

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 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°C for a minimum of 30 minutes. The agency shall require that thermocouple(s) be properly located to accurately measure the temperature achieved in the heat chamber. The process for verifying the 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 facilities without heat treatment chambers shall specify in their Quality Manual procedures for segregation of non KD-HT and/or HT products. In addition facilities that purchase material from agency certified KD-HT or HT facilities, rework this material and subsequently mark this material KD-HT or HT; each facility shall maintain an agency approved systematic method of keeping records that identifies if the volumes of KD-HT or HT facilities are adequate to produce the quantities of KD-HT or HT material that are being labeled.

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 and dry bulb temperature

2.1.2 dry bulb only

2.1.3 direct measurement of wood core temperatures

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.

GENERAL HEAT TREATMENT CHAMBER OPERATING CONDITIONS

- A minimum air flow 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.
- 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.
- Dry and wet bulb measuring system must accurately measure the temperature within 2.5°C (4.5°F). The verification of the measuring system will be required on an annual basis. This requirement may be removed where the temperature exceeds the requirement for option A-B-D-E-F-G by at least 5°C and by at least 10°C for option C.
- 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. The system should record temperatures at a minimum of every 30 minutes.

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

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 & 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.

Option A: Heat Treatment without Moisture Reduction

HEAT TREATMENT CHAMBER OPERATING CONDITIONS FOR OPTION A

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 metres (24 feet) apart, 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. The temperatures must be recorded at a minimum of every 30 minutes.

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. 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. This deviation will be referred to the Canadian Forest Products Advisory Committee for review. 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 equal to or greater than 15°C 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 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, 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 60mm (2 1/4") to 85 mm (3 1/4")..... add 10.0 minutes per 1°C (5.6 minutes per 1 °F)*
- *Over 85mm (3 1/4") to 110 mm (4 1/4")..... add 15.3 minutes per 1°C (8.5 minutes per 1 °F)*
- *Greater than 110 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 60 mm (2-1/4 inches)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION A			
Lumber Thickness	Minimum Heat Treatment Run Time ¹	Wet Bulb Temperature Run Time > 60°C (140°F) ²	Minimum Final Wet-Bulb Temperature
Up to 60 mm (2 1/4 inches)	6 hrs, 26 minutes	2 hrs, 3 minutes	63°C (145°F)

Note: 1 The pre-schedule wood core temperature of at least one piece of wood must be at least 15°C before the treatment run time is measured (see table of "Heat Treatment Chamber Operating Conditions for Option A" above for verification procedures for wood core temperature)

Note: 2 "Wet Bulb Temperature Run Time" is the continuous portion of the heat treatment time where the wet bulb temperature measures > 60°C, measured in hours

Up to 85 mm (3 1/4 inches)	7 hrs, 20 minutes	3 hrs, 20 minutes	66°C (151°F)
Up to 110 mm (4 1/4 inches)	10 hrs, 57 minutes	6 hrs, 34 minutes	67°C (153°F)

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 Run Time > 70°C/(158°F) ¹	Minimum Final Wet-Bulb Temperature
Up to 127 mm (5 inches)	9 hrs, 38 minutes	5 hrs, 8 minutes	70°C (158°F)
Up to 152 mm (6 inches)	11 hrs, 16 minutes	6 hrs, 46 minutes	70°C (158°F)
Up to 178 mm (7 inches)	13 hrs, 14 minutes	8 hrs, 44 minutes	70°C (158°F)
Up to 203 mm (8 inches)	15 hrs, 37 minutes	11 hrs, 7 minutes	70°C (158°F)
Up to 228 mm (9 inches)	18 hrs, 25 minutes	13 hrs, 55 minutes	70°C (158°F)
Up to 254 mm (10 inches)	21 hrs, 44 minutes	17 hrs, 14 minutes	70°C (158°F)
Up to 279 mm (11 inches)	25 hrs, 36 minutes	21 hrs, 6 minutes	70°C (158°F)
Up to 305 mm (12 inches)	30 hrs, 4 minutes	25 hrs, 34 minutes	70°C (158°F)

