Monitoring – Optimized – Options A, B, D and D-1

A graph or table per track must show the push rate and the individual readings of the temperature sensors according to the selected heat treatment option. Temperatures must be recorded at a minimum of every 30 minutes. Method 2 is optimized through the formulas for the Kiln Specific Delay and the Kiln Specific Time.

Method 3 – Lumber Package Monitoring

A graph or table per package must show the individual readings of the temperature sensors during the time the package was in the Heat Treatment Zone (HTZ) according to the selected heat treatment option. Temperatures must be recorded at a minimum of every 30 minutes. A system must be used to identify that each package met heat treatment requirements.

When there has been a **planned or unplanned interruption** in the selected method, kiln operators are required to follow the steps outlined in **Appendix 1** to ensure heat treatment of the lumber has occurred.

Appendix 2 details the pusher restarting “procedures” referred to in Appendix 1.

Appendix 3 provides a listing of the terms and definitions for the procedures to monitor Bi-Directional Continuous Dry Kilns (BDCK).

Appendix 1
Steps to follow when there has been a planned or unplanned interruption to the selected method

Method 1: Kiln Track Monitoring

Step 1 - A Maximum Push Rate (MPR) must be determined for each track to satisfy RTx and mTx durations for each specific option. Lumber packages must be in the RUZ and HTZ for at least the RTx and the dry-bulb or wet-bulb temperature sensor(s) must have reached and maintained the minimum temperatures specific to each Option for at least the last mTx.

Initial start-up or restarting from empty kiln	Dealing with failure or malfunction		Restarting after a shutdown	
	• When the wet-bulb temperature drops below required temperature for Options A and/or B the pusher must be disabled	• Option D - when the dry bulb drops below 140ºF the pusher must be disabled		
Follow Procedure 1	The pusher is enabled: • If Kiln temp > 126ºF follow Procedure 3, or • If Kiln temp < 126ºF follow Procedure 5	The pusher is enabled: • If Kiln temp > 126ºF follow Procedure 3, or • If Kiln temp < 126ºF follow Procedure 5	If Kiln temp > 126ºF Follow Procedure 3	If Kiln temp < 126ºF Follow Procedure 5

Method 2: Kiln Track Monitoring (Optimized through the formulas for the Kiln Specific Delay and the Kiln Specific Time)

Step 1 - A Maximum Push Rate (MPR) must be determined for each track to satisfy RTx and mTx durations.
The MPR is a function of RUZL and the HTZL specific to each track and each heat treatment option.
The MPR is the fastest push rate that can be used to meet both criteria.

Initial start-up or restarting from empty kiln	Dealing with failure or malfunction	Restarting after a shutdown			
		When the pusher was disabled:			
	When the temperature of wet-bulb for Options A and B or Dry-Bulb for Option D drops below the required temperature the pusher can continue up to the KST	• If temp of kiln satisfies the option	• If temp of kiln below option for > 15 minutes	• If temp of kiln satisfies the option	• If temp of kiln below option for > 15 minutes

Follow Procedure 1	• Calculate KST
	• If pusher disabled before or at KST – follow Procedure 2
	• If pusher disabled after KST
	  ○ Non-compliant packages
	  ▪ Refer to Quality Manual and
	  • If Kiln temp > 126ºF follow Procedure 3, or
	  • If Kiln temp < 126ºF follow Procedure 5
		• If Kiln temp > 126ºF Follow Procedure 2	• If Kiln temp > 126ºF Follow Procedure 3	• If Kiln temp < 126ºF Follow Procedure 4	• If Kiln temp < 126ºF Follow Procedure 5

Appendix 2
Pusher Restarting Procedures

Procedure 1	The main heating section of the kiln is loaded in such a manner that green loads overlap in the center of the main heating section at least up to the location of the DB1 or WB1 sensor. Loaded kiln carts are placed at the exit ends of both tracks in the main heating section to prevent excessive heat losses. The kiln can be started and the pusher may be enabled. Lumber packages must be in the HTZ for at least the RTx after the kiln was started if the DB1 and DB2 or wet-bulb temperature sensor(s) reach and maintain the minimum temperatures required by each heat treatment option for at least the last mTx. The kiln is then considered to be in normal operating conditions related to heat treatment.
Procedure 2	Once both the DB1 and DB2 or wet-bulb temperature sensor(s) reach and maintain a minimum temperature specific to each option, the pusher can only be enabled after a Kiln-Specific Delay (KSD) which depends on the HTZL and the push rate. The KSD is determined as follows: KSD-mTx = 2 * mTX - HTZL / PR If KSD is less than or equal to 0, then KSD = 0 If KSD is longer than mTx, then KSD = mTx <u>Occurrence of failure or malfunction</u> If mTx is not completed before a subsequent failure, the pusher must be disabled until mTx is completed. Once completed, the pushers can be enabled. The kiln is then considered in normal operating conditions related to heat treatment.
Procedure 3	The pusher can be enabled after a delay of mTx once the DB1 and DB2 or wet-bulb temperature sensor(s) in the HTZ reach and maintain the minimum temperatures required by each option. The kiln is then considered in normal operating conditions related to heat treatment.
Procedure 4	The pusher can only be enabled after a Kiln-Specific Delay (KSD). The Kiln-Specific Delay (KSD), which depends on the HTZL and the push rate, is determined as follows: KSD-RTx = 2 * RTx - HTZL / PR If KSD is less than or equal to 0, than KSD = 0. If KSD is longer than RTx, than KSD = RTx. During RTx both the DB1 and DB2 or wet-bulb temperature sensor(s) must have reached and maintained a minimum temperature specific to each Option for at least the last mTx. <u>Occurrence of failure or malfunction</u> If the RTx and the mTx are not completed before a subsequent failure, the pusher must be disabled until RTx and mTx are completed. Once completed, the pushers can be enabled. The kiln is then considered in normal operating conditions related to heat treatment.
Procedure 5	The pusher can be enabled after a delay of RTx if the DB1 and DB2 or wet-bulb temperature sensor(s) sensors reach and maintain the minimum temperatures required by each heat treatment option for at least the last mTx. The kiln is then considered in normal operating conditions related to heat treatment.

RTx = "Minimum Heat Treatment Run Time" for Options A (6.5 hours – 2 ¼") and B (8.5 hours – 2 ¼") and "Heat Treatment Run Time" for Option D (12 hours – 2 ¼") and Option D-1 (10 hours – 2 ¼")

mTx = "Wet Bulb Temperature Run Time" for Options A (2 hours – 2 ¼") and B (4 hours – 2 ¼") or "Minimum Time at the End of the Treatment with the Dry-Bulb" for Option D (6 hours – 2 ¼") and Option D-1 (5 hours – 2 ¼")

Appendix 3
Terms and Definitions

Term	Acronym	Definition
Dry-Bulb Temperature	DB	Is the temperature of air measured by a sensor freely exposed to the air
First Dry-Bulb	DB1	The sensor used to determine the beginning of the heat treatment zone or equivalent.
Second Dry-Bulb	DB2	The sensor used to determine the end of the heat treatment zone or equivalent.
Heat Treatment Zone	HTZ	Zone(s) within the main heating section of a continuous kiln where the heat treatment will be monitored.
Heat Treatment Zone Length	HTZL	The length of the Heat Treatment Zone.
Kiln-Specific Delay-mTx	KSD-mTx	KSD-mTx = 2 * mTx - HTZL / PR
Kiln-Specific Delay-RTx	KSD-RTx	KSD-RTx = 2 * RTx - HTZL / PR
Kiln-Specific Time	KST	KST = HTZL / PR - 2 * mTx If KST is less than 15 minutes then KST = 15 minutes
Maximum push rate as a function of mTx	MPRMT	MPRMT = HTZL / mTx
Maximum push rate as a function of RTx	MPRRT	MPRRT = RUZL / RUTx
	mTa	“Wet Bulb Temperature Run Time” for Option A
	mTd	“Minimum Time at the End of the Treatment with the Dry-Bulb” for Option D and D-1
	mTx	“Wet Bulb Temperature Run Time” for Options A and B or “Minimum Time at the End of the Treatment with the Dry-Bulb” for Option D and D-1
Push Rate	PR	Rate of motion of the lumber specific to the track.
	RTx	“Minimum Heat Treatment Run Time” for Options A and B and “Heat Treatment Run Time” for Option D and D-1
	RUTx	Ramp-Up Time for each specific option – RUTx = (RTx) – (mTx)
Ramp-Up Zone	RUZ	Is the zone within a continuous kiln where the minimum heat treatment run starts.
Ramp-Up Zone Length	RUZL	Length of the ramp up zone
Wet-Bulb Temperature	WB	Is the temperature measured by a temperature sensor covered with a water soaked cloth over which air is passed.
First Wet-Bulb	WB1	The sensor used to determine the beginning of the heat treatment zone or equivalent.
Second Wet-Bulb	WB2	The sensor used to determine the end of the heat treatment zone or equivalent.
Entering/Exiting sections		Entering and exiting sections of a continuous kiln without controlled artificial heating and no doors
Main heating section		Section of a continuous kiln with controlled artificial heating (the central section of the kiln)
Multiple heating zones in the main heating section		Longitudinal zones within the main heating section of a continuous kiln for which temperature can be controlled independently

Option A: Heat Treatment with or without Moisture Reduction

This option can be used by a facility to heat treat wood during the thermal treatment (HT) or kiln-drying (KD) process.

HEAT TREATMENT CHAMBER OPERATING CONDITIONS FOR OPTION A

Temperatures must be recorded at a minimum of every 30 minutes.

Air flow should occur in each two opposite directions within the treatment chamber for half of the time specified at a temperature equal to or exceeding the wet bulb temperature run time (see tables for each option). This requirement may be modified where it can be technically proven by a recognized heat treatment evaluator and when other measures can compensate for deviation. Any modifications must be included in the quality manual and account for all the processes used to ensure that the phytosanitary standard is being met.

Batch Kilns

Both wet-bulb and dry bulb temperatures are measured.

Dry bulb temperature sensors must be located on at least one side of the heat treatment chamber and spaced not more than 7.3 metres (24 feet) apart, perpendicular to the airflow and with one located no more than 2.5 m (8.5 feet) from each end of the treatment chamber. The number of dry bulb sensors required will depend on the length of the individual kiln and the above sensor placement scale.

At least one wet bulb temperature sensor, either measuring wet bulb temperature or providing data to determine the wet bulb temperature must be located near the mid third of the treatment chamber, on any one side. The dry bulb temperature must exceed the wet bulb temperature during the heat treatment to ensure the uniformity of the heat treatment chamber conditions.

Appendix C – Figure 1 provides a diagram illustrating the minimum layout requirements for Option A – batch kiln.

The pre-schedule wood core temperature must be equal to or greater than 15°C (59°F) in order to use the generic schedule for Option A. The pre-schedule wood core temperature can be determined by direct measurement of the wood core temperature or by using the previous night's low temperature as the wood core temperature.

At wood core temperatures below 15°C (59°F) the facility must have specifications in the quality manual to pre-heat the wood until the core temperature of at least one piece of lumber of the thickest nominal size reaches 15°C (59°F), before starting the generic schedule. Alternatively, the following temperature adjustments may be made:

For wood core temperatures below 15°C, add the temperature adjustment to the "Minimum Heat Treatment Run Time".

- *Over 57 mm (2 1/4") to 83 mm (3 1/4")..... add 10.0 minutes per 1°C (5.6 minutes per 1 °F)*
- *Over 83 mm (3 1/4") to 110 mm (4 1/4")..... add 15.3 minutes per 1°C (8.5 minutes per 1 °F)*
- *Greater than 108 mm (4 1/4 inches)……. Adjustment not available. Direct core measurement is required.*

Pre-schedule wood core temperature verification and the pre-heating process is not required for pieces of wood less than or equal to 57 mm (2-1/4 inches)

<u>Bi-Directional Continuous Kilns</u> – (Applies only to Option A)

The following temperature bulb placements are available to a registered facility operating a bi-directional continuous kiln.

a. <u>One wet bulb</u>

- One (1) wet-bulb temperature sensor, either measuring wet bulb temperature or providing data to determine the wet bulb temperature must be placed within the mid-third of the main heating section.
- The length of the mid-third of the main heating section is referred to as the Heat Treatment Zone Length (HTZL) and is used to determine that the wet bulb temperature continuous run time for the option has been satisfied.

b. <u>Three wet bulbs</u>

- One (1) wet-bulb temperature sensor, either measuring wet bulb temperature or providing data to determine the wet bulb temperature must be placed within the mid-third of the main heating section.
- To extend the Heat Treatment Zone Length (HTZL), one (1) wet-bulb temperature sensor, either measuring wet bulb temperature or providing data to determine the wet bulb temperature must be placed within the exiting (recommended) or entering third of the main heating section on each track.
- The Heat Treatment Zone Length (HTZL) is determined by adding the length of the mid-third heating section plus the distance to the location of the wet-bulb temperature sensor within the exiting (recommended) or entering third of the main heating section on each track and is used to determine that the wet bulb temperature continuous run time for the option has been satisfied.

c. <u>Four wet bulbs</u>

- Two (2) wet-bulb temperature sensors, either measuring wet bulb temperature or providing data to determine the wet bulb temperature must be placed within the main heating section of each track.
- For each track the distance perpendicular to airflow between these sensors is referred to as the Heat Treatment Zone Length (HTZL) and is used to determine that the wet bulb temperature continuous run time for the option has been satisfied.

Appendix D - Figure 1, 2 and 3 provides a diagram illustrating the minimum layout requirements for Option A – Bi-Directional Continuous Kiln.

