

GRADING MACHINES APPROVED BY THE BOARD OF REVIEW

Grading Machine	Agency Support	Machine Manufacturer	BOR Action
1. Metriguard Model 3300 Transverse Vibration E-Computer Metriguard Model 340 Transverse Vibration E Computer	WCLIB	Metriguard, Inc. PO Box 399 Pullman, WA 99163	Granted Model 3300 approval on 7/12/84 for: • dry lumber only.
2. Stress-O-Matic	WWPA	Industrial Woodworking Machines PO Box 1465 Garland, TX	Granted approval around 1962.
3. C-L-T (Continuous Lumber Tester) C-L-T Model 7200 HCLT (High Capacity Lumber Tester)	WWPA for C-L-T	Metriguard Inc. PO Box 399 Pullman, WA 99163	Granted approval around 1962 for C-L-T.
4. Cook Bolinder Model SG-TF NA	WWPA	Cook Bolinder Ltd. PO Box 42 Stansmore, Middlesex, GB HA7 4XD	Granted approval 1/23/86.
5. X-Ray Lumber Gauge [previously known as Advanced Stress Grader (BOR 10/26/89) no longer available]	SPIB	Newnes Machine Ltd. Company	Granted approval 4/95 subject to: • the use of visual slope of grain requirements for the various grade levels as found in ASTM D-245 unless the X-Ray Lumber Gauge is used in conjunction with another method to evaluate slope of grain • the moisture content of the stock being controlled and taken into account for the design value assignments • the use of accredited agency quality control and certification procedures. If short runs are made, intensive sampling will be done through the accredited agency quality control program.
6. Dart M. S. R. Testing Machine	CMSA	Eldeco Pty Ltd. Albury, Australia	Granted approval 2/2/95.
7. Ersson ESG 240-Strength Grader	WCLIB	John Ersson Engineering AB Storvik, Sweden	Granted approval 2/5/98
8. Dynagrade Strength Grading Machine	QLMA	Dynalyse AB Partille, Sweden	Granted approval 7/27/00
9. Computermatic	WCLIB	Measuring and Process Control Ltd. Essex, UK	Granted approval 2/8/01
10. Dimter 403 Grademaster	WCLIB	Dimter GmbH Maschinenfabric Illertissen, Germany	Granted approval 4/24/03 with the following operational limitations of the machine: • recommended range of the lumber temperature is 15° – 30° C (59° – 86° F) • machine operation speed range is 25 pieces/minute • lumber thickness range is from 33 – 60 mm (1.30” – 2.36”) • lumber width range is from 80 – 220 mm (3.15” – 8.66”) • lumber length range is 3,000 – 6,000 mm (118” – 236”) • lumber surface must be planed • moisture content of lumber between 8% - 15%.

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11. Microtec GoldenEye Lumber Grading Machine	WCLIB	MiCROTEC Srl GmbH Bressanone, Italy	Granted approval 4/24/03 with the following operation limitations of the machine: <ul style="list-style-type: none"> • recommended range of the lumber temperature is 15° – 30° C (59° – 86° F) • recommended machine operating temperature is 0° – 45° C (5° – 113° F) • machine operation speed range is 80 – 300 meters/second (262 –984 feet/minute) • lumber thickness range is from 20 – 60 mm (0.79” – 2.36”) • lumber width range is from 80 – 300 mm (3.15” – 11.81”) • moisture content of lumber between 8% - 15%.
12. Transverse MSR Grader (TMG)	QFIC	Centre de Recherche Industrielle du Quebec (CRIQ), Quebec, Canada	Granted approval April 29, 2004 with the following operation limitations of the machine: <ul style="list-style-type: none"> • Temperature-The equipment shall be operating at temperature above freezing point 32° F (0° C). • Humidity-The recommended environmental operating range for humidity is a maximum of 85% (no condensing). No lower limit. • Operational speed-The maximum operation speed is 160 pieces per minute. • Lumber thickness-The thickness range is from 0 inches to 2 inches. Variance in thickness has no mechanical influence on the machine. • Lumber width-The lumber width range is from 3 inches to 4 inches. • Lumber length-The minimum length of a piece of lumber that can be effectively graded is six feet. The maximum length is nine feet. • Lumber temperature-The recommended lumber temperature operating range is -40° F (-200° C) as lower limit. No upper limit. • Number of grades-The capacity to segregate up to three different grade categories simultaneously.
13. Transverse MSR Grader (TMG) 12	QFIC	Centre de Recherche Industrielle du Quebec (CRIQ), Quebec, Canada	Granted approval July 22, 2004 with the following operation limitations of the machine: <ul style="list-style-type: none"> • Temperature-The equipment shall be operating at temperature above freezing point 32° F (0° C) • Humidity-The recommended environmental operating range for humidity is 85% (no condensing). No lower limit. • Operational speed-The maximum operation speed is 240 pieces per minute. • Lumber thickness-The thickness range is from 0 inches to 2 inches. Variance in thickness has no mechanical influence on the machine. • Lumber width-The lumber width range is from 3 inches to 6 inches. • Lumber length-The minimum length of a piece of lumber that can be effectively graded is five feet. The maximum length is twelve feet. • Lumber temperature-The recommended lumber temperature operating range is -4° F (-20° C) as lower limit. No upper limit. • Number of grades-The capacity to segregate up to three different grade categories simultaneously.