Note 1: During the “Wet bulb temperature run time”, the Dry Bulb temperature must equal or exceed 71°C (160°F)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION A-2			
Lumber Thickness	Minimum Heat Treatment Run Time	Wet Bulb Temperature Run Time $\geq 69^{\circ}\text{C}/(156^{\circ}\text{F})$ ¹	Minimum Final Wet-Bulb Temperature
Up to 127 mm (5 inches)	11 hrs, 10 minutes	6 hrs, 40 minutes	69°C (156°F)
Up to 152 mm (6 inches)	12 hrs, 16 minutes	8 hrs, 46 minutes	69°C (156°F)
Up to 178 mm (7 inches)	15 hrs, 49 minutes	11 hrs, 19 minutes	69°C (156°F)
Up to 203 mm (8 inches)	18 hrs, 52 minutes	14 hrs, 22 minutes	69°C (156°F)
Up to 228 mm (9 inches)	22 hrs, 29 minutes	17 hrs, 59 minutes	69°C (156°F)
Up to 254 mm (10 inches)	26 hrs, 44 minutes	22 hrs, 14 minutes	69°C (156°F)
Up to 279 mm (11 inches)	31 hrs, 41 minutes	27 hrs, 11 minutes	69°C (156°F)
Up to 305 mm (12 inches)	37 hrs, 24 minutes	32 hrs, 54 minutes	69°C (156°F)

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION A-3			
Lumber Thickness	Minimum Heat Treatment Run Time	Wet Bulb Temperature Run Time $\geq 68^{\circ}\text{C}/(154^{\circ}\text{F})$ ¹	Minimum Final Wet-Bulb Temperature
Up to 127 mm (5 inches)	12 hrs, 18 minutes	7 hrs, 48 minutes	68°C (154°F)
Up to 152 mm (6 inches)	14 hrs, 45 minutes	10 hrs, 15 minutes	68°C (154°F)
Up to 178 mm (7 inches)	17 hrs, 44 minutes	13 hrs, 14 minutes	68°C (154°F)
Up to 203 mm (8 inches)	21 hrs, 17 minutes	16 hrs, 47 minutes	68°C (154°F)
Up to 228 mm (9 inches)	25 hrs, 30 minutes	21 hrs	68°C (154°F)
Up to 254 mm (10 inches)	30 hrs, 26 minutes	25 hrs, 56 minutes	68°C (154°F)
Up to 279 mm (11 inches)	36 hrs, 11 minutes	31 hrs, 41 minutes	68°C (154°F)
Up to 305 mm (12 inches)	42 hrs, 49 minutes	38 hrs, 19 minutes	68°C (154°F)

Note 1: During the “Wet bulb temperature run time”, the Dry Bulb temperature must equal or exceed 71°C (160°F).

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GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION A-4			
Lumber Thickness	Minimum Heat Treatment Run Time	Wet Bulb Temperature Run Time $\geq 67^{\circ}\text{C}/(152^{\circ}\text{F})$¹	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 Run Time $\geq 66^{\circ}\text{C}/(150^{\circ}\text{F})$¹	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)

Note 1: During the "Wet bulb temperature run time", the Dry Bulb temperature must equal or exceed 71°C (160°F).

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GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION A-6			
Lumber Thickness	Minimum Heat Treatment Run Time	Wet Bulb Temperature Run Time $\geq 64^{\circ}\text{C}/(148^{\circ}\text{F})$ ¹	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)

Note 1 : During the “Wet bulb temperature run time”, the Dry Bulb temperature must equal or exceed 71°C (160°F).

Option B: Heat Treatment with Moisture Reduction

HEAT TREATMENT CHAMBER OPERATING CONDITIONS FOR OPTION B

This option can be used by a facility to heat treat the wood during the kiln drying process in order to reduce the moisture content below the fiber saturation point of the wood (approximately 30% MC).

Both wet-bulb and dry bulb temperatures are measured.

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

At least one dry bulb temperature sensor must be located near the mid third of the heat treatment chamber, on any one side. The temperatures must be recorded at a minimum of every 30 minutes.

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. 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. This deviation will be referred to the Canadian Forest Products Advisory Committee for review. 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 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. 60mm (2-1/4 inches), 85mm (3-1/4 inches), or 110mm (4-1/4 inches) reaches 15°C, 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 60mm (2 1/4") to 85 mm (3 1/4") add 10.0 minutes per 1°C (5.6 minutes per 1°F)
- Over 85mm (3 1/4") 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 60 mm (2-1/4 inches).

Option B1: Heat Treatment Without Moisture Reduction**HEAT TREATMENT CHAMBER OPERATING CONDITIONS FOR OPTION B-1**

Moisture reduction is not required to use this option.

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). The number of dry bulb sensors required will depend on the length of the individual kiln and the above sensor placement scale. The temperatures must be recorded at a minimum of every 30 minutes.