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION A			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 60ºC (140ºF)**	**Minimum Final Wet-Bulb Temperature**
Up to 57 mm (2 1/4 inches)	6 hrs, 26 minutes	2 hrs, 3 minutes	63ºC (145ºF)
Up to 83 mm (3 1/4 inches)	7 hrs, 20 minutes	3 hrs, 20 minutes	66ºC (151ºF)
Up to 108 mm (4 1/4 inches)	10 hrs, 57 minutes	6 hrs, 34 minutes	67ºC (153ºF)

Generic Phytosanitary Heat Treatment Schedules for Softwood Timbers Thicker Than 110mm (5 inch nominal) - (Options A-1 to A-6)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION A-1			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 70°C (158°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	9 hrs, 38 minutes	5 hrs, 8 minutes	70ºC (158ºF)
Up to 152 mm (6 inches)	11 hrs, 16 minutes	6 hrs, 46 minutes	70ºC (158ºF)
Up to 178 mm (7 inches)	13 hrs, 14 minutes	8 hrs, 44 minutes	70ºC (158ºF)
Up to 203 mm (8 inches)	15 hrs, 37 minutes	11 hrs, 7 minutes	70ºC (158ºF)
Up to 228 mm (9 inches)	18 hrs, 25 minutes	13 hrs, 55 minutes	70ºC (158ºF)
Up to 254 mm (10 inches)	21 hrs, 44 minutes	17 hrs, 14 minutes	70ºC (158ºF)
Up to 279 mm (11 inches)	25 hrs, 36 minutes	21 hrs, 6 minutes	70ºC (158ºF)
Up to 305 mm (12 inches)	30 hrs, 4 minutes	25 hrs, 34 minutes	70ºC (158ºF)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION A-2			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Continuous Temperature Run Time ≥ 69° C (156°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	11 hrs, 10 minutes	6 hrs, 40 minutes	69ºC (156ºF)
Up to 152 mm (6 inches)	12 hrs, 16 minutes	8 hrs, 46 minutes	69ºC (156ºF)
Up to 178 mm (7 inches)	15 hrs, 49 minutes	11 hrs, 19 minutes	69ºC (156ºF)
Up to 203 mm (8 inches)	18 hrs, 52 minutes	14 hrs, 22 minutes	69ºC (156ºF)
Up to 228 mm (9 inches)	22 hrs, 29 minutes	17 hrs, 59 minutes	69ºC (156ºF)
Up to 254 mm (10 inches)	26 hrs, 44 minutes	22 hrs, 14 minutes	69ºC (156ºF)
Up to 279 mm (11 inches)	31 hrs, 41 minutes	27 hrs, 11 minutes	69ºC (156ºF)
Up to 305 mm (12 inches)	37 hrs, 24 minutes	32 hrs, 54 minutes	69ºC (156ºF)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION A-3			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 68° C (154°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	12 hrs, 18 minutes	7 hrs, 48 minutes	68ºC (154ºF)
Up to 152 mm (6 inches)	14 hrs, 45 minutes	10 hrs, 15 minutes	68ºC (154ºF)
Up to 178 mm (7 inches)	17 hrs, 44 minutes	13 hrs, 14 minutes	68ºC (154ºF)
Up to 203 mm (8 inches)	21 hrs, 17 minutes	16 hrs, 47 minutes	68ºC (154ºF)
Up to 228 mm (9 inches)	25 hrs, 30 minutes	21 hrs	68ºC (154ºF)
Up to 254 mm (10 inches)	30 hrs, 26 minutes	25 hrs, 56 minutes	68ºC (154ºF)
Up to 279 mm (11 inches)	36 hrs, 11 minutes	31 hrs, 41 minutes	68ºC (154ºF)
Up to 305 mm (12 inches)	42 hrs, 49 minutes	38 hrs, 19 minutes	68ºC (154ºF)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION A-4			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 67° C (152°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	13 hrs, 14 minutes	8 hrs, 44 minutes	67°C (152°F)
Up to 152 mm (6 inches)	15 hrs, 59 minutes	11 hrs, 29 minutes	67°C (152°F)
Up to 178 mm (7 inches)	19 hrs, 18 minutes	14 hrs, 48 minutes	67°C (152°F)
Up to 203 mm (8 inches)	23 hrs, 16 minutes	18 hrs, 46 minutes	67°C (152°F)
Up to 228 mm (9 inches)	27 hrs, 58 minutes	23 hrs, 28 minutes	67°C (152°F)
Up to 254 mm (10 inches)	33 hrs, 29 minutes	28 hrs, 59 minutes	67°C (152°F)
Up to 279 mm (11 inches)	39 hrs, 53 minutes	35 hrs, 23 minutes	67°C (152°F)
Up to 305 mm (12 inches)	47 hrs, 17 minutes	42 hrs, 47 minutes	67°C (152°F)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION A-5			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 66° C (150°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	14 hrs, 3 minutes	9 hrs, 33 minutes	66°C (150°F)
Up to 152 mm (6 inches)	17 hrs, 2 minutes	12 hrs, 32 minutes	66°C (150°F)
Up to 178 mm (7 inches)	20 hrs, 39 minutes	16 hrs, 9 minutes	66°C (150°F)
Up to 203 mm (8 inches)	24 hrs, 59 minutes	20 hrs, 29 minutes	66°C (150°F)
Up to 228 mm (9 inches)	30 hrs, 7 minutes	25 hrs, 37 minutes	66°C (150°F)
Up to 254 mm (10 inches)	36 hrs, 7 minutes	31 hrs, 37 minutes	66°C (150°F)
Up to 279 mm (11 inches)	43 hrs, 5 minutes	38 hrs, 35 minutes	66°C (150°F)
Up to 305 mm (12 inches)	51 hrs, 9 minutes	46 hrs, 39 minutes	66°C (150°F)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION A-6			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 64° C (148°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	14 hrs, 46 minutes	10 hrs, 16 minutes	64°C (148°F)
Up to 152 mm (6 inches)	17 hrs, 59 minutes	13 hrs, 29 minutes	64°C (148°F)
Up to 178 mm (7 inches)	21 hrs, 52 minutes	17 hrs, 22 minutes	64°C (148°F)
Up to 203 mm (8 inches)	26 hrs, 31 minutes	22 hrs, 1 minute	64°C (148°F)
Up to 228 mm (9 inches)	32 hrs, 1 minute	27 hrs, 31 minutes	64°C (148°F)
Up to 254 mm (10 inches)	38 hrs, 28 minutes	33 hrs, 58 minutes	64°C (148°F)
Up to 279 mm (11 inches)	45 hrs, 57 minutes	41 hrs, 27 minutes	64°C (148°F)
Up to 305 mm (12 inches)	54 hrs, 36 minutes	50 hrs, 6 minutes	64°C (148°F)

Option B: Heat Treatment with Moisture Reduction

This option can be used by a facility to heat treat wood during the thermal treatment (HT) or kiln-drying (KD) process.

HEAT TREATMENT CHAMBER OPERATING CONDITIONS FOR OPTION B

Temperatures must be recorded at a minimum of every 30 minutes.

Air flow should occur in each two opposite directions within the treatment chamber for half of the time specified at a temperature equal to or exceeding the wet bulb temperature run time (see tables for each option). This requirement may be modified where it can be technically proven by a recognized heat treatment evaluator and when other measures can compensate for deviation. Any modifications must be included in the quality manual and account for all the processes used to ensure that the phytosanitary standard is being met.

Batch Kilns

Both wet-bulb and dry bulb temperatures are measured.

At least one dry bulb temperature sensor must be located near the mid third of the heat treatment chamber, on any one side.

At least one wet bulb temperature sensor, either measuring wet bulb temperature or providing data to determine the wet bulb temperature must be located near the mid third of the treatment chamber, on any one side.

The heat treatment chamber must be equipped with at least one dry-bulb temperature sensor. If the air entering/ air exiting plenum is divided into three equal length segments, the temperature sensor(s) must be located as follows: At least one dry-bulb temperature sensor will be located within the mid-third segment of the kiln (on either side). If this condition is met, location of other sensors is not restricted. In lieu of a dry-bulb temperature sensor within the mid-third of the kiln, the kiln can be operated with two (or more) dry-bulb temperature sensors with at least one sensor located in each of the segments located at opposite ends of the kiln (on either side). The dry bulb(s) temperature must exceed the wet bulb temperature during the heat treatment to ensure the uniformity of the heat treatment chamber conditions.

Appendix C – Figure 2 provides a diagram illustrating the minimum layout requirements for Option B – Batch Kiln.

The pre-schedule wood core temperature must be determined by the facility (e.g. wood core measurements or the previous night's low temperature could be used as methods for determining core temperatures). At temperatures below 15°C (59°F) the facility must have specifications in the quality manual to pre-heat the wood until a wood core temperature of at least one piece of lumber of the thickest nominal size (i.e. 57 mm (2-1/4 inches), 83 mm (3-1/4 inches), or 108 mm (4-1/4 inches) reaches 15°C (59°F), before starting the official heat treatment process. Alternatively, the following temperature adjustment may be made

For wood core temperatures below 15°C, add the temperature adjustment to the "Minimum Heat Treatment Run Time".

- *Over 57 mm (2 1/4") to 83 mm (3 1/4") ..... add 10.0 minutes per 1°C (5.6 minutes per 1°F)*
- *Over 83 mm (31/4") to 110 mm (4 1/4") ..... add 15.3 minutes per 1°C (8.5 minutes per 1°F)*

Pre-schedule wood core temperature verification and the pre-heating process is not required for pieces of wood less than or equal to 57 mm (2-1/4 inches).

Bi-Directional Continuous Kilns – refer to Option A
Option B1: Heat Treatment With or Without Moisture Reduction

This option can be used by a facility to heat treat wood during the thermal treatment (HT) or kiln-drying (KD) process.

HEAT TREATMENT CHAMBER OPERATING CONDITIONS FOR OPTION B-1

Moisture reduction is not required to use this option.

Temperatures must be recorded at a minimum of every 30 minutes.

Air flow should occur in each two opposite directions within the treatment chamber for half of the time specified at a temperature equal to or exceeding the wet bulb temperature run time (see tables for each option). This requirement may be modified where it can be technically proven by a recognized heat treatment evaluator and when other measures can compensate for deviation. Any modifications must be included in the quality manual and account for all the processes used to ensure that the phytosanitary standard is being met.

Batch Kilns

Both wet-bulb and dry bulb temperatures are measured.

At least three (3) dry bulb temperature sensors must be located on either side of the heat treatment chamber. Sensors must be spaced approximately at equal distance apart perpendicular to the air flow. One sensor must be located at each end of the treatment chamber. These sensors should be placed closest to the end of the treatment chamber (approximately 5 m (16.5 feet). For chambers equal to or less than 17 metres (56 feet) in length (in the direction perpendicular to air flow) the number of dry bulb sensors can be reduced to 2 dry bulb sensors with the above placement criteria. The dry bulb(s) temperature must exceed the wet bulb temperature during the heat treatment to ensure the uniformity of the heat treatment chamber conditions.

At least one wet bulb temperature sensor, either measuring wet bulb temperature or providing data to determine the wet bulb temperature must be located near the mid-point of the treatment chamber, on any one side.

Appendix C – Figure 3 provides a diagram illustrating the minimum layout requirements for Option B-1 – Batch Kiln.

The pre-schedule wood core temperature must be determined by the facility (e.g. wood core measurements or the previous night's low temperature could be used as methods for determining core temperatures). At temperatures below 15°C (59°F) the facility must have specifications in the quality manual to pre-heat the wood until a wood core temperature of at least one piece of lumber of the thickest nominal size (i.e. 57 mm (2-1/4 inches), 83 mm (3-1/4 inches), or 108 mm (4-1/4 inches) reaches 15°C (59°F) , before starting the official heat treatment process. Alternatively, the following temperature adjustment may be made:

For wood core temperatures below 15 °C, add the temperature adjustment to the "Minimum Heat Treatment Run Time".

- *Over 57 mm (2 1/4") to 83 mm (3 1/4") ..... add 10.0 minutes per 1°C (5.6 minutes per 1°F)*
- *Over 83 mm (31/4") to 110 mm (4 1/4") ..... add 15.3 minutes per 1°C (8.5 minutes per 1°F)*

Pre-schedule wood core temperature verification and the pre-heating process is not required for pieces of wood less than or equal to 57 mm (2-1/4 inches).

Bi-Directional Continuous Kilns – refer to Option A **– (Applies only to Option B and B-1)**

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION B AND B-1			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 60°C (140 °F)**	**Minimum Final Wet-Bulb Temperature**
Up to 57 mm (2 1/4 inches)	8 hrs, 29 minutes	4 hrs, 6 minutes	63°C (145°F)
Up to 83 mm (3 1/4 inches)	10 hrs, 40 minutes	6 hrs, 40 minutes	66°C (151°F)
Up to 108 mm (4 1/4 inches)	17 hrs, 31 minutes	13 hrs, 8 minutes	67°C (153°F)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR Option B-1 (Thick stock)			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 70°C (158 °F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	14 hrs, 46 minutes	10 hrs, 16 minutes	70°C (158°F)
Up to 152 mm (6 inches)	18 hrs, 02 minutes	13 hrs, 32 minutes	70°C (158°F)
Up to 178 mm (7 inches)	21 hrs, 58 minutes	17 hrs, 28 minutes	70°C (158°F)
Up to 203 mm (8 inches)	26 hrs, 44 minutes	22 hrs, 14 minutes	70°C (158°F)
Up to 228 mm (9 inches)	32 hrs, 20 minutes	27 hrs, 50 minutes	70°C (158°F)
Up to 254 mm (10 inches)	38 hrs, 58 minutes	34 hrs, 28 minutes	70°C (158°F)
Up to 279 mm (11 inches)	46 hrs, 42 minutes	42 hrs, 12 minutes	70°C (158°F)
Up to 305 mm (12 inches)	55 hrs, 38 minutes	51 hrs, 08 minutes	70°C (158°F)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR Option B-2 (Thick stock)			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 69°C (156 °F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	17 hrs, 50 minutes	13 hrs, 20 minutes	69°C (156°F)
Up to 152 mm (6 inches)	22 hrs, 02 minutes	17 hrs, 32 minutes	69°C (156°F)
Up to 178 mm (7 inches)	27 hrs, 08 minutes	22 hrs, 38 minutes	69°C (156°F)
Up to 203 mm (8 inches)	33 hrs, 14 minutes	28 hrs, 44 minutes	69°C (156°F)
Up to 228 mm (9 inches)	40 hrs, 28 minutes	35 hrs, 58 minutes	69°C (156°F)
Up to 254 mm (10 inches)	48 hrs, 58 minutes	44 hrs, 28 minutes	69°C (156°F)
Up to 279 mm (11 inches)	58 hrs, 52 minutes	54 hrs, 22 minutes	69°C (156°F)
Up to 305 mm (12 inches)	70 hrs, 18 minutes	65 hrs, 48 minutes	69°C (156°F)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR Option B-3 (Thick stock)			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 68°C (154 °F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	20 hrs, 06 minutes	15 hrs, 36 minutes	68°C (154°F)
Up to 152 mm (6 inches)	25 hrs, 00 minutes	20 hrs, 30 minutes	68°C (154°F)
Up to 178 mm (7 inches)	30 hrs, 58 minutes	26 hrs, 28 minutes	68°C (154°F)
Up to 203 mm (8 inches)	38 hrs, 04 minutes	33 hrs, 34 minutes	68°C (154°F)
Up to 228 mm (9 inches)	46 hrs, 30 minutes	42 hrs, 00 minutes	68°C (154°F)
Up to 254 mm (10 inches)	56 hrs, 22 minutes	51 hrs, 52 minutes	68°C (154°F)
Up to 279 mm (11 inches)	67 hrs, 52 minutes	63 hrs, 22 minutes	68°C (154°F)
Up to 305 mm (12 inches)	81 hrs, 08 minutes	76 hrs, 38 minutes	68°C (154°F)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR Option B-4 (Thick stock)			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 67°C (152 °F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	21 hrs, 58 minutes	17 hrs, 28 minutes	67°C (152°F)
Up to 152 mm (6 inches)	27 hrs, 28 minutes	22 hrs, 58 minutes	67°C (152°F)
Up to 178 mm (7 inches)	34 hrs, 06 minutes	29 hrs, 36 minutes	67°C (152°F)
Up to 203 mm (8 inches)	42 hrs, 02 minutes	37 hrs, 32 minutes	67°C (152°F)
Up to 228 mm (9 inches)	51 hrs, 26 minutes	46 hrs, 56 minutes	67°C (152°F)
Up to 254 mm (10 inches)	62 hrs, 28 minutes	57 hrs, 58 minutes	67°C (152°F)
Up to 279 mm (11 inches)	75 hrs, 16 minutes	70 hrs, 46 minutes	67°C (152°F)
Up to 305 mm (12 inches)	90 hrs, 04 minutes	85 hrs, 34 minutes	67°C (152°F)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR Option B-5 (Thick stock)			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 66°C (150°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	23 hrs, 36 minutes	19 hrs, 06 minutes	66°C (150°F)
Up to 152 mm (6 inches)	29 hrs, 34 minutes	25 hrs, 04 minutes	66°C (150°F)
Up to 178 mm (7 inches)	36 hrs, 48 minutes	32 hrs, 18 minutes	66°C (150°F)
Up to 203 mm (8 inches)	45 hrs, 28 minutes	40 hrs, 58 minutes	66°C (150°F)
Up to 228 mm (9 inches)	55 hrs, 44 minutes	51 hrs, 14 minutes	66°C (150°F)
Up to 254 mm (10 inches)	67 hrs, 44 minutes	63 hrs, 14 minutes	66°C (150°F)
Up to 279 mm (11 inches)	81 hrs, 40 minutes	77 hrs, 10 minutes	66°C (150°F)

Up to 305 mm (12 inches)	97 hrs, 48 minutes	93 hrs, 18 minutes	66°C (150°F)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR Option B-6 (Thick stock)			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 64°C (148°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	25 hrs, 02 minutes	20 hrs, 32 minutes	64°C (148°F)
Up to 152 mm (6 inches)	31 hrs, 28 minutes	26 hrs, 58 minutes	64°C (148°F)
Up to 178 mm (7 inches)	39 hrs, 14 minutes	34 hrs, 44 minutes	64°C (148°F)
Up to 203 mm (8 inches)	48 hrs, 32 minutes	44 hrs, 02 minutes	64°C (148°F)
Up to 228 mm (9 inches)	59 hrs, 32 minutes	55 hrs, 02 minutes	64°C (148°F)
Up to 254 mm (10 inches)	72 hrs, 26 minutes	67 hrs, 56 minutes	64°C (148°F)
Up to 279 mm (11 inches)	87 hrs, 24 minutes	82 hrs, 54 minutes	64°C (148°F)
Up to 305 mm (12 inches)	104 hrs, 42 minutes	93 hrs, 18 minutes	64°C (148°F)

Option C: Heat Treatment with Moisture Reduction (Dry Bulb Only)

This option can be used by a facility to heat treat wood during the thermal treatment (HT) or kiln-drying (KD) process.