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14. CRP 360 MSR Testing Machine	QFIC	Conception RP, St-Victor De Deauce, Quebec, Canada	<p>Granted approval July 22, 2004 with the following operation limitations of the machine:</p> <ul style="list-style-type: none"> • Machine environmental conditions: <ul style="list-style-type: none"> -Ambient operating temperature-0 to 50 degrees Celsius -Ambient humidity conditions-up to 90% humidity, no condensing • Operational speed-The maximum operational speed is up to 800 feet per minute. • Lumber thickness-The thickness range is up to 2 inches • Lumber width-The lumber width range is from 3 inches to 6 inches. • Length capacity-The minimum length of a piece of lumber that can be effectively graded is four feet. • Lumber temperature-The recommended lumber temperature operating range is -20° C and up. • Amount of grades identified-Four different grades simultaneously.
15. RE-II (formerly called XLG/LHG+Thumper Strength Grader)	SPIB	Weyerhaeuser	<p>Granted approval February 3, 2005 with the following limitations of the machine:</p> <ul style="list-style-type: none"> • The use of visual slope of grain requirements for the various grade levels as found in ASTM D-245 unless the XLG/LHG is used in conjunction with another method to evaluate slope of grain. • The moisture content of the stock being controlled and taken into account for the design value assignments. • The use of accredited agency quality control and certification procedures. If short runs are made, intensive sampling will be done through the accredited agency control program. • Lumber sizes <ul style="list-style-type: none"> -Thickness up to 4”. -Width up to 12”. -Length up to 24’. • Pending future tests, lumber temperature must be above freezing, 32° F (0° C). • The maximum operational speed is 180 pieces per minute with the current computer configuration. Future speed improvements can be made.
16. Transverse MSR Grader (TMG) 16	QFIC	Centre de Recherche Industrielle du Quebec (CRIQ), Quebec, Canada	<p>Granted approval July 28, 2005 with the following operation limitations of the machine:</p> <ul style="list-style-type: none"> • Temperature-The equipment shall be operating at temperature above freezing point 32° F (0° C) • Humidity-The recommended environmental operating range for humidity is 85% (no condensing). No lower limit. • Operational speed-The maximum operation speed is 240 pieces per minute. • Lumber thickness-The thickness range is from 0 inches to 2 inches. Variance in thickness has no mechanical influence on the machine. • Lumber width-The lumber width range is from 3 inches to 6 inches. • Lumber length-The minimum length of a piece of lumber that can be effectively graded is five feet. The maximum length is sixteen feet. • Lumber temperature-The recommended lumber temperature operating range is -4° F (-20° C) as lower limit. No upper limit. • Number of grades-The capacity to segregate up to three different grade categories simultaneously.