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. 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. This deviation will be referred to the Canadian Forest Products Advisory Committee for review. 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 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. 60mm (2-1/4 inches), 85mm (3-1/4 inches), or 110mm (4-1/4 inches) reaches 15°C, 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 60mm (2 1/4") to 85 mm (3 1/4") add 10.0 minutes per 1°C (5.6 minutes per 1°F)
- Over 85mm (3 1/4") 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 60 mm (2-1/4 inches).

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION B AND B-1			
Lumber Thickness	Minimum Heat Treatment Run Time ¹	Wet Bulb Temperature Run Time > 60°C (140F) ²	Minimum Final Wet-Bulb Temperature
Up to 60 mm (2 1/4 inches)	8 hrs, 29 minutes	4 hrs, 6 minutes	63°C (145°F)
Up to 85 mm (3 1/4 inches)	10 hrs, 40 minutes	6 hrs, 40 minutes	66°C (151°F)
Up to 110 mm (4 1/4 inches)	17 hrs, 31 minutes	13 hrs, 8 minutes	67°C (153°F)

Note 1 :When treating wood greater than 60mm (2-1/4 inches) in thickness, the pre-schedule wood core temperature of at least one piece of wood must be at least 15°C before the treatment run time is measured (see table of "Heat Treatment Chamber Operating Conditions for Option B (or B-1)" for verification procedures for wood core temperature).

Note 2: "Wet Bulb Temperature Run Time" is the continuous portion of the heat treatment time where the wet bulb temperature measures > 60°C, measured in hours.

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR Option B-1 (Thick stock)			
Lumber Thickness	Minimum Heat Treatment Run Time	Wet Bulb Temperature Run Time > 70°C (158F)¹	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)

Note 1: "Wet Bulb Temperature Run Time" is the continuous portion of the heat treatment time where the wet bulb temperature measures > 60°C, measured in hours.

Note: When using Option B1 (Thick stock) with moisture reduction, the operation conditions as set out under Option B must be followed. When using Option B1 (Thick stock) without moisture reduction, the operating conditions as set out under Option B1 must be followed.

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR Option B-2 (Thick stock)			
Lumber Thickness	Minimum Heat Treatment Run Time	Wet Bulb Temperature Run Time > 69°C (156)¹	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)

Note 1: "Wet Bulb Temperature Run Time" is the continuous portion of the heat treatment time where the wet bulb temperature measures > 60°C, measured in hours.

Note: When using Option B2 (Thick stock) with moisture reduction, the operation conditions as set out under Option B must be followed. When using Option B2 (Thick stock) without moisture reduction, the operating conditions as set out under Option B1 must be followed.

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR Option B-3 (Thick stock)			
Lumber Thickness	Minimum Heat Treatment Run Time	Wet Bulb Temperature Run Time > 68°C (154)¹	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)

Note 1: "Wet Bulb Temperature Run Time" is the continuous portion of the heat treatment time where the wet bulb temperature measures > 60°C, measured in hours.

Note: When using Option B3 (Thick stock) with moisture reduction, the operation conditions as set out under Option B must be followed. When using Option B3 (Thick stock) without moisture reduction, the operating conditions as set out under Option B1 must be followed.

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR Option B-4 (Thick stock)			
Lumber Thickness	Minimum Heat Treatment Run Time	Wet Bulb Temperature Run Time > 67°C (152)¹	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)

Note 1: "Wet Bulb Temperature Run Time" is the continuous portion of the heat treatment time where the wet bulb temperature measures > 60°C, measured in hours.

Note: When using Option B4 (Thick stock) with moisture reduction, the operation conditions as set out under Option B must be followed. When using Option B4 (Thick stock) without moisture reduction, the operating conditions as set out under Option B1 must be followed.

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR Option B-5 (Thick stock)			
Lumber Thickness	Minimum Heat Treatment Run Time	Wet Bulb Temperature Run Time > 66°C (150)¹	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, 59 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)

Note 1: "Wet Bulb Temperature Run Time" is the continuous portion of the heat treatment time where the wet bulb temperature measures > 60°C, measured in hours.

Note: When using Option B5 (Thick stock) with moisture reduction, the operation conditions as set out under Option B must be followed. When using Option B5 (Thick stock) without moisture reduction, the operating conditions as set out under Option B1 must be followed.

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR Option B-6 (Thick stock)			
Lumber Thickness	Minimum Heat Treatment Run Time	Wet Bulb Temperature Run Time > 64°C (148)¹	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)

Note 1: "Wet Bulb Temperature Run Time" is the continuous portion of the heat treatment time where the wet bulb temperature measures > 60°C, measured in hours.

Note: When using Option B6 (Thick stock) with moisture reduction, the operation conditions as set out under Option B must be followed. When using Option B6 (Thick stock) without moisture reduction, the operating conditions as set out under Option B1 must be followed.