HEAT TREATMENT CHAMBER OPERATING CONDITIONS FOR OPTION C

The temperatures must be recorded at a minimum of every 30 minutes.

Air flow should occur in each two opposite directions within the treatment chamber for half of the time specified at a temperature equal to or exceeding the dry bulb temperature run time (see tables for each option). This requirement may be modified where it can be technically proven by a recognized heat treatment evaluator and when other measures can compensate for deviation. Any modifications must be included in the quality manual and account for all the processes used to ensure that the phytosanitary standard is being met.

Batch Kilns

Only dry bulb measurement is required.

The facility must employ the use of at least two dry bulb temperature sensors.

Appendix C – Figure 4 provides a diagram illustrating the minimum layout requirements for Option C – Batch Kiln.

Bi-Directional Continuous Kilns

As per site specific continuous kiln specific HT schedule.

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION C		
Lumber Thickness	**Dry-Bulb Temperature Continuous Run Time ≥ 52° C (126° F)**	**Minimum time at the End of the Treatment with the Dry-Bulb ≥ 60° C (140° F)**
Up to 29 mm (1 1/8 inches)	8 hrs.	4 hrs.
Up to 57 mm (2 1/4 inches)	18 hrs.	6 hrs.
Up to 83 mm (3 1/4 inches)	45 hrs.	15 hrs.
Up to 108 mm (4 1/4 inches)	72 hrs.	24 hrs.

Option D: Heat Treatment with Moisture Reduction (Dry Bulb Only)

This option can be used by a facility to heat treat wood during the thermal treatment (HT) or kiln-drying (KD) process.

HEAT TREATMENT CHAMBER OPERATING CONDITIONS FOR OPTION D

The temperatures must be recorded at a minimum of every 30 minutes.

Fan reversal is not required.

Batch Kilns

Only dry bulb measurement is required.

The facility must employ the use of at least two dry bulb temperature sensors.

Appendix C – Figure 5 provides a diagram illustrating the minimum layout requirements for Option D – Batch Kiln.

Bi-Directional Continuous Kilns

The following temperature bulb placements are available to a registered facility operating a bi-directional continuous kiln.

a. Four dry-bulbs –

- To maximize the Heat Treatment Zone Length, two (2) dry-bulb temperature sensors on each track with one dry-bulb sensor located within the first half of the mid-third of the main heating section of the kiln. The second dry-bulb must be located in the second-half of the exiting third of the main heating section.
- For each track the distance from the beginning of the mid-third of the main heating section to the end of the main heating section is referred to as the Heat Treatment Zone Length and is used to determine that the minimum time at the end of the treatment with the dry bulb for the option has been satisfied.
- Where the Heat Treatment Zone Length has not been maximized the Heat Treatment Zone Length is the distance between the dry-bulb temperature sensors. The first dry-bulb temperature sensor shall not be placed in the first-third of the main heating section of the kiln.

Appendix D – Figure 4 provides a diagram illustrating the minimum layout requirements for Option D – Bi-Directional Continuous Kiln.

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION D		
Lumber Thickness	**Heat Treatment Run Time**	**Minimum time at the End of the Treatment with the Dry-Bulb ≥ 71° C (160°F)**
Up to 29 mm (1 1/8 inches)	9 hrs	3 hrs
Up to 57 mm (2 1/4 inches)	12 hrs	6 hrs
Up to 83 mm (3 1/4 inches)	22 hrs	16 hrs
Up to 108 mm (4 1/4 inches)	32 hrs	26 hrs
Up to 133 mm (5 1/4 inches)	42 hrs	36 hrs

Option D-1: Heat Treatment with Moisture Reduction (Dry Bulb Only)

This option can be used by a facility to heat treat wood during the thermal treatment (HT) or kiln-drying (KD) process.

Air flow should occur in each two opposite directions within the treatment chamber for half of the time specified at a temperature equal to or exceeding the dry bulb temperature run time as shown in the table below.

HEAT TREATMENT CHAMBER OPERATING CONDITIONS FOR OPTION D-1

The temperatures must be recorded at a minimum of every 30 minutes.

Batch Kilns

Only dry bulb measurement is required.

The facility must employ the use of at least two dry bulb temperature sensors.

Appendix C – Figure 5 provides a diagram illustrating the minimum layout requirements for Option D-1 – Batch Kiln.

Bi-Directional Continuous Kilns

Refer to Option D.

Appendix D – Figure 4 provides a diagram illustrating the minimum layout requirements for Option D-1 – Bi-Directional Continuous Kiln.

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION D-1		
Lumber Thickness	**Heat Treatment Run Time**	**Minimum time at the End of the Treatment with the Dry-Bulb ≥ 71° C (160°F)**
Up to 29 mm (1 1/4 inches)	7.5 hrs	2.5 hrs
Up to 57 mm (2 1/4 inches)	10 hrs	5 hrs
Up to 83 mm (3 1/4 inches)	19 hrs	14 hrs
Up to 108 mm (4 1/4 inches)	27 hrs	22 hrs
Up to 133 mm (5 1/4 inches)	35 hrs	30 hrs

Option E: Generic Hardwood Phytosanitary Heat Treatment Schedule without Moisture Reduction

This option can be used by a facility to heat treat wood during the thermal treatment (HT) or kiln-drying (KD) process.

Heat Treatment Chamber Operating Conditions for Option E

Both wet-bulb and dry bulb temperatures are measured.

The temperatures must be recorded at a minimum of every 30 minutes.

Dry bulb temperature sensors must be located on at least one side of the heat treatment chamber and spaced not more than 7.3 meters (24 feet) apart, perpendicular to the airflow and with one located no more than 2.5 m (8 feet) from each end of the treatment chamber. The number of dry bulb sensors required will depend on the length of the individual kiln and the above sensor placement scale.

Appendix C – Figure 1 provides a diagram illustrating the minimum layout requirements for Option E – batch kiln.

At least one wet bulb temperature sensor, either measuring wet bulb temperature or providing data to determine the wet bulb temperature must be located near the mid third of the treatment chamber, on any one side. The dry bulb(s) temperature must exceed the wet bulb temperature during the heat treatment to ensure the uniformity of the heat treatment chamber conditions.

Air flow should occur in each two opposite directions within the treatment chamber for half of the time specified at a temperature equal to or exceeding the wet bulb temperature continuous run time (see tables for each option). This requirement may be modified where it can be technically proven by a recognized heat treatment evaluator and when other measures can compensate for deviation. Any modifications must be included in the quality manual and account for all the processes used to ensure that the phytosanitary standard is being met.

The pre-schedule wood core temperature must be determined by the facility (e.g., wood core measurements or the previous night's low temperature could be used as methods for determining core temperatures). At temperatures below 15°C (59°F) the facility must have specifications in the quality manual to pre-heat the wood until a wood core temperature of at least one piece of lumber of the thickest nominal size (i.e. 57 mm (2-1/4 inches), 83 mm (3-1/4 inches), or 108 mm (4-1/4 inches) reaches 15°C (59°F), before starting the official heat treatment process. Alternatively, the following temperature adjustments may be made:

For wood core temperatures below 15° C, add the temperature adjustment to the "Minimum Heat Treatment Run Time".

- *57 mm (2 1/4") to 83 mm (3 1/4") ..... add 12.7 minutes per 1° C (7.1minutes per 1°F)*
- *83 mm (31/4") to 108 mm (4 1/4") ..... add 19.3 minutes per 1° C (10.7minutes per 1°F)*

Pre-schedule wood core temperature verification and the pre-heating process is not required for pieces of wood less than or equal to 60 mm (2-1/4 inches).

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION E			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 60°C (140°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 57 mm (2 1/4 inches)	8 hrs, 2 minutes	2 hrs, 46 minutes	63°C (145°F)
Up to 83 mm (3 1/4 inches)	9 hrs, 10 minutes	4 hrs, 30 minutes	66°C (151°F)
Up to 108 mm (4 1/4 inches)	13 hrs, 40 minutes	8 hrs, 52 minutes	67°C (153°F)

Generic Phytosanitary Heat Treatment Schedules for Hardwood Timbers Thicker Than 5"
(Options E-1 to E-6)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION E-1			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 70° C (158°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	11 hrs, 26 minutes	6 hrs, 56 minutes	70°C (158°F)
Up to 152 mm (6 inches)	13 hrs, 38 minutes	9 hrs, 8 minutes	70°C (158°F)
Up to 178 mm (7 inches)	16 hrs, 17 minutes	11 hrs, 47 minutes	70°C (158°F)
Up to 203 mm (8 inches)	19 hrs, 30 minutes	15 hrs	70°C (158°F)
Up to 228 mm (9 inches)	23 hrs, 17 minutes	18 hrs, 47 minutes	70°C (158°F)
Up to 254 mm (10 inches)	27 hrs, 46 minutes	23 hrs, 16 minutes	70°C (158°F)
Up to 279 mm (11 inches)	32 hrs, 59 minutes	28 hrs, 29 minutes	70°C (158°F)
Up to 305 mm (12 inches)	39 hrs, 1 minute	34 hrs, 31 minutes	70°C (158°F)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION E-2			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 69° C (156°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	13 hrs, 30 minutes	9 hrs	69°C (156°F)
Up to 152 mm (6 inches)	16 hrs, 20 minutes	11 hrs, 50 minutes	69°C (156°F)
Up to 178 mm (7 inches)	19 hrs, 47 minutes	15 hrs, 17 minutes	69°C (156°F)
Up to 203 mm (8 inches)	23 hrs, 54 minutes	19 hrs, 24 minutes	69°C (156°F)
Up to 228 mm (9 inches)	28 hrs, 47 minutes	24 hrs, 17 minutes	69°C (156°F)
Up to 254 mm (10 inches)	34 hrs, 31 minutes	30 hrs, 1 minute	69°C (156°F)
Up to 279 mm (11 inches)	41 hrs, 12 minutes	36 hrs, 42 minutes	69°C (156°F)
Up to 305 mm (12 inches)	48 hrs, 55 minutes	44 hrs, 25 minutes	69°C (156°F)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION E-3			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 68° C (154°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	15 hrs, 2 minutes	10 hrs, 32 minutes	68°C (154°F)
Up to 152 mm (6 inches)	18hrs, 20 minutes	13 hrs, 50 minutes	68°C (154°F)
Up to 178 mm (7 inches)	22 hrs, 22 minutes	17 hrs, 52 minutes	68°C (154°F)
Up to 203 mm (8 inches)	27 hrs, 9 minutes	22 hrs, 39 minutes	68°C (154°F)
Up to 228 mm (9 inches)	32 hrs, 51 minutes	28 hrs, 21 minutes	68°C (154°F)
Up to 254 mm (10 inches)	39 hrs, 31 minutes	35 hrs, 1 minute	68°C (154°F)
Up to 279 mm (11 inches)	47 hrs, 16 minutes	42 hrs, 46 minutes	68°C (154°F)
Up to 305 mm (12 inches)	56 hrs, 14 minutes	51 hrs, 44 minutes	68°C (154 °F)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION E-4			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 67° C (152°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	16 hrs, 17 minutes	11 hrs, 47 minutes	67°C (152°F)
Up to 152 mm (6 inches)	20 hrs	15 hrs, 30 minutes	67°C (152°F)
Up to 178 mm (7 inches)	24 hrs, 29 minutes	19 hrs, 59 minutes	67°C (152°F)
Up to 203 mm (8 inches)	29 hrs, 50 minutes	25 hrs, 20 minutes	67°C (152°F)
Up to 228 mm (9 inches)	36 hrs, 11 minutes	31 hrs, 41 minutes	67°C (152°F)
Up to 254 mm (10 inches)	43 hrs, 38 minutes	39 hrs, 8 minutes	67°C (152°F)
Up to 279 mm (11 inches)	52 hrs, 16 minutes	47 hrs, 46 minutes	67°C (152°F)
Up to 305 mm (12 inches)	62 hrs, 15 minutes	57 hrs, 45 minutes	67°C (152°F)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION E-5			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 66° C (150°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	17 hrs, 24 minutes	12 hrs, 54 minutes	66°C (150°F)
Up to 152 mm (6 inches)	21 hrs, 25 minutes	16 hrs, 55 minutes	66°C (150°F)
Up to 178 mm (7 inches)	26 hrs, 18 minutes	21 hrs, 48 minutes	66°C (150°F)
Up to 203 mm (8 inches)	32 hrs, 9 minutes	27 hrs, 39 minutes	66°C (150°F)
Up to 228 mm (9 inches)	39 hrs, 5 minutes	34 hrs, 35 minutes	66°C (150°F)
Up to 254 mm (10 inches)	47 hrs, 11 minutes	42 hrs, 41 minutes	66°C (150°F)
Up to 279 mm (11 inches)	56 hrs, 35 minutes	52 hrs, 5 minutes	66°C (150°F)
Up to 305 mm (12 inches)	67 hrs, 29 minutes	62 hrs, 59 minutes	66°C (150°F)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION E-6			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 64° C (148°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 127 mm (5 inches)	18 hrs, 22 minutes	13 hrs, 52 minutes	64°C (148°F)
Up to 152 mm (6 inches)	22 hrs, 42 minutes	18 hrs, 12 minutes	64°C (148°F)
Up to 178 mm (7 inches)	27 hrs, 57 minutes	23 hrs, 27 minutes	64°C (148°F)
Up to 203 mm (8 inches)	34 hrs, 13 minutes	29 hrs, 43 minute	64°C (148°F)
Up to 228 mm (9 inches)	41 hrs, 39 minutes	37 hrs, 9 minutes	64°C (148°F)
Up to 254 mm (10 inches)	50 hrs, 21 minutes	45 hrs, 51 minutes	64°C (148°F)
Up to 279 mm (11 inches)	60 hrs, 27 minutes	55 hrs, 57 minutes	64°C (148°F)
Up to 305 mm (12 inches)	72 hrs, 8 minutes	67 hrs, 38 minutes	64°C (148°F)

Option F: Generic Hardwood Phytosanitary Heat Treatment Schedule with Moisture Reduction

This option can be used by a facility to heat treat wood during the thermal treatment (HT) or kiln-drying (KD) process.

SPECIFIC HEAT TREATMENT CHAMBER OPERATING CONDITIONS FOR OPTION F

Both wet-bulb and dry bulb temperatures are measured. Temperatures must be recorded at a minimum of every 30 minutes.

