

Price: \$30



GRADING AND PACKAGING

CONTENTS

GRADING AND PACKAGING

3

INTRODUCTION:

Why We Have Grades

4

NATIONAL OAK FLOORING MANUFACTURERS ASSOCIATION

Who Is NOFMA

Handling of Grading Disputes

5

MAPLE FLOORING MANUFACTURERS ASSOCIATION

Who Is MFMA

Handling of Grading Disputes

6

CANADIAN LUMBERMEN'S ASSOCIATION

Who Is CLA

Handling of Grading Disputes

7

OTHER GRADES

Lumber Grades

Softwoods

Mill Run

Proprietary Grades

Imported Wood

9

MEASURING WOOD FLOORING

Square Foot

Board Foot

Lineal Foot

Equal Lineal Foot

Cubic Foot

Square Meter

Packaging

10

USEFUL FORMULAS

11

THE TALLY SHEET

13

GLOSSARY

14

RESOURCE LIST

15

APPENDIX

NOFMA Grades

MFMA Grades

CLA Grades

26

INDEX

27

SOURCES AND CREDITS

NO GUARANTEE OR WARRANTY

The information contained in this publication represents widely accepted industry practices. There are, however, no universally approved flooring grades. The National Wood Flooring Association accepts no risk or liability for application of the information contained in this publication.

GRADING AND PACKAGING

Introduction: Why We Have Grades

People have been using hardwood floors for hundreds of years — examples can be found in some of the oldest castles and palaces in Europe. In the era when those floors were laid, hardwood floors were constructed by hand in every aspect, from cutting down the lumber to applying the wax.

With the advent of hardwood floor manufacturing machinery, however, an entire industry was born. While installing, sanding and finishing a floor remained a specialized skill, creating the floors themselves was no longer a painstaking process. Around the turn of the century, mills were established specifically for the production of hardwood floors. Not long after, the burgeoning wood flooring industry saw the need to implement standards, or grades.

Today, nearly a century later, grading is an essen-

tial part of doing business in the hardwood floor industry. Grades group flooring with similar qualities, bringing a degree of consistency to products from different mills. Grades tell the purchaser the minimum to expect when buying product, including surface characteristics, required lengths and milling tolerances. Grades also help ensure that money isn't wasted either by consumers or producers — buyers can confidently expect to get the quality of product they pay for, and manufacturers know they aren't wasting money by selling high-quality product at a lower-quality price.

In some cases, grades are established by industry associations, such as the National Oak Flooring Manufacturers Association and the Maple Flooring Manufacturers Association. The development of hardwood flooring grades was the main impetus in the formation of those groups. Association guidelines apply to more than 90 percent of the solid flooring manufactured in the United States and Canada. In addition to

creating grades, the associations provide an impartial party to settle disputes about grading and perform grading inspections.