Option C: Heat Treatment with Moisture Reduction (Dry Bulb Only)**HEAT TREATMENT CHAMBER OPERATING CONDITIONS FOR OPTION C**

This option can be used by a facility to heat treat the wood during the kiln drying process in order to reduce the moisture content below the fiber saturation point of the wood (approximately 30% MC).

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.

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. This deviation will be referred to the Canadian Forest Products Advisory Committee for review. 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.

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION C		
Lumber Thickness	Dry-Bulb Temperature Run Time > 52° C (>126° F) ¹	Minimum time at the End of the Treatment with the Dry-Bulb > 60° C (140° F)²
Up to 28 mm (1 1/8 inches)	8 hrs.	4 hrs.
Up to 60 mm (2 1/4 inches)	18 hrs.	6 hrs.
Up to 85 mm (3 1/4 inches)	45 hrs.	15 hrs.
Up to 110 mm (4 1/4 inches)	72 hrs.	24 hrs.

Note 1 :Dry bulb temperature run time is the continuous portion of the heat treatment time where the dry bulb temperature measures > 52°C, measured in hours.

Note 2 : The "Minimum Time at the End of the Treatment with the Dry-Bulb > 60°C is included in the "Dry-Bulb Temperature Run Time", measured in hours.

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

HEAT TREATMENT CHAMBER OPERATING CONDITIONS FOR OPTION D

This option can be used by a facility to heat treat the wood during the kiln drying process in order to reduce the moisture content below the fiber saturation point of the wood (approximately 30% MC).

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.

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) ¹
Up to 60 mm (2 1/4 inches)	12 hrs.	6 hrs.

Note 1: The “Minimum Time at the End of the Treatment with the Dry-Bulb > 71°C is included in the “Heat treatment Run Time”, measured in hours.

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

Heat Treatment Chamber Operating Conditions for Option E

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 meters (24 feet) apart, 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. The temperatures must be recorded at a minimum of every 30 minutes.

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. 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. This deviation will be referred to the Canadian Forest Products Advisory Committee for review. 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 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. 60mm (2-1/4 inches), 85mm (3-1/4 inches), or 110mm (4-1/4 inches) reaches 15°C, 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".

- 60mm (2 1/4") to 85 mm (3 1/4") add 12.7 minutes per 1° C (7.1minutes per 1°F)
- 85mm (3 1/4") to 110 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 ¹	Wet Bulb Temperature Run Time > 60°C (> 140°F) ²	Minimum Final Wet-Bulb Temperature
Up to 60 mm (2 1/4 inches)	8 hrs, 2 minutes	2 hrs, 46 minutes	63°C (145°F)
Up to 85 mm (3 1/4 inches)	9 hrs, 10 minutes	4 hrs, 30 minutes	66°C (151°F)
Up to 110 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 Run Time ≥ 70°C/(158°F) ¹	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)

Note 1: When treating wood greater than 60mm (2-1/4 inches) in thickness, the pre-schedule wood core temperature of at least one piece of wood must be at least 15°C before the treatment run time is measured.

Note 2: "Wet Bulb Temperature Run Time" is the continuous portion of the heat treatment time where the wet bulb temperature measures > 60°C, measured in hours.

Note1: During the "Wet bulb temperature run time", the Dry Bulb temperature must equal or exceed 71°C (160°F).

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION E-2			
Lumber Thickness	Minimum Heat Treatment Run Time	Wet Bulb Temperature Run Time $\geq 69^{\circ}\text{C}$ / (156°F) ¹	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 Run Time $\geq 68^{\circ}\text{C}$ / (154°F) ¹	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)	18 hrs, 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)

Note 1 : During the “Wet bulb temperature run time”, the Dry Bulb temperature must equal or exceed 71°C (160°F).

Note 1: During the “Wet bulb temperature run time”, the Dry Bulb temperature must equal or exceed 71°C (160 °F).

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION E-4			
Lumber Thickness	Minimum Heat Treatment Run Time	Wet Bulb Temperature Run Time $\geq 67^{\circ}\text{C}$ / (152°F) ¹	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 Run Time $\geq 66^{\circ}\text{C}$ / (150°F) ¹	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)

Note 1 : During the “Wet bulb temperature run time”, the Dry Bulb temperature must equal or exceed 71°C (160°F).

Note 1: During the “Wet bulb temperature run time”, the Dry Bulb temperature must equal or exceed 71°C (160°F).