The heat treatment chamber must be equipped with at least one dry-bulb temperature sensor. If the air entering/ air exiting plenum is divided into three equal length segments, the temperature sensor(s) must be located as follows: At least one dry-bulb temperature sensor will be located within the mid-third segment of the kiln (on either side). If this condition is met, location of other sensors is not restricted. In lieu of a dry-bulb temperature sensor within the mid-third of the kiln, the kiln can be operated with two (or more) dry-bulb temperature sensors with at least one sensor located in each of the segments located at opposite ends of the kiln (on either side). The dry bulb(s) temperature must exceed the wet bulb temperature during the heat treatment to ensure the uniformity of the heat treatment chamber conditions.

At least one dry bulb temperature sensor must be located near the mid third of the heat treatment chamber, on any one side.

Appendix C – Figure 2 provides a diagram illustrating the minimum layout requirements for Option F – Batch Kiln.

At least one wet bulb temperature sensor, either measuring wet bulb temperature or providing data to determine the wet bulb temperature must be located near the mid third of the treatment chamber, on any one side.

Air flow should occur in each two opposite directions within the treatment chamber for half of the time specified at a temperature equal to or exceeding the wet bulb temperature run time (see tables for each option). This requirement may be modified where it can be technically proven by a recognized heat treatment evaluator and when other measures can compensate for deviation. Any modifications must be included in the quality manual and account for all the processes used to ensure that the phytosanitary standard is being met.

The pre-schedule wood core temperature must be determined by the facility (e.g. wood core measurements or the previous night's low temperature could be used as methods for determining core temperatures). At temperatures below 15°C (59°F) the facility must have specifications in the quality manual to pre-heat the wood until a wood core temperature of at least one piece of lumber of the thickest nominal size (i.e. 57 mm (2-1/4 inches), 83 mm (3-1/4 inches), or 108 mm (4-1/4 inches) reaches 15°C (59°F) , before starting the official heat treatment process. Alternatively, the following temperature adjustment may be made:

For wood core temperatures below 15 °C, add the temperature adjustment to the "Minimum Heat Treatment Run Time".

- *Over 57 mm (2 1/4") to 83 mm (3 1/4") ..... add 12.7 minutes per 1°C (7.1 minutes per 1°F)*
- *Over 83 mm (31/4") to 108 mm (4 1/4") ..... add 19.3 minutes per 1°C (10.7 minutes per 1°F)*

Pre-schedule wood core temperature verification and the pre-heating process is not required for pieces of wood less than or equal to 60 mm (2-1/4 inches).

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION F			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 60°C (140°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 57 mm (2 1/4 inches)	10 hrs, 36 minutes	5 hrs, 32 minutes	63°C (145°F)
Up to 83 mm (3 1/4 inches)	13 hrs, 20 minutes	9 hrs	66°C (151°F)
Up to 108 mm (4 1/4 inches)	21 hrs, 54 minutes	17 hrs, 44 minutes	67°C (153°F)

Option F-1: Specific Heat Treatment Chamber Operating Conditions without Moisture Reduction

At least 3 dry bulbs temperature sensor must be located on either side of the heat treatment chamber. Sensors must be spaced approximately at equal distance apart, perpendicular to the air flow. One sensor must be located at each end of the treatment chamber. These sensors should be placed closest to the end of the treatment chamber (approx. > 5 m (16.5 feet)). For chamber equal to or less than 17 metres (56 feet) in length (in the direction perpendicular to air flow) the number of dry bulb sensors can be reduced to 2 dry bulb sensors with the above placement criteria.

The dry bulb temperature must exceed the wet bulb temperature during the heat treatment to ensure the uniformity of the heat treatment chamber conditions.

Appendix C – Figure 3 provides a diagram illustrating the minimum layout requirements for Option F-1 – Batch Kiln.

The temperatures must be recorded at a minimum of every 30 minutes.

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION F-1			
Lumber Thickness	**Minimum Heat Treatment Run Time**	**Wet Bulb Temperature Continuous Run Time ≥ 60°C (140°F)**	**Minimum Final Wet-Bulb Temperature**
Up to 57 mm (2 1/4 inches)	10 hrs, 36 minutes	5 hrs, 32 minutes	63°C (145°F)
Up to 83 mm (3 1/4 inches)	13 hrs, 20 minutes	9 hrs, 00 minutes	66°C (151°F)
Up to 108 mm (4 1/4 inches)	21 hrs, 54 minutes	17 hrs, 44 minutes	67°C (153°F)

Option G: Generic Hardwood Phytosanitary Heat Treatment Schedule, Heat Treatment with Moisture Reduction (Dry Bulb Only)

This option can be used by a facility to heat treat wood during the thermal treatment (HT) or kiln-drying (KD) process.

SPECIFIC HEAT TREATMENT CHAMBER OPERATING CONDITIONS FOR OPTION G

Air flow should alternate in each of two opposite directions within the treatment chamber for approximately half of the time specified at the dry bulb temperature equal to or exceeding 60°C.

This requirement may be modified where it can be technically proven, by recognized heat treatment evaluator and when others measures can compensate for deviation. Any modifications must be included in the manual and account for all the processes used to ensure that the phytosanitary standard is being met.

Appendix C – Figure 4 provides a diagram illustrating the minimum layout requirements for Option G – Batch Kiln.

The facility must employ the use of at least two dry bulb temperature sensors.

The temperatures must be recorded at a minimum of every 30 minutes.

Generic hardwood Phytosanitary Heat Treatment Schedule for Option G		
Lumber Thickness	**Dry- Bulb Temperature Continuous Run Time ≥ 52°C (126°F)**	**Minimum Time at the End of the Treatment with the Dry-Bulb ≥ 60°C (140°F)**
Up to 28 mm (1 1/8 inches)	12 hrs, 00 minutes	6 hrs, 00 minutes
Up to 57 mm (2 1/4 inches)	27 hrs, 00 minutes	9 hrs, 00 minutes
Up to 83 mm (3 1/4 inches)	67 hrs, 30 minutes	22 hrs, 30 minutes
Up to 108 mm (4 1/4 inches)	108 hrs, 00 minutes	36 hrs, 00 minutes

Options H-1 and H-2: Hardwood Heat Treatment Schedule to 71°C throughout the profile for 1200 minutes with Moisture Reduction

This option can be used by a facility to heat treat wood during the thermal treatment (HT) or kiln-drying (KD) process.

Specific Heat Treatment Chamber Operating Conditions for Option H

Only dry bulb measurement is required. The facility must employ the use of at least two dry bulb temperature sensors.

The temperatures must be recorded at a minimum of every 30 minutes.

Appendix C – Figure 4 provides a diagram illustrating the minimum layout requirements for Option H-1 and H-2 – Batch Kiln.

Air flow should occur in each two opposite directions within the treatment chamber for half of the time specified at a temperature equal to or exceeding the minimum time at the end of the treatment with the dry bulb temperature (see tables for each option).

This requirement may be modified where it can be technically proven, by recognized heat treatment evaluator and when others measures can compensate for deviation. Any modifications must be included in the manual and account for all the processes used to ensure that the phytosanitary standard is being met.

Generic Hardwood Phytosanitary Heat Treatment Schedule for Option H-1		
Lumber Thickness	**Dry-Bulb Temperature Continuous Run Time ≥ 67°C (153 °F)**	**Minimum Time at the End of the Treatment with the Dry-Bulb ≥ 75°C (167 °F)**
Up to 28 mm (1⅛ inches)	31 hrs, 30 minutes	25 hrs, 30 minutes
Up to 57 mm (2¼ inches)	46 hrs, 30 minutes	28 hrs, 30 minutes
Up to 83 mm (3¼ inches)	87 hrs, 00 minutes	42 hrs, 00 minutes
Up to 108 mm (4¼ inches)	127 hrs, 30 minutes	55 hrs, 30 minutes

Generic Hardwood Phytosanitary Heat Treatment Schedule for Option H-2 (with independent verification check)		
Lumber Thickness	**Dry-Bulb Temperature Continuous Run Time ≥ 65°C (149 °F)**	**Minimum Time at the End of the Treatment with the Dry-Bulb ≥ 73°C (163 °F)**
Up to 28 mm (1⅛ inches)	31 hrs, 30 minutes	25 hrs, 30 minutes
Up to 57 mm (2¼ inches)	46, hrs, 30 minutes	28 hrs, 30 minutes
Up to 83 mm (3¼ inches)	87 hrs, 00 minutes	42 hrs, 00 minutes
Up to 108 mm (4¼ inches)	127 hrs, 30 minutes	55 hrs, 30 minutes

Option J: Hardwood heat treatment schedule to attain 60°C throughout the profile for 60 minutes

This schedule is applied to kiln dried lumber during the drying process.

This option can be used by a facility to heat treat hardwood that has been kiln dried prior to the application of the heat treatment (HT) process.

Air flow should alternate in each of two opposite directions within the treatment chamber for approximately half of the time specified at the dry bulb temperature equal to or higher than 64°C.

Appendix C – Figure 4 provides a diagram illustrating the minimum layout requirements for Option J – Batch Kiln.

Only dry bulb measurement is required.

The facility must employ the use of at least two dry bulb temperature sensors.

The temperatures must be recorded at a minimum of every 30 minutes.

Option J: generic hardwood phytosanitary heat treatment schedule

Lumber thickness	**Dry-bulb temperature continuous run time ≥ 56°C / ≥ 133°F**	**Minimum time at the end of the treatment with the dry-bulb ≥ 64°C / ≥ 147°F**
Up to 28 mm (1⅛ inches)	12 hrs, 30 minutes	6 hrs, 30 minutes
Up to 57 mm (2¼ inches)	27 hrs, 30 minutes	9 hrs, 30 minutes
Up to 83 mm (3¼ inches)	68 hrs, 00 minutes	23 hrs, 00 minutes
Up to 108 mm (4¼ inches)	108 hrs, 30 minutes	36 hrs, 30 minutes

Appendix A

The following diagrams are provided to assist in understanding the definition of kiln length for a batch kiln based upon the direction of airflow.

Figure 1.

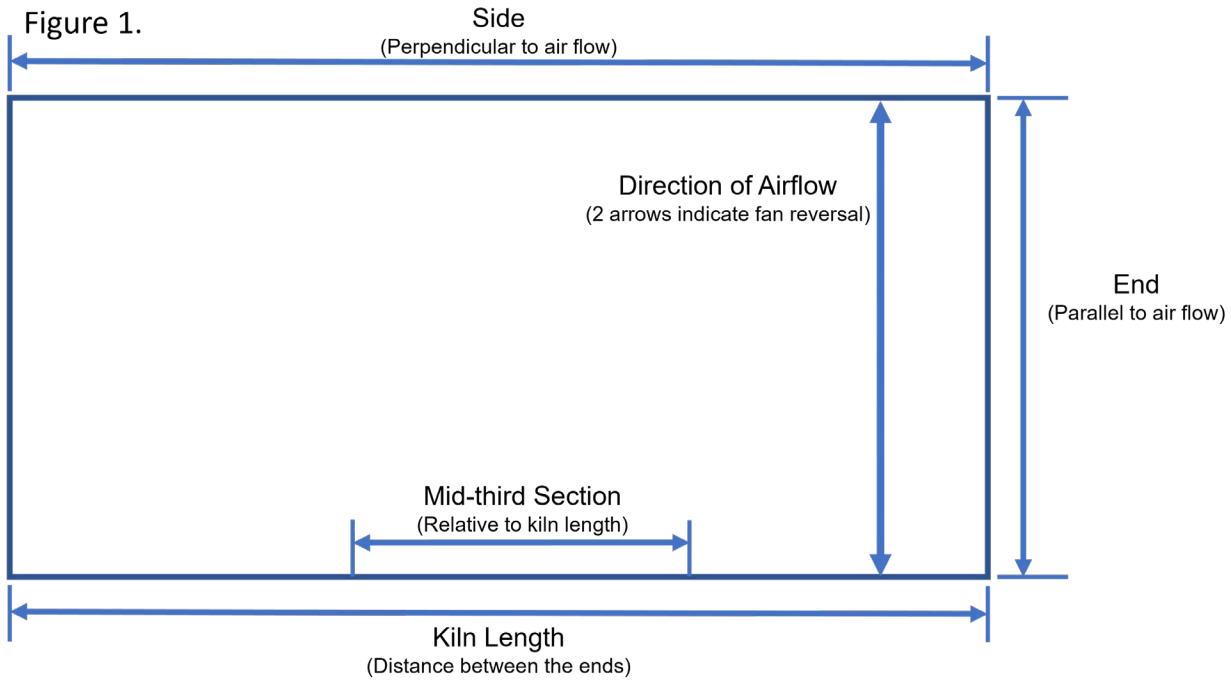
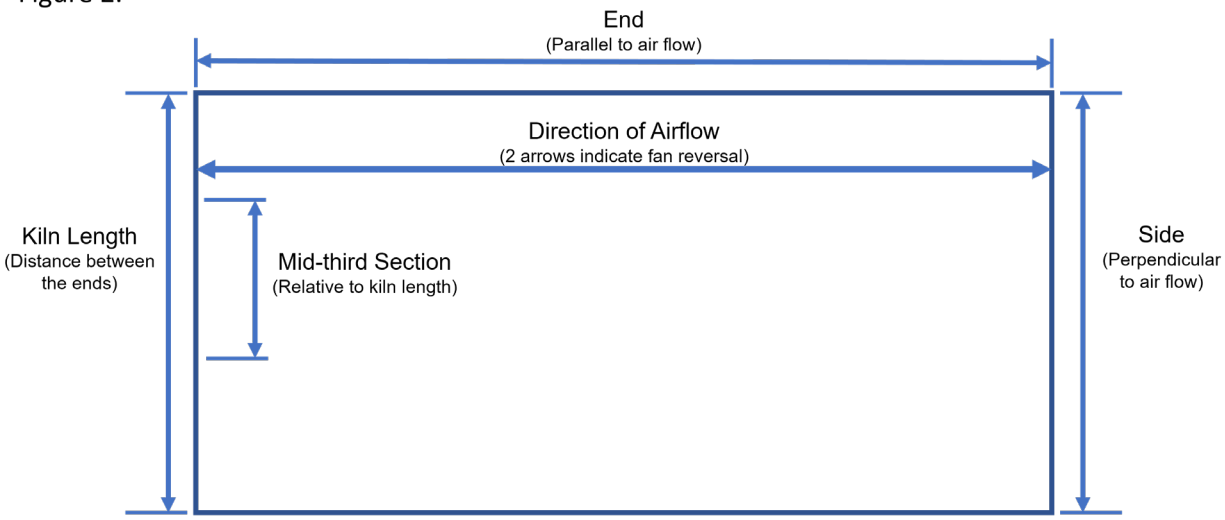


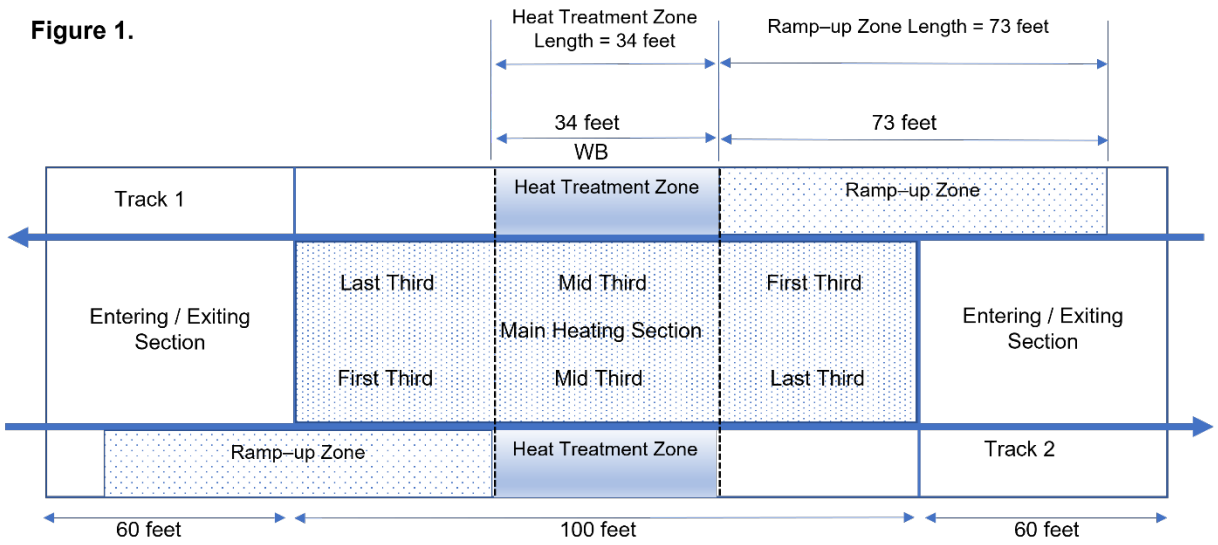
Figure 2.