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17. RE-I (formerly called Stand Alone Thumper Strength Grader)	SPIB	Weyerhaeuser	Granted approval July 28, 2005 with the following limitations of the machine: <ul style="list-style-type: none"> • The use of accredited agency quality control and certification procedures. If short runs are made, intensive sampling will be done through the accredited agency control program. • Lumber sizes <ul style="list-style-type: none"> -Thickness up to 4". -Width up to 12". -Length up to 24'. • Pending future tests, lumber temperature must be above freezing, 32° F (0° C). • The maximum operational speed is 180 pieces per minute. • The machine shall only be used to evaluate dry lumber.
18. Falcon Engineering A-Grader	WCLIB	Falcon Engineering, Inglewood, New Zealand	Granted approval July 27, 2006 with the following operation limitations of the machine: <ul style="list-style-type: none"> • Operating speed limitation of a maximum of 180 pieces per minute
19. Microtec Goldeneye Model 706 Lumber Grading Machine	WCLIB	MiCROTEC Srl GmbH Bressanone, Italy	Granted approval November 2, 2006 with the following operation limitations of the machine: <ul style="list-style-type: none"> • recommended range of the lumber temperature is above 32° F (0° C) • recommended machine operating temperature is 5° – 35° C (41° – 95° F) • machine operation speed range is 450 meters/minute (1,500 feet/minute) • maximum lumber thickness range is up to 150 mm (approximately 5.91") • maximum lumber width range is 500 mm (19.69") • moisture content of lumber between 8% - 19%
20. Precigrader MSR Grading Machine	CLA	Dynalyse AB, Partille, Sweden	Granted approval February 8, 2007 with operation limitations of the machine as stated in the CLA submission. Modified speed limitation from 180 lugs/minute to 260 lugs/minute (see SPIB submission January 24, 2019 meeting)
21. LHG:XLG With E-Valuator Stiffness Estimation with Vibration	WWPA	COE Newnes/McGehee	Granted approval April 26, 2007 with the following operation limitations of the machine: <ul style="list-style-type: none"> • Operational feed speed 800 ft/min – 2500 ft/min • Operational temperature -30° C to 50° C • Material sizes 2x3 to 2x12 • Metric thickness 33 mm to 55 mm • Metric width 70 mm to 300 mm • To eliminate planer noise that may affect the laser profile subsystem the machine must not be close-coupled with the planer and board flow must be relatively smooth. Abrupt changes in feed speed and non-fluent board flow adversely affect frequency measurement and should be avoided.
22. RE-III (formerly called Thumper III)	SPIB	Weyerhaeuser	Granted approval November 1, 2007 with the following operation limitations of the machine: <ol style="list-style-type: none"> 1. Lumber sizes: <ul style="list-style-type: none"> • Thickness up to 4 inches • Width up to 12 inches • Length up to 24 feet 2. Temperature range: <ul style="list-style-type: none"> • Kiln dried lumber: -50° C to 50° C. When dry lumber is processed while frozen, CUSUM samples must be warmed to between 10° C and 30° C before being bench tested. • Green lumber: 0° C to 50° C 3. Maximum speed is 200 pieces per minute with a lug chain maximum speed of 350 feet per minute. Higher rates could be obtained by putting in two Thumper units evaluating every other board. 4. The use of accredited agency quality control and product certification procedures.