GENERIC PHYTOSANITARY HEAT TREATMENT SCHEDULE FOR OPTION E-6			
Lumber Thickness	Minimum Heat Treatment Run Time	Wet Bulb Temperature Run Time $\geq 64^{\circ}\text{C}$ / (148°F) ¹	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)

Note 1: During the “Wet bulb temperature run time”, the Dry Bulb temperature must equal or exceed 71°C (160°F).

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

SPECIFIC HEAT TREATMENT CHAMBER OPERATING CONDITIONS FOR OPTION F

This option can be used by a facility to heat treat the wood during the kiln drying process in order to reduce the moisture content below the fiber saturation point of the wood (approximately 30% MC).

Both wet-bulb and dry bulb temperatures are measured.

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

At least one dry bulb temperature sensor must be located near the mid third of the heat treatment chamber, on any one side. The temperatures must be recorded at a minimum of every 30 minutes.

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. 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. This deviation will be referred to the Canadian Forest Products Advisory Committee for review. 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 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. 60mm (2-1/4 inches), 85mm (3-1/4 inches), or 110mm (4-1/4 inches) reaches 15°C, 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 60mm (2 1/4") to 85 mm (3 1/4") add 12.7 minutes per 1°C (7.1 minutes per 1°F)*
- *Over 85mm (3 1/4") to 110 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 Time¹	Wet Bulb Temperature Run Time > 60°C (140°F) ²	Minimum Final Wet-Bulb Temperature
Up to 60 mm (2 1/4 inches)	10 hrs, 36 minutes	5 hrs, 32 minutes	63°C (145°F)
Up to 85 mm (3 1/4 inches)	13 hrs, 20 minutes	9 hrs,	66°C (151°F)
Up to 110 mm (4 1/4 inches)	21 hrs, 54 minutes	17 hrs, 44 minutes	67°C (153°F)

Note 1 : When treating wood greater than 60mm (2-1/4 inches) in thickness, the pre-schedule wood core temperature of at least one piece of wood must be at least 15° C before the treatment run time is measured.

Note 2 : “Wet Bulb Temperature Run Time” is the continuous portion of the heat treatment time where the wet bulb temperature measures > 60°C, measured in hours

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

Option F-1: Generic Hardwood Phytosanitary Heat Treatment Schedule

Lumber Thickness	Minimum Heat Treatment Run Time	Wet Bulb Temperature Run Time > 60°C (140°F)	Minimum Final Wet-Bulb Temperature
Up to 60 mm (2 1/4 inches)	10 hrs, 36 minutes	5 hrs, 32 minutes	63°C (145°F)
Up to 85 mm (3 1/4 inches)	13 hrs, 20 minutes	9 hrs,	66°C (151°F)
Up to 110 mm (4 1/4 inches)	21 hrs, 54 minutes	17 hrs, 44 minutes	67°C (153°F)

Note: “Wet Bulb Temperature Run Time” is the continuous portion of the heat treatment time where the wet bulb temperature measures 60°C, measured in hours.

Note: The pre-schedule wood core temperature of at least one piece of wood greater than 60 mm (2 ¼ inches) in thickness must be equal to or higher than 15°C.

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

SPECIFIC HEAT TREATMENT CHAMBER OPERATING CONDITIONS FOR OPTION G

The following sets out the minimum conditions under which a facility may heat treat the wood during the kiln drying process in order to reduce the moisture content below the fiber saturation point of the wood (approximately 30 % MC).

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. This deviation will be referred to the Canadian Forest Products Advisory Committee for review. Any modifications must be included in the manual and account for all the processes used to ensure that the phytosanitary standard is being met.

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 G: Generic hardwood Phytosanitary Heat Treatment Schedule

Lumber Thickness	Dry- Bulb Temperature Run Time $\geq 52^{\circ}\text{C}$ (126°F) ¹	Minimum Time at the End of the Treatment with the Dry-Bulb $\geq 60^{\circ}\text{C}$ (140°F) ²
Up to 28 mm (1 1/8 inches)	12 hrs	6 hrs
Up to 60 mm (2 1/4 inches)	27 hrs	9 hrs
Up to 85 mm (3 1/4 inches)	67.5 hrs	22.5 hrs
Up to 110 mm (4 1/4 inches)	108 hrs	36 hrs

Note 1: Dry bulb temperature run time is the continuous portion of the heat treatment time where the dry bulb temperature measures $\geq 52^{\circ}\text{C}$, measured in hours.

Note 2: The “Minimum Time at the End of the Treatment with the Dry-Bulb $\geq 60^{\circ}\text{C}$ ”, is included in the “Dry bulb temperature run time $>52^{\circ}\text{C}$ ”, measured in hours.