Appendix B

The following diagram is provided to assist in understanding the definitions used in Section 1.3.5 of Schedule C for a Bi-Directional Continuous Kiln (BDCK).

Figure 1.



Appendix C

Minimum layout requirements for batch kilns by option.

Figure 1.

Option A or E

Minimum layout requirements for a batch kiln

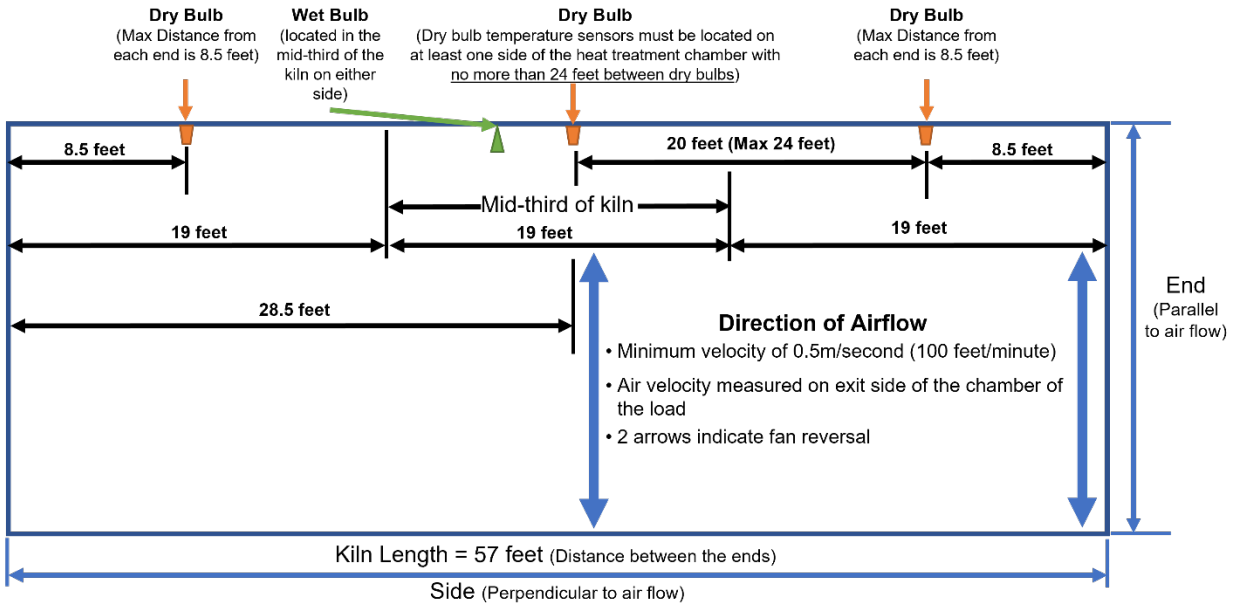


Figure 2.

Option B or F with Moisture Reduction

Minimum layout requirements for a batch kiln with air entering / air exiting plenum is divided into three equal length segments

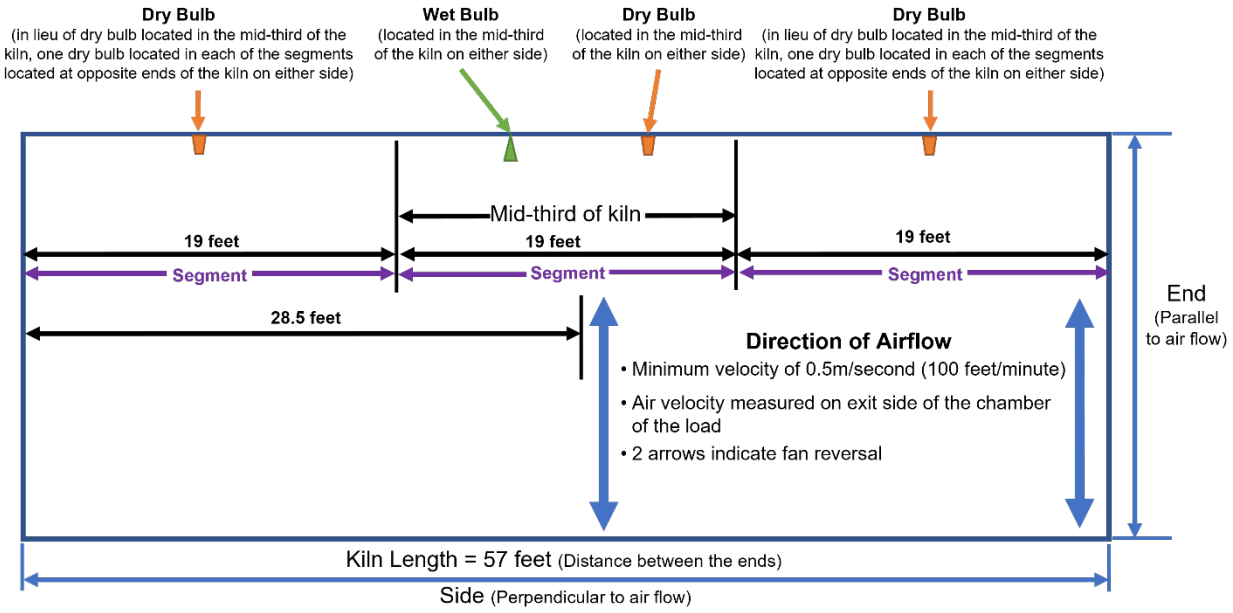


Figure 3. **Option B-1 or F-1 With or Without Moisture Reduction**
Minimum layout requirements for a batch kiln

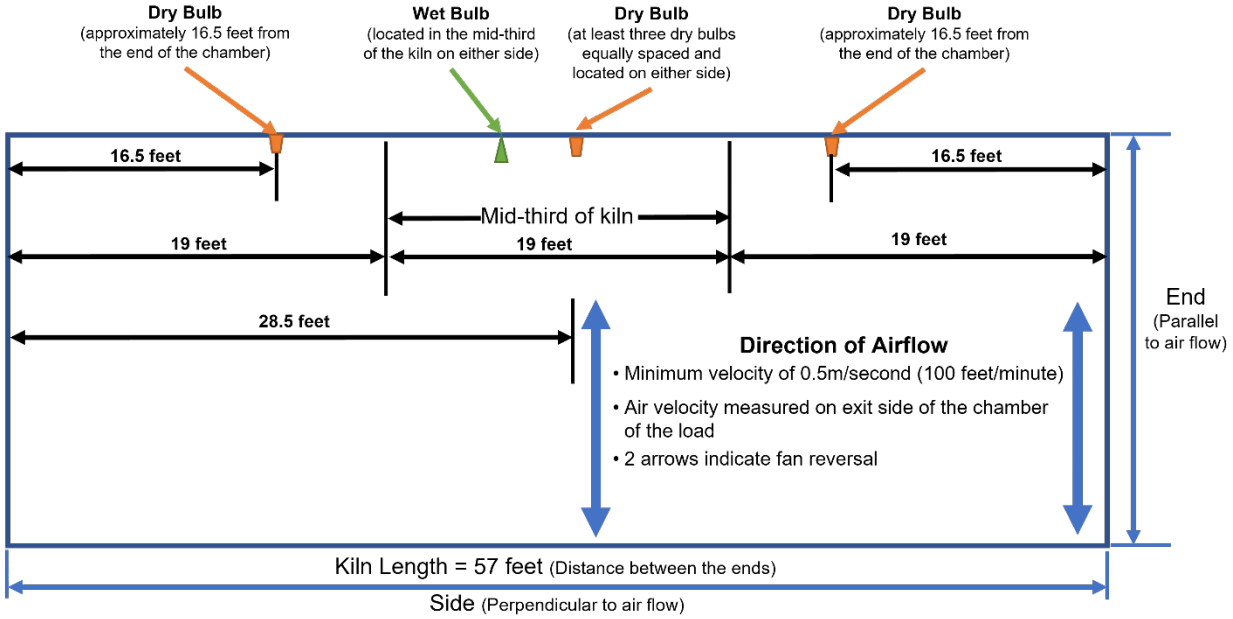


Figure 4. **Option C, G, H, J or 1**
Minimum layout requirements for a batch kiln

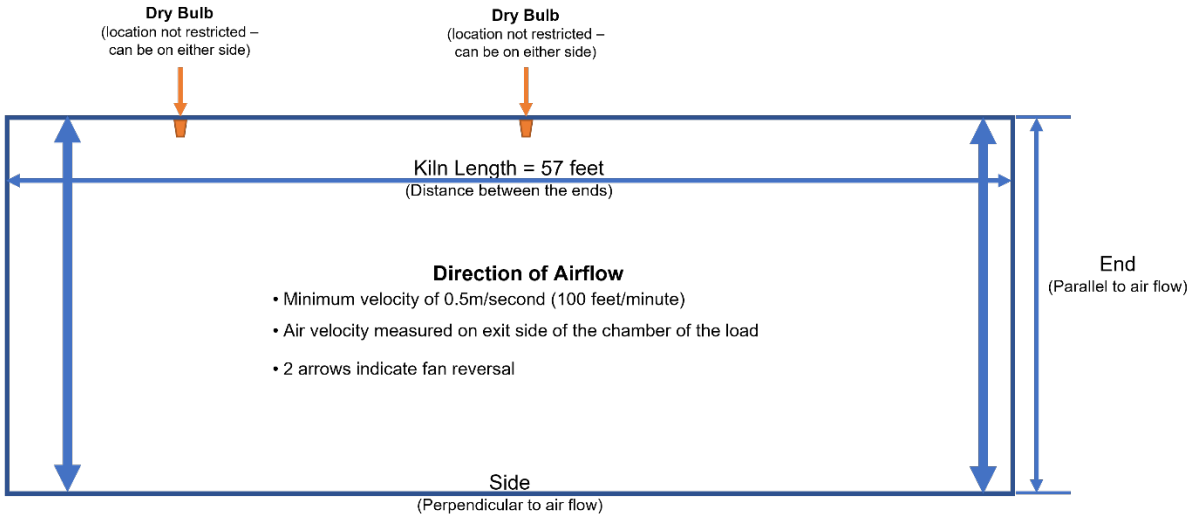
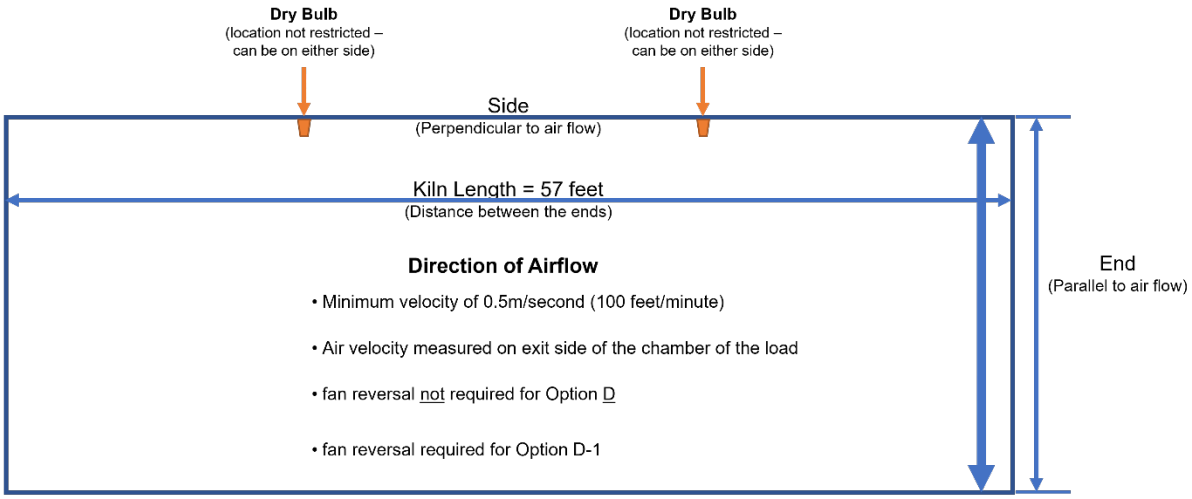


Figure 5.

Option D and D-1
Minimum layout requirements for a batch kiln



Appendix D

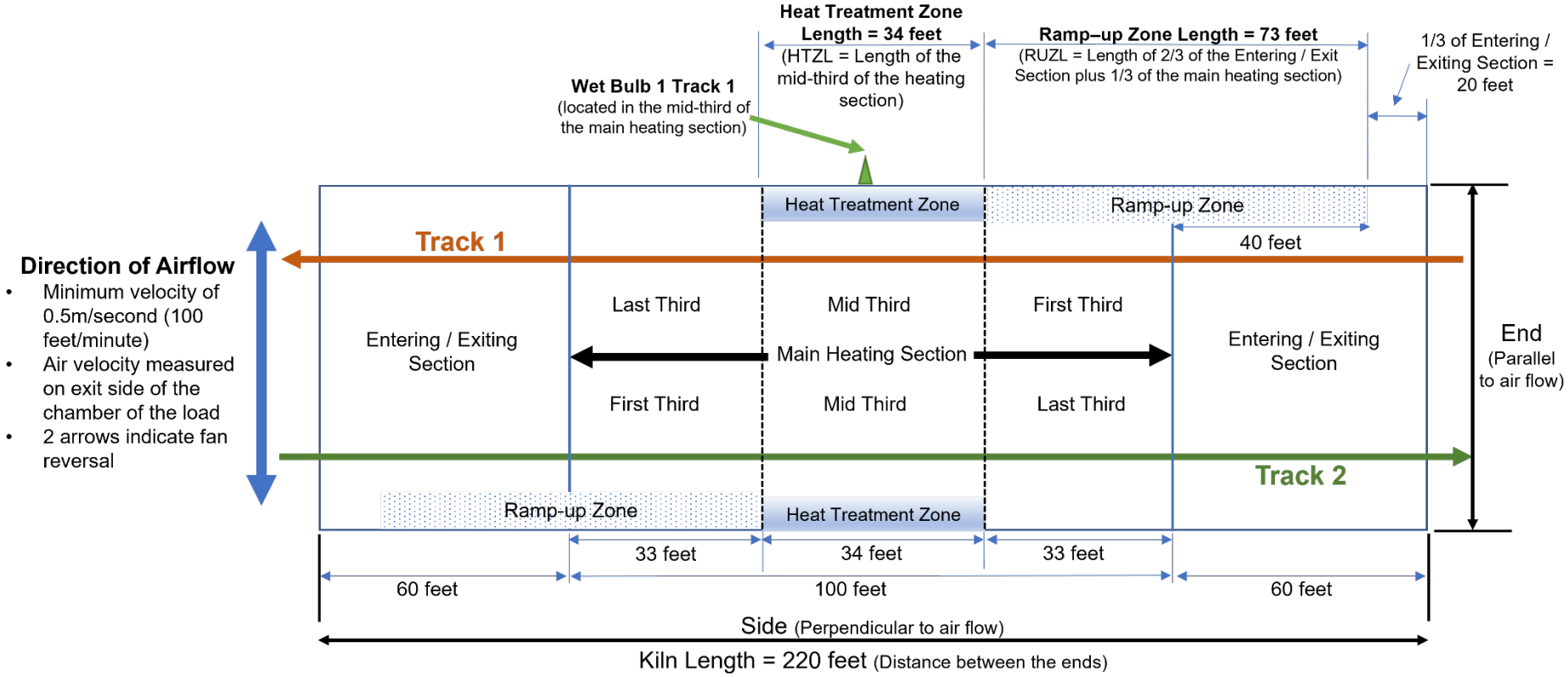
Minimum layout requirements for a Bi-Directional Continuous Kiln (BDCK) by option.