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23. MiCROTEC ViSCAN Lumber Grading Machine	WCLIB	MiCROTEC Srl GmbH Bressanone, Italy	<p>Granted approval November 12, 2009 with the following operation limitations of the machine:</p> <ul style="list-style-type: none"> • Operating Temperature – The operating range of the temperature of the electronics is 5° C (41° F) to +35° C (95° F) • Lumber Temperature - The range of lumber temperatures is -20° C (-4° F) with a mean moisture content of < 20% • Operational Speed – The maximum speed of measurement is 180 boards/minute • Lumber thickness – The range of lumber thickness is from 0.70" (18 mm) to 7.25" (184 mm) • Lumber width – The range of lumber widths is from 2.25" (57 mm) to 12.50" (318 mm) • End of piece – Since the end of piece (approximately 18") is evaluated by the ViSCAN, the "end of the piece" visual limitations in 206-b of WCLIB Standard Grading Rules No. 17 will not be applicable.
24. MiCROTEC ViSCAN-PLUS Lumber Grading Machine	WCLIB	MiCROTEC Srl GmbH Bressanone, Italy	<p>Granted approval November 12, 2009 with the following operation limitations of the machine:</p> <ul style="list-style-type: none"> • Operating Temperature – The operating range of the temperature of the electronics is 5° C (41° F) to +35° C (95° F) • Lumber Temperature: <ul style="list-style-type: none"> Lumber <20% moisture content: The range of lumber temperatures is -20° C (-4° F). When lumber is processed at less than 0°C (32° F), samples collected as part of a quality control program must be warmed to >0°C (32° F) prior to testing. Lumber >20% moisture content: The range of lumber temperature is 0°C (32° F). • Operational Speed – The maximum speed of measurement is 180 boards/minute • Lumber thickness – The range of lumber thickness is from 0.70" (18 mm) to 7.25" (184 mm) • Lumber width – The range of lumber widths is from 2.25" (57 mm) to 12.50" (318 mm) • End of piece – Since the end of piece (approximately 18") is evaluated by the ViSCAN-PLUS, the "end of the piece" visual limitations in 206-b of WCLIB Standard Grading Rules No. 17 will not be applicable.
25. Weyerhaeuser NR Company's Gradescan®-Based Strength Grading System	SPIB	Weyerhaeuser/Lucidyne Technologies GradeScan	<p>Granted approval July 21, 2011 with the following operation limitations of the machine:</p> <ul style="list-style-type: none"> • Lumber sizes: <ul style="list-style-type: none"> • Thickness up to 4 inches • Width up to 14 inches • Length up to 28 feet • Temperature range is -50° C to 50° C. When lumber is frozen, CUSUM samples must be warmed to between 10° C and 30° C before being bench tested. • The maximum speed at the thumper station is 200 pieces per minute with a lug chain maximum speed of 350 feet per minute. Higher rates could be obtained by putting in two Thumper units evaluating every other board. The automated visual grader (GradeScan®) scans lumber at planer speeds up to 3000 ft/min. • The use of accredited agency quality control and product certification procedures. • When used in combination with the RE-I or RE-III machine the manufacturer operational restrictions previously assigned to RE-I or RE-III machine are applicable depending on the selected configuration.

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26. Ecoustic Board Grader	WCLIB	Calibre Equipment Limited, Wellington, New Zealand	Granted approval January 5, 2012 with the following operation limitations of the machine: <ul style="list-style-type: none"> • Maximum operating speed-240 boards per minute • Maximum width-14 inches • Maximum thickness-12 inches • Maximum length-28 feet • Lumber temperature – MC < 20%: -20° C to 50° C; – MC 20%: 0° C to 50° C
27. Metriguard 2350 Sonic Grader	WCLIB	Metriguard, Inc. PO Box 399 Pullman, WA 99163	Granted approval October 18, 2012 with the following operation limitations of the machine: <ul style="list-style-type: none"> • Maximum operating speed - 250 boards per minute • Maximum thickness – 12 inches • Maximum width – 14 inches • Lumber temperature range: ---MC < 20 %: -4° F to 120° F ---MC 20% : 32° F to 120° F • Since the end of the piece (approximately 18 inches) is evaluated by the Metriguard 2350 Sonic Grader the “end of the piece” visual limitations specified in paragraph 206-b of the WCLIB Standard Grading Rules No. 17 will not be applicable.
28. MTG	OLMA	Brookhuis Micro Electronics, Enschede, Netherlands	Granted approval April 17, 2014 with the following operation limitations of the machine <ul style="list-style-type: none"> • Not intended for timber treated by fire retardant products or modified timber • Not intended for finger jointed lumber • Lumber dimensions with internal Stress Wave Activator: ---Length 1.6-26.2 ft (500-8,000 mm) ---Width 2-10” (50-250 mm) ---Thickness 0.6-4.5” (15-115 mm) • Lumber dimensions with external Stress Wave Activator: ---Length 1.6-65 ft (500-20,000 mm) ---Width 2-15” (50-400 mm) ---Thickness 0.6-12” (15-300 mm) • Temperature range of equipment is 14 to 122° F (-10° to 50° C)