Figure 1.

Option A, B and B-1-wom

Minimum layout requirements for a Bi-Directional Continuous Kiln with one wet bulb

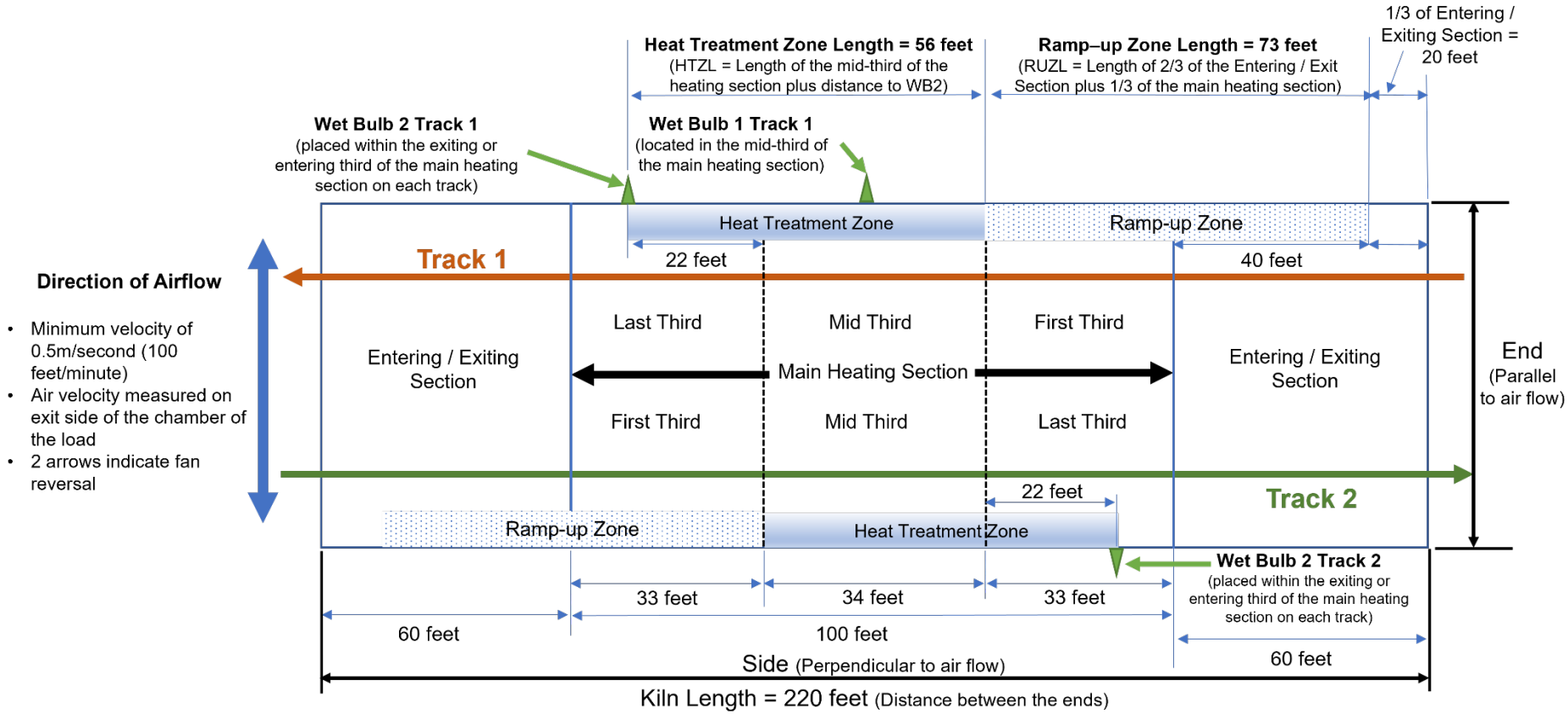
(Distances are relative to the length of the main heating section and entering / exiting section)



Option A, B and B-1-wom

Figure 2. **Minimum layout requirements for a Bi-Directional Continuous Kiln with three wet bulbs**

(Distances are relative to the length of the main heating section and entering / exiting section)



Option A, B and B-1-wom

Figure 3. Minimum layout requirements for a Bi-Directional Continuous Kiln with four wet bulbs

(Distances are relative to the length of the main heating section and entering / exiting section)

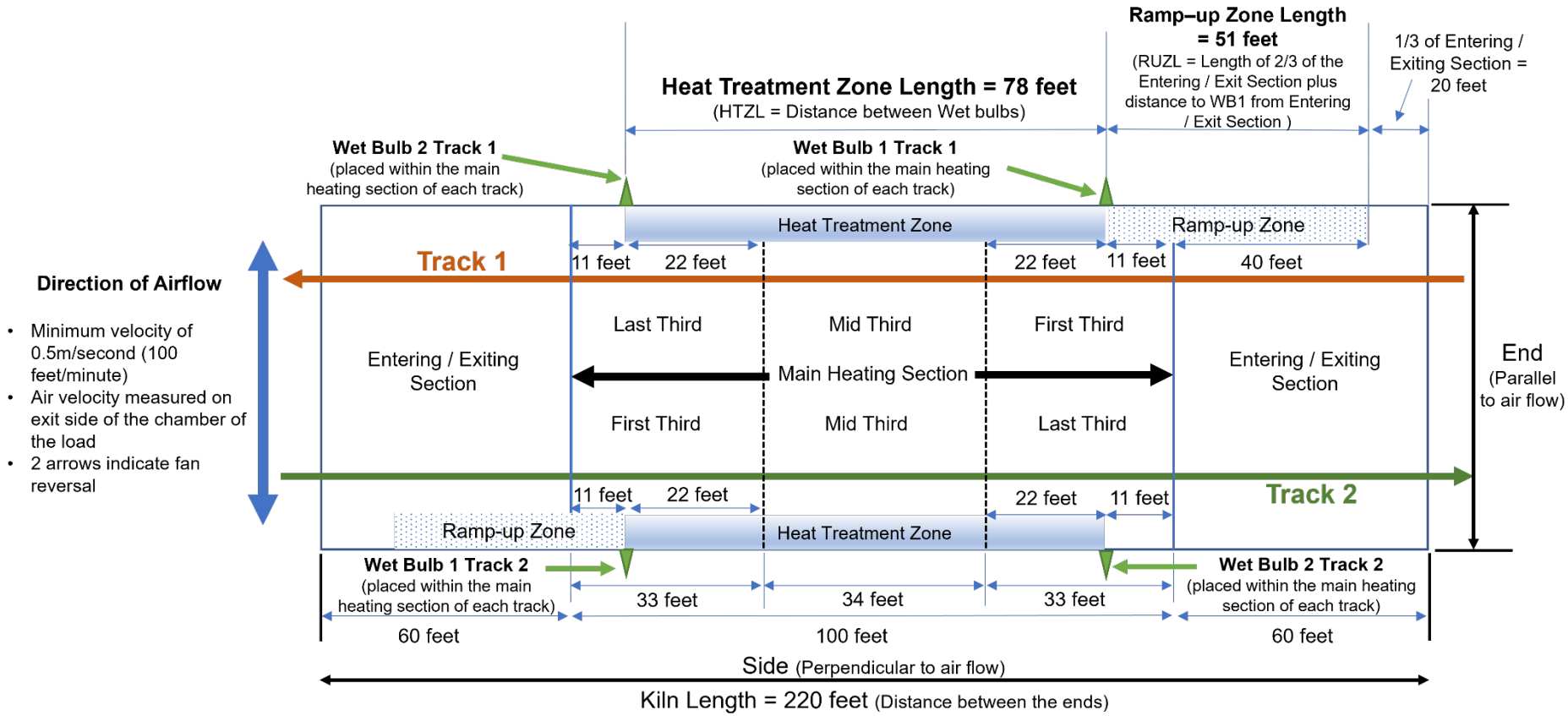
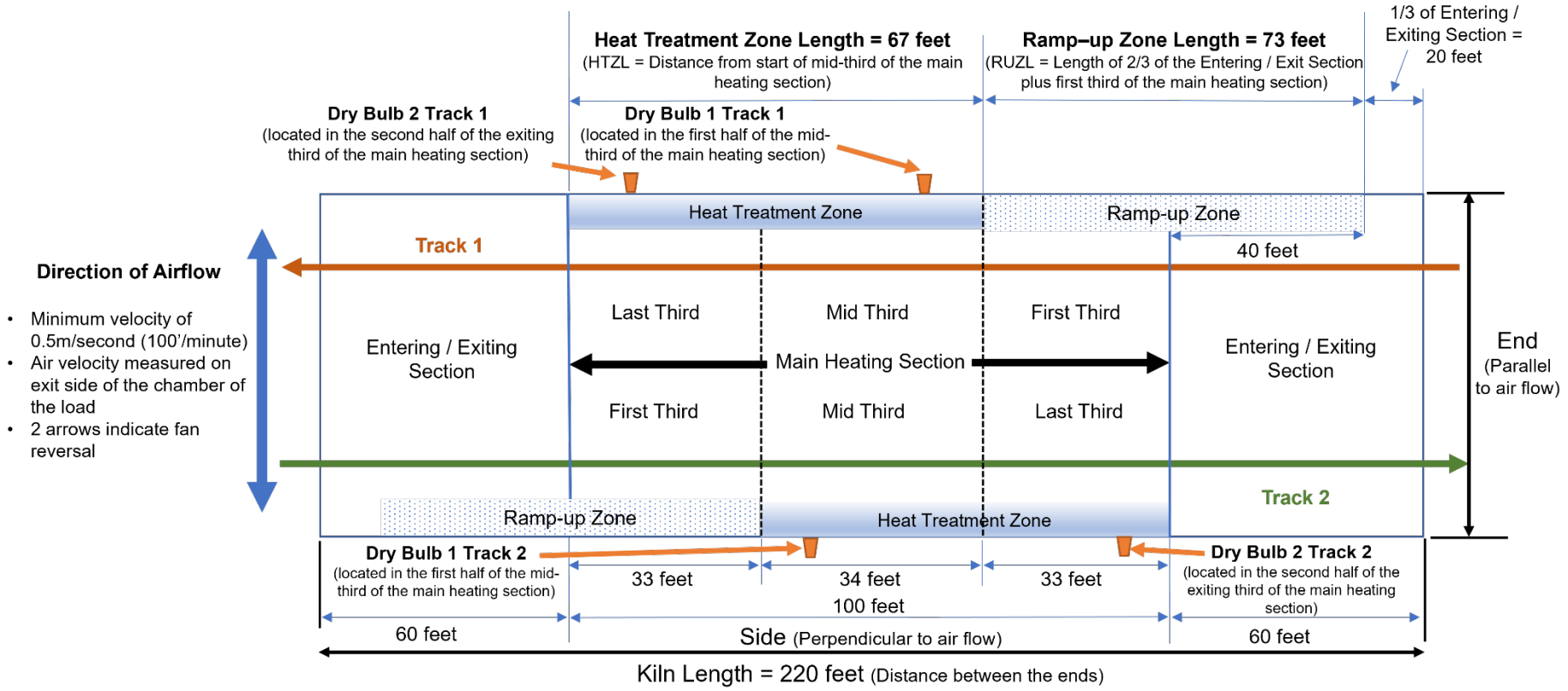


Figure 4.

Option D and D-1

Minimum layout requirements for a Bi-Directional Continuous Kiln with four dry bulbs

(Distances are relative to the length of the main heating section and entering / exiting section)



Schedule D: CLSAB "KD-HT" Check List

Agency Logo		Company		Mill #	
Facility Type (Primary HT, HT reman, IPPC only, Custom Kiln, BSW) Type d'établissement (primaire TC (HT), secondaire TC (HT), seulement IPPC, C/E/G, Séchoirs TC (HT))		Location:		Date:	

1. Phytosanitary Quality Manual / Manuel de qualité phytosanitaire	Y	N	NA
a. Is the approved Phytosanitary Quality Manual (PQM) on file and available? / Un manuel de qualité phytosanitaire (MQS) approuvé est-il sur place et disponible?			
b. Is the manual current with the facility process and the HT program directive (D-13-01)? / Est-ce que le manuel est à jour avec les opérations de l'établissement et les directives du programme TC (HT) (D-13-01)?			
c. Have there been any changes to the manual since last visit? Y a-t-on apporté des modifications depuis la dernière visite?			
i. If yes, have the changes made by the facility been approved by the Agency responsible for overseeing the program? / Si oui, les modifications effectuées par l'établissement ont-elles été approuvées par l'agence assurant la supervision du programme?			
Comments / Commentaires			

2. Kiln Schedules / Programme de séchage	Y	N	NA
a. Does this facility have kilns? / L'établissement a-t-il des séchoirs?			
b. Have there been any new kiln charges since last visit? / Y a-t-il des nouvelles charges de séchoir depuis la dernière visite ?			
c. Do their records conform to their PQM? / Les documents de l'établissement sont-ils conformes avec leur MQS?			
d. Is the facility using one of the options included in the CLSAB Schedule C or PI-07? / Est-ce que l'établissement utilise une option incluse dans l'Annexe C du CLSAB ou le PI-07?			
i. If yes, indicate the option utilized? / Si oui, indiquez l'option utilisée.			
ii. If Option A, B, E or F are used, did the WB reach 140° F (60°C) for the minimum required time? / Si les options A, B, E ou F sont utilisées, le TH a-t-il atteint 60° C (140° F) pour la durée requise?			
• Were the pre-schedule wood core temperature requirements met (Pre-heat or run time adjustment) (If applicable)? / Les exigences minimales pour la température interne du bois avant le traitement sont-elles respectées? (préchauffage ou prolongation du programme de traitement, s'il y a lieu).			
iii. If Option C, D or G are used, did the DB reach the applicable time/temperature? / Si les options C, D ou G sont utilisées, le TS a-t-il atteint la température nécessaire pour la durée requise?			
e. Is the facility using a site specific schedule by an approved HT evaluator? / L'établissement utilise-t-il un programme spécifique au site d'un organisme d'évaluation TC (HT) approuvé?			
i. When site specific schedule is used, is it compliant with the requirements? Lorsqu'un programme spécifique au site est utilisé, est-ce qu'il est conforme aux exigences?			
Comments / Commentaires			

3. Operating Conditions / Conditions d'opération	Y	N	NA
a. Are the operating conditions in-compliance with their PQM? / Les conditions d'opération sont-elles conformes avec le MQS de l'établissement?			
i. Are packages well prepared for treatment (sticker size, placement etc.)? / Les paquets sont-ils bien préparés pour le traitement (dimension des baguettes, emplacement, etc.)?			
b. Have any treatment records been found to be non-compliant? ? / Est-ce qu'il y a des documents de traitement en non-conformité?			
i. If yes, has appropriate action been taken (comment)? Si oui, est-ce-que les mesures appropriées ont été prises? (commentaires)			
Comments / Commentaires			

4. Inventory Control / Contrôle des inventaires	Y	N	NA
a. Is KD-HT or HT material segregated from non KD-HT or HT material? / Le matériel KD-HT ou HT est-il bien isolé du matériel n'ayant pas subi de traitement?			
b. Is the material traceable to kiln charge(s) or Bill of Lading? / Le matériel est-il traçable au(x) chargement(s) du/des séchoir(s) ou aux bons de connaissement?			
c. Is there any off-shore material available for inspection? / Y a-t-il du matériel à destination outre-mer de disponible?			
Comments / Commentaires			

5. HT Certificates / Certificats TC (HT)	Y	N	NA
a. Has the facility issued any HT certificates since last visit? / L'établissement a-t-il émis des certificats TC (HT) depuis la dernière visite?			
b. If yes, are certificates completed correctly, including: / Si oui, ont-ils été complétés correctement, incluant:			
i. Address / l'adresse			
ii. Lot Numbers / les numéros des lots			
iii. Certificate # / les numéros de certificat			
iv. Product Description / description du produit			
v. Signature / une signature			
c. Are the certificates signed by approved personnel listed on the facility's Heat Treatment Certificate Signing Authority? / Les certificats sont-ils signés par un membre du personnel inclus sur la liste des signataires autorisés par l'établissement pour l'émission de certificats de traitement à la chaleur?			
d. Are issued certificates traceable to appropriate kiln charge(s) or to a registered facility's KD-HT or HT mark? / Les certificats sont-ils traçables au(x) chargement(s) de séchoir approprié(s) ou à la marque KD-HT ou HT d'un établissement enregistré?			
Comments / Commentaires			

6. Packaging / Paquets	Y	N	NA
a. Does the label identify / L'étiquette identifie-t-elle:			
i. CA-XXXXX number and/or Agency name + Mill number? / Le numéro CA-XXXXX ou l'agence et le numéro d'usine?			
ii. KD-HT, KD or HT? KD-HT, KD ou HT?			
b. Is the attached marked dunnage ISPM 15 compliant? / Le bois de calage attaché et marqué NIMP (ISPM) 15 est-il conforme aux exigences?			
i. Is the IPPC mark legible? / Est-ce que la marque IPPC est lisible ?			
Comments / Commentaires			

7. Further Processing of HT Wood / Transformation supplémentaire de bois TC (HT)	Y	N	NA
a. Is the HT material being processed traceable to a facility registered in the CLSAB HT program (D-13-01)? / Le matériel TC (HT) transformé est-il traçable à un établissement enregistré dans le programme TC (HT) du CLSAB (D-13-01)?			
Comments / Commentaires			

8. Control of ISPM 15 Mark / Contrôle de la marque NIMP (ISPM) 15	Y	N	NA
a. Is the wood packaging and/or dunnage produced by the facility ISPM 15 compliant? / Le bois d'emballage et/ou le bois de calage produit par l'établissement est-il conforme aux NIMP (ISPM) 15?			
i. Is the IPPC mark legible? / Est-ce que la marque IPPC est lisible ?			
Comments / Commentaires			

Schedule E: CLSAB Policy for Grading Agency Verification of Kiln Drying Chambers for Option 1

General

This policy establishes the minimum criteria to be used by CLSAB Accredited Agencies in verifying that equipment used in the execution of Option 1 ensures the material meets:

- Paragraph 717. Kiln Dried, and
- Paragraph 715. Heat Treated

of the NLGA Standard Grading Rules for Canadian Lumber.

Responsibility for this policy is vested in the CLSAB Board of Directors. Revisions may be recommended by the CLSAB Operations Committee (CLSAB OC).

Responsibility for evaluation, application and interpretation of this policy is vested in the CLSAB OC.

1.0 Requirements for the Qualification of a Facility:

1.1 All equipment must be in proper working condition.
1.2 The agency shall verify that:

1.2.1 the kiln drying chambers meet the requirements of Section 3.0,
1.2.2 the kiln drying chambers meet the operating conditions of Option 1, and
1.2.3 dry bulb temperature sensors be properly located to accurately measure the temperature achieved in the heat chamber.
- Appendix A provides diagrams illustrating how to determine kiln length to assist in placement of dry bulb temperature sensors.

1.3 The agency shall require each facility with or without a kiln drying chamber to develop a quality manual of the facility's quality system procedures and it shall review and approve each manual. The quality manual shall include:

1.3.1 a procedure that confirms proper operation of the kiln drying chamber during the kiln drying cycle and condition period.
1.3.2 procedures for dealing with failure or deficiencies in equipment operation including heat sensors, fans, etc.
1.3.3 procedures for segregation of non KD-HT or KD products for facilities without kiln drying chambers.
1.3.4 an approved method that verifies a sufficient volume of KD-HT or KD material was purchased from a registered facility for the volume of reworked material that is labelled as KD-HT or KD.

2.0 Monitoring

2.1 Agencies shall require facilities to monitor temperatures throughout the kiln drying cycle and the condition period with dry bulbs.
2.2 If a facility is not in operation for a period of 6 months or longer, the facility must specify steps used in ensuring that the equipment is in normal operating condition before beginning kiln drying treatments.

3.0 General Kiln Drying Chamber Operating Conditions

3.1 A minimum air velocity of 0.5 meters/second (100 feet/minute), (measured on the air exit side of the chamber of the load) is required.

3.1.1 A zone is an area of 5m (16 feet) long by 2.5m (8 feet) high.

3.2 Lumber must be stacked on stickers no less than 9.5mm (3/8 inches) in thickness and in a manner to provide adequate air flow.

3.3 The dry bulb measuring system must accurately measure the temperature within 2.0°C (3.6°F) during the condition period.

3.3.1 Verification of the measuring system for the condition period shall be required on an annual basis, unless the dry bulb temperature during the condition period exceeds 63°C (145°F) for 60 minutes.

3.4 Applies to all coniferous (softwood) species grown in Canada.

4.0 Verification of Compliance

4.1 Labeling

All softwood lumber which has been dried to meet Section 3.0 and Option 1 may be identified:

4.1.1 With a Grading Agency stamp approved by CLSAB bearing the letters KD-HT or KD. The KD-HT or KD stamp shall be positioned on each piece of lumber in accordance with the CLSAB Regulations.

4.2 Certificate Issuance

All softwood lumber which has been dried to meet Section 3.0 and Option 1 may be identified:

4.2.1 With an industry issued certificate stating that material has met the requirements of the KD-HT designation or,

4.2.2 a phytosanitary certificate issued by CFIA.

In either case, the facility producing or certifying the material shall be under the jurisdiction of the CLSAB and its Accredited Agencies.

5.0 Records & Reporting

5.1 All records shall be in compliance with the CLSAB Regulations.

5.1.1 An audit checklist, as shown in Schedule “F” shall be completed by the agency.

5.2 Agencies shall make their records available to CLSAB in compliance with CLSAB Regulations and as required by the Board.

Option 1 – Heat Treatment - Application of Condition Period after Kiln Drying Lumber (Dry Bulb Only)

This option is for low temperature and/or dehumidification kilns that kiln dry lumber. A low temperature heat treatment chamber and/or dehumidification kiln is identified as operating between approximately 43°C (110°F) and 56°C (133°F) for an extended period during the kiln drying cycle. When the operating conditions of this option are followed the material will meet the requirements of being kiln dried (KD) and heat treated (HT). The material must be kiln dried (KD) prior to the application of the condition period which enables the HT declaration.

This option only applies to coniferous (softwood) species grown in Canada and is intended for higher value appearance grade lumber such as 1" spruce, western red cedar, eastern white pine, red pine, etc.

Appendix C – Figure 4 provides a diagram illustrating the minimum layout requirements for Option 1 – Batch Kiln.

Option 1 – Operating Conditions

General:
- Temperatures shall be recorded at a minimum of every 30 minutes.
- Air flow shall occur in each two opposite directions within the treatment chamber during the kiln drying cycle and application of the condition period.
- The kiln drying cycle is complete when the moisture content of all the lumber is less than or equal to 19%.
- Only dry bulb measurement is required.
- The facility must employ the use of at least two dry bulb temperature sensors.

Moisture content:
- Before the condition period is applied, the moisture content of all the lumber must be less than or equal to 19%.
- Where the moisture content of a kiln is not monitored during the kiln drying cycle the facility is required to establish and follow a timeframe to ensure the moisture content of all the lumber is less than or equal to 19% prior to the application of the condition period. The procedure will be described in the facility quality manual.

Operating Temperatures:
- The initial kiln operating temperature as measured by the dry-bulb shall be at least 43°C (110°F).
- The dry-bulb temperature of the kiln customarily remains below 56°C (133°F) during the kiln drying cycle and prior to the application of the condition period. Where the dry-bulb temperature exceeds 56°C (133°F) for an extended period of time during the kiln drying cycle, option C or D shall be selected.
- Prior to the application of the condition period the dry-bulb operating temperature should operate in the range of 52°C (125°F) and 56°C (133°F) for a minimum of 25 hours. When the dry-bulb operating temperature is lower than 52°C (125°F) and/or operating time is less 25 hours, the facility shall demonstrate compliance with KD-HT. When demonstration of compliance is required, the facility shall provide a record of compliance for review by the auditor.

Condition Period:
- Kiln to meet or exceed 60°C (140°F) for at least one hour after the kiln drying cycle.

Lumber Thickness:
- Up to 57 mm (2 ¼ inches).

Schedule F: CLSAB "KD-HT" Check List for Option 1

Agency Logo		Company		Mill #	
Facility Type (Primary KD-HT, KD-HT reman, Custom Kiln) Type d'établissement (primaire KD-HT, secondaire KD-HT, Séchoirs TC (HT))		Location:		Date:	

1. **Phytosanitary Quality Manual / Manuel de qualité phytosanitaire**	Y	N	NA
a. Is the approved Phytosanitary Quality Manual (PQM) on file and available? / Un manuel de qualité phytosanitaire (MQS) approuvé est-il sur place et disponible?			
b. Is the manual current with the facility process and the HT program directive (D-13-01)? / Est-ce que le manuel est à jour avec les opérations de l'établissement et les directives du programme TC (HT) (D-13-01)?			
c. Have there been any changes to the manual since last visit? Y a-t-on apporté des modifications depuis la dernière visite?			
i. If yes, have the changes made by the facility been approved by the Agency responsible for overseeing the program? / Si oui, les modifications effectuées par l'établissement ont-elles été approuvées par l'agence assurant la supervision du programme?			
Comments / Commentaires			

2. **Kiln Schedules / Programme de séchage**	Y	N	NA
a. Does this facility have kilns? / L'établissement a-t-il des séchoirs?			
b. Have there been any new kiln charges since last visit? / Y a-t-il des nouvelles charges de séchoir depuis la dernière visite?			
c. Do their records conform to their PQM? / Les documents de l'établissement sont-ils conformes avec leur MQS?			
d. Was the initial dry-bulb kiln operating temperature at least 43ºC (110ºF)? / La température sèche (TS) initiale du cycle de séchage était-elle d'au moins 43°C (110°F)?			
e. Did the dry-bulb temperature of the kiln customarily remain below 56ºC (133ºF) during the kiln drying cycle? / La température sèche est-elle généralement restée inférieure à 56°C (133°F) pendant le cycle de séchage?			
f. Was the dry-bulb operating temperature in the range of 52ºC (125ºF) to 56ºC (133ºF) for a minimum of 25 hours prior to the application of the condition period? / La température sèche était-elle entre 52°C (125°F) to 56°C (133°F) pendant au moins 25 heures avant l'application du conditionnement?			
g. Did the dry bulb temperature during the condition period meet or exceed 60°C (140°F) for at least one hour? / La température sèche lors du conditionnement a-t-elle atteint ou dépassé 60°C (140°F) pendant au moins une heure?			
h. Was the moisture content of the lumber less than or equal to 19% prior to the application of the condition period? / La teneur en humidité du bois était-elle inférieure ou égale à 19% avant l'application du conditionnement?			
i. Was the lumber less than or equal to 2 ¼" in thickness? / Le bois était-il d'une épaisseur inférieure ou égale à 2 ¼ po?			
Comments / Commentaires			

3. **Operating Conditions / Conditions d'opération**	Y	N	NA
a. Are the operating conditions in-compliance with their PQM? / Les conditions d'opération sont-elles conformes avec le MQS de l'établissement?			
i. Are packages well prepared for treatment (sticker size, placement etc.)? / Les paquets sont-ils bien préparés pour le traitement (dimension des baguettes, emplacement, etc.)?			
b. Have any treatment records been found to be non-compliant? / Est-ce qu'il y a des documents de traitement en non-conformité?			
i. If yes, has appropriate action been taken (comment)? Si oui, est-ce-que les mesures appropriées ont été prises? (commentaires)			
Comments / Commentaires			

4. **Inventory Control / Contrôle des inventaires**	Y	N	NA
a. Is KD-HT or KD material segregated from non KD-HT or KD material? / Le matériel KD-HT ou KD est-il bien isolé du matériel n'ayant pas subi de traitement?			
b. Is the material traceable to kiln charge(s) or Bill of Lading? / Le matériel est-il traçable au(x) chargement(s) du/des séchoir(s) ou aux bons de connaissement?			
Comments / Commentaires			

5. **KD-HT Certificates / Certificats KD-HT**	Y	N	NA
a. Has the facility issued any KD-HT certificates since last visit? / L'établissement a-t-il émis des certificats KD-HT depuis la dernière visite?			
b. If yes, are certificates completed correctly, including: / Si oui, ont-ils été complétés correctement, incluant:			
i. Address / l'adresse			
ii. Lot Numbers / les numéros des lots			
iii. Certificate # / les numéros de certificat			
iv. Product Description / description du produit			
v. Signature / une signature			
c. Are the certificates signed by approved personnel listed on the facility's Heat Treatment Certificate Signing Authority? / Les certificats sont-ils signés par un membre du personnel inclus sur la liste des signataires autorisés par l'établissement pour l'émission de certificats de traitement à la chaleur?			
d. Are issued certificates traceable to appropriate kiln charge(s) or to a registered facility's KD-HT or KD mark? / Les certificats sont-ils traçables au(x) chargement(s) de séchoir approprié(s) ou à la marque KD-HT ou KD d'un établissement enregistré?			
Comments / Commentaires			

6. **Packaging / Paquets**	Y	N	NA
a. Does the label identify / L'étiquette identifie-t-elle:			
i. CA-XXXXX number and/or Agency name + Mill number? / Le numéro CA-XXXXX ou l'agence et le numéro d'usine?			
ii. KD-HT or KD? KD-HT or KD?			
b. Is the attached marked dunnage ISPM 15 compliant? / Le bois de calage attaché et marqué NIMP (ISPM) 15 est-il conforme aux exigences?			
1. Is the IPPC mark legible? / Est-ce que la marque IPPC est lisible?			
Comments / Commentaires			

Schedule G: CLSAB Policy for the approval of Moisture Content Correction Factors for Temperature and Species that were developed using a “Resistance-Type” Meter with Insulated Pins

1. Background

1.1. At a given Moisture Content the electrical resistance of wood varies according to the species. Therefore, a correction factor is required for each species to convert a meter reading into the actual moisture content between the probe pins. Electrical resistance also varies with wood temperature and consequently a temperature correction must also be applied. This correction is applied first followed by the species correction for the temperature corrected reading.

2. General

2.1. Responsibility for this Policy is vested in the Board of Directors of the CLSAB.
2.2. Responsibility for evaluation, application and interpretation of this Policy is vested in the Canadian Lumber Standards Operations Committee (CLSOC) or any other committee duly appointed by the Board of Directors.
2.3. Additions or revisions may be recommended by the CLSOC or any other appointed committee of the CLSAB to ensure consistent application of the Policy.
2.4. The CLSAB may employ consultants to assist in evaluating the application for approval of moisture content correction factors for temperature and species developed using a “Resistance-Type” Meter with Insulated Pins.
2.5. The applicant Agency will be responsible to CLSAB for any fees and expenses incurred by the consultant(s).

3. Scope

3.1. The intent of this Policy is to approve moisture content correction factors for temperature and species associated with specific direct current conductance meters that use insulated pins. The meters are commonly referred to as “resistance-type” meters.
3.2. The Policy is limited to “resistance-type” meters with insulated pins as they are to be used to arbitrate the moisture content during an inspection.
3.3. This Policy outlines the minimum CLSAB criteria for approving moisture content correction factors for temperature and species used in the lumber grading process, under the supervision of CLSAB Accredited grading agencies (hereinafter referred to as the "Agency").

4. Agency Responsibilities

4.1. The Agency submitting moisture content correction factors for temperature and species for approval shall be responsible for verifying that the testing and evaluation are carried out as described in the application for approval and in accordance with the requirements of this Policy.
4.2. Each Agency, shall:
  4.2.1. identify to the CLSAB the moisture content correction factors for temperature and species they use,
  4.2.2. supply their registered facilities with the moisture content correction factors for temperature and species approved by the CLSAB, and

4.2.3. comply with any additional requirements identified by this Policy.

5. **Application** - (Applications may be obtained by contacting a CLSAB Accredited Agency)

5.1. The application for CLSAB approval of the moisture content correction factors for temperature and species shall be submitted only by a CLSAB Accredited Agency to the President & CEO of the CLSAB.

5.2. The application shall include the following:

5.2.1. An explanation for the need for moisture content correction factors for temperature and species.

5.2.2. Sample selection – the number of wood specimens used for the calibration shall be selected following the concepts of ASTM D2915

5.2.3. A report with the following wood sample information:

5.2.3.1. Moisture Content,

5.2.3.2. Size (dimensions in each plane (TxWxL),

5.2.3.3. For species groupings with commercial production for grading rules approved by the CLSAB,

5.2.3.4. Method of species identification,

5.2.3.5. Geographical area over which sampling will take place (nation, province, manufacturing sites, etc.),

5.2.3.6. Time span for sampling (a day's production, a month, a year, etc.), and

5.2.3.7. Density or specific gravity which shall be within ± 10% of the "Mean oven-dry relative density" of the species grouping as published in Table A.11 – Relative Density Values of CSA O86-19 or its successor.

5.2.4. A report with the following meter information:

5.2.4.1. Manufacturer and model,

5.2.4.2. Reference temperature, and

5.2.4.3. Electrode type and configuration.

5.2.5. A report with the following standardization and calibration information:

5.2.5.1. Method of analyses and presentation,

5.2.5.2. Influence of wood characteristics (i.e. species groupings),

5.2.5.3. Influence of temperature and method of correction, and

5.2.5.4. Details of electrode placement.

6. Format of the Tables for Moisture Content Correction Factors for Temperature and Species

6.1. The table shall include the following:

6.1.1. A title that includes the species, region and the make and model of the moisture meter for which the correction factors apply.

6.1.2. The wood temperature in Celsius and Fahrenheit in 5°C (9°F) increments from -5°C (23°F) to 35°C (95°F) as it relates to correction factors and moisture meter reading.

6.1.3. The moisture meter reading range is to be defined by the proponent; however the range shall include moisture readings from 15% to 26%.

6.1.4. The correction factors as they relate to moisture and temperature.

6.1.5. The average specific gravity for the species used to provide the corrected values. The specific gravity shall be used for handheld surface moisture meters.

6.1.6. An explanation of how to read the table.

7. Commentary (Rationale)

7.1. The following COFI temperature and species conversion tables are approved for use by CLSAB and the CLSAB Accredited Agencies for the following species grown in Canada:
- 7.1.1. Western White spruce - Lodgepole pine – Alpine Fir (SPF),
- 7.1.2. Western Hemlock (Hem-Fir),
- 7.1.3. Douglas-fir (D Fir-L), and
- 7.1.4. Western Red Cedar

The COFI tables were developed from field work undertaken by Nils Larsson and are consistent with Clause 5.2 of ASTM D4444, Standard Test Methods for Use and Calibration of Hand-Held Moisture Meters for the following reasons:
1. Results were referenced to oven dry tests;
2. The tables were based on the existing Delmhorst scale, which provides the basic relationship between meter readings and the moisture content from oven dry tests; and
3. The field calibrations undertaken were used to adjust the Delmhorst scale for species effects (other than Douglas-fir) and moisture gradients typically found in the field.

7.2. The policy will be limited to “Resistance-Type” moisture meters with insulated pins used in the development of Moisture Content Correction Factors for Temperature and Species.

7.3. Only “Resistance-Type” moisture meters with insulated pins used in the development of Moisture Content Correction Factors for Temperature and Species will be used to arbitrate moisture content between CLSAB and CLSAB Accredited Agency.

7.4. CLSAB Operations Committee shall approve the correction factors based upon the make and model of “Resistance-Type” moisture meters with insulated pins.

7.5. Proponents should have correction factors based upon species groupings referenced in the grading rules and standards approved by the CLSAB.

7.6. While outside the scope of this policy, CLSAB and the CLSAB Accredited Agencies need to develop a procedure on how they will address differences between the readings provided by different moisture meters, whether they are the same manufacturer or different.

7.7. Applicants are advised to use the following ASTM standards in the development of Moisture Content Correction Factors for Temperature and Species that were developed using a “Resistance-Type” Meter with Insulated Pins:
- 7.7.1. ASTM D7438 – Standard Practice for Field Calibration and Application of Hand-Held Moisture Meters
- 7.7.2. ASTM D4444 – Standard Test Method for Laboratory Standardization and Calibration of Hand-Held Moisture Meters
- 7.7.3. ASTM D2915 – Standard Practice for Sampling and Data Analysis for Structural Wood and Wood Based Products
- 7.7.4. ASTM D143 – Standard Test Methods for Small Clear Specimens of Timber – Clause 19 – Specific Gravity and Shrinkage in Volume

Schedule H – CLSAB Policy for Grading Agency Verification of Kiln Drying Chambers using Wood Core Probes

General

Operating parameters for the use of wood core probe (WCP) monitoring to verify heat treatment of lumber, wood packaging material and other types of wood products.

The following outlines the minimum heat treatment chamber operating conditions for use by heat treatment facilities registered under CFIA Directive D-13-01 (HT Program) using wood core temperature probes to monitor and verify heat treatment.

This option can be used by a facility to heat treat only or heat treat during the kiln drying (KD) process.

This option is limited to use in batch kilns.

This option applies to softwood (coniferous) and hardwood (deciduous) tree species.

1. Requirements for the qualification of a facility

    1.1. All equipment must be in proper working condition.
    1.2. Treatment chambers meet the requirements of Wood Core Probe Option 1 as described in Section 2 or Wood Core Probe Option 2 as described in Section 3.
    1.3. At least one (1) wood core probe sensor installed and located to accurately measure the temperature of the wood being treated in each zone of a kiln or the temperature of the surrogate block in each zone of a kiln.
    1.4. At least one (1) dry bulb temperature sensor must be properly located in each zone (mid zone) to accurately measure the temperature achieved in the heat treatment chamber for a multi-zone kiln, or two (2) dry bulb temperature sensors must be properly located to accurately measure the temperature achieved in the heat treatment chamber for a single zone kiln.
    1.5. At least one (1) wet bulb temperature sensor must be properly located to accurately measure the temperature achieved in the heat treatment chamber when using option WCP2.
    1.6. Dry bulb, wet bulb and wood core probe temperature sensors must accurately measure within ± 2.5°C (4.5°F) and be verified annually.
    1.7. HT Chamber/kiln must be equipped with a temperature monitoring and recording system that permits facilities to monitor and document wood core temperature probes and dry and / or wet bulb temperature sensors at a minimum of 5-minute intervals throughout the entire heat treatment process.
    1.8. A minimum air velocity of 0.5 meters/second (100 feet/minute), measured on the air exit side of the chamber of the load is required.
    1.9. Lumber must be stacked on stickers of no less than 9.5 mm (⅜ inch) in thickness and in a manner to provide adequate air flow through the load and not bypass the load.
    1.10. Develop a quality manual of the facility's system procedures, which shall include:
        1.10.1. A procedure that confirms proper operation of the treatment chamber during heat treatment.
            1.10.1.1. Procedures for dealing with failure or deficiencies in equipment operation, including wood core temperature probes, dry bulb temperature sensors, fans, etc.
        1.10.2. Procedures for annual verification of the temperature monitoring system.
        1.10.3. The condition/orientation of the load relative to airflow direction, placement and use of baffles, and manner in which the fans are operated must be documented in the manual to ensure they are operated in the same manner for on-going treatments.

1.10.4. Procedures for the use of surrogate blocks, when used, shall include:
- 1.10.4.1. the surrogate block shall be longer than 4 times its thickness.
- 1.10.4.2. the surrogate block shall only be used once and be representative of the species and moisture content of the load being treated.
- 1.10.4.3. the surrogate block shall be of the same thickness as the largest or maximum combined thickness of the largest material in the load.
- 1.10.4.4. the surrogate block shall have an internal core temperature that is the same as or lower than the rest of the load prior to beginning treatment.
- 1.10.4.5. the surrogate block shall have their internal core temperature recorded prior to the start of treatment and the values stored with the treatment record.

1.10.5. Procedures for the proper installation of wood core probes, which shall include:
- 1.10.5.1. wood core probes shall not be placed near nail shanks or above components with notches, holes etc. which would decrease the effective thickness being heat treated in that area.
- 1.10.5.2. wood core probes shall be inserted in a drilled hole so that the sensing portion of the wood core probe sensor is recording the temperature at the geometric centre of the cross section of the piece of wood.
- 1.10.5.3. wood core probes shall be sealed into place using non-conductive materials to prevent air from entering the core sensor hole.

1.10.6. Procedures for moisture content verification where the treatment requires moisture reduction.

1.10.7. If a facility is not in operation for a period of 6 months or longer, the facility must specify steps used in ensuring the equipment is in normal operating condition before beginning treatments.

1.10.8. A zone is an area of 5 meters (16.5 feet) long by 2.5 meters (8 feet) high.

2. Wood Core Probe Option 1 (WCP1)

This option requires a final wood core probe temperature of 70°C.

The prescribed operating conditions ensure that every piece of wood in the heat chamber or kiln meet the phytosanitary standard for heat treatment (56°C for a minimum of 30 minutes at the core of the wood) when wood core probes are appropriately placed in the heat chamber or kiln and reach at least 56°C for a minimum of 30 minutes and a final temperature of 70°C.

2.1. Specific operating conditions

Schedule H - Figure 1 provides diagrams illustrating the proper placement of the wood core probes and dry bulbs within the kiln.

Uni-directional or bi-directional airflow.

2.2. Operating temperatures

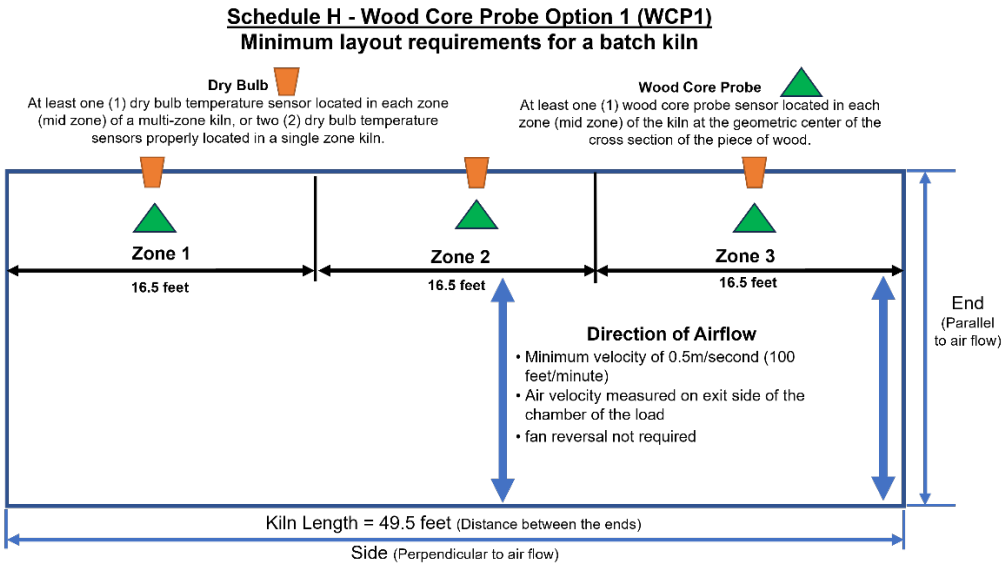
2.2.1. Minimum operating temperature in the heat treatment chamber must ensure that each wood core probe sensor achieves a minimum temperature of 56°C for a minimum of 30 minutes and a final temperature of 70°C.

2.2.2. The dry bulb temperature should consistently exceed the wood core probe temperature sensor during the heat treatment phase to ensure uniformity of the heat treatment chamber conditions.

2.3. Lumber thickness

Unrestricted.

Schedule H - Figure 1



A zone is an area of 5 meters (16.5 feet) long by 2.5 meters (8 feet) high

3. Wood Core Probe Option 2 (WCP2)

This option is based upon heat treatment run time.

The prescribed operating conditions ensure that all pieces of wood in the heat treatment chamber will meet the phytosanitary standard for heat treatment (56°C for a minimum of 30 minutes at the core of the wood).

3.1. Specific operating conditions

Schedule H - Figure 2 provides a diagram illustrating the minimum layout requirements for option WCP2 – batch kiln.

A wet bulb temperature probe shall be placed in the mid-third of the kiln.

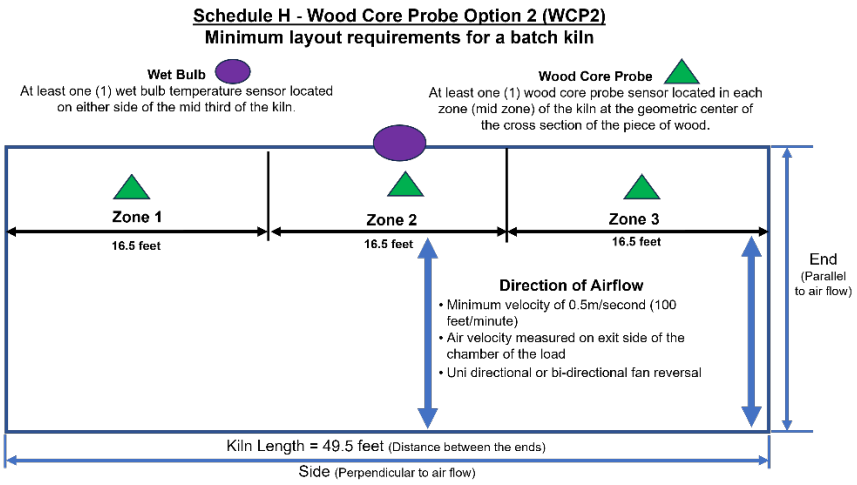
Air flow should occur in each of 2 opposite directions within the treatment chamber for half of the time specified in the “minimum heat treatment run time”.

3.2. Phytosanitary Heat Treatment Schedule

Table WCP2. Heat treatment schedule using Wood Core Probe and run time when probe(s) inserted in dry or green material (99.95% confidence interval)

Lumber Thickness	Minimum heat treatment run time after one probe reaches 56°C/30 minutes to account for wood variability	Minimum wet bulb temperature at the end of the treatment (°C)
Up to 57 mm (2¼ inches)	4 hrs 00 minutes	60
Up to 83 mm (3¼ inches)	4 hrs 15 minutes	60
Up to 108 mm (4¼ inches)	4 hrs 30 minutes	60
Up to 133 mm (5¼ inches)	4 hrs 45 minutes	60
Up to 152 mm (6¼ inches)	5 hrs 00 minutes	60

Schedule H - Figure 2



A zone is an area of 5 meters (16.5 feet) long by 2.5 meters (8 feet) high