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29. MTG BATCH	OLMA	Brookhuis Micro Electronics, Enschede, Netherlands	Granted approval April 17, 2014 with the following operation limitations of the machine <ul style="list-style-type: none"> • Not intended for timber treated by fire retardant products or modified timber • Not intended for finger jointed lumber • Lumber dimensions <ul style="list-style-type: none"> ---Length 1.6-26.2 ft (500-8,000 mm) ---Width 2-10" (50-250 mm) ---Thickness 0.6-4.5" (15-115 mm) • Temperature range of equipment is 14 to 122 ° F (-10° to 50° C)
30. MTG ESCAN	OLMA	Brookhuis Micro Electronics, Enschede, Netherlands	Granted approval April 17, 2014 with the following operation limitations of the machine <ul style="list-style-type: none"> • Not intended for timber treated by fire retardant products or modified timber • Not intended for finger jointed lumber • Lumber dimensions <ul style="list-style-type: none"> ---Length 1.6-26.2 ft (500-8,000 mm) ---Width 2-10" (50-250 mm) ---Thickness 0.6-4.5" (15-115 mm) • Temperature range of equipment is 14 to 122 ° F (-10° to 50° C)
31. VAB - MSR Lug Loader	QFIC	VAB Machines, Inc. Levis, Quebec, Canada	Granted approval on April 26, 2018 with the following operation limitations of the machine <ul style="list-style-type: none"> • Not intended for timber treated by fire retardant products or modified timber • Not intended for finger jointed lumber • Lumber dimensions <ul style="list-style-type: none"> ---Length 6-16 ft (152.4-406.4 mm) – (modified January 24, 2019 -see QFIC submission) ---Width 2.5" (63.5 mm); 3.5" (88.9 mm); 5.5" (139.7 mm) ---Thickness 1.5" (38.1 mm) • Maximum rate – 200 boards/minute (6-12 ft); 140 boards/minute (14 and 16 ft) – (modified 012419 – see QFIC submission) • MOE span: 1,000,000psi – 3,000,000psi • Wood temperature range: -22° F to 86° F (-30° C to 40° C) • Wood moisture range: 10-25%
32. Microtec Goldeneye Model 806 Lumber Grading Machine	WCLIB	MiCROTEC Srl GmbH Bressanone, Italy	Granted approval January 24, 2019 with the following operation limitations of the machine: <ul style="list-style-type: none"> • recommended range of the lumber temperature is above -4° F (-20° C) • recommended machine operating temperature is 41° – 95° F (approximately 5° -35° C) • machine operation speed range is 240 boards/minutes or approximately 4000 feet/minute (1,219 meters/minute) • maximum lumber thickness range is up to 103mm (approximately 4") • maximum lumber width range is 305mm (approximately 12") • mean moisture content of lumber less than 20% • no "end of piece limitations due to full length scan"

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33. Microtec Goldeneye Model 802 Lumber Grading Machine	WCLIB	MiCROTEC Srl GmbH Bressanone, Italy	Granted approval January 24, 2019 with the following operation limitations of the machine: <ul style="list-style-type: none"> • recommended range of the lumber temperature is above -4° F (-20° C) • recommended machine operating temperature is 41 – 95F (approximately 5-35C) • machine operation speed range is 4000 feet/minute (1,219 meters/minute) • maximum lumber thickness range is up to 103mm (approximately 4”) • maximum lumber width range is 305mm (approximately 12”) • mean moisture content of lumber less than 20% • no “end of piece” limitations due to full length scan
34. USNR Thor Acoustic MSR Grader	PLIB	USNR Woodland, WA, USA	Granted approval January 9, 2020 with the following operation limitations of the machine: <ul style="list-style-type: none"> • Operating Environment 31° - 125° F (0°-52° C) • Lumber Temperature -22° F (-30° C) if MC < 25% • Lumber Temperature 32° F to 125° F (0°-52° C) if MC >25% • Max Width 14” (360 mm) • Max Thickness: (16” (400 mm) • Max Length: 33 ft. (10 m) • Kiln Dried Lumber MC <25% • Sawmill Lumber (“Green”): No Limit • Machine operating up to 360 boards per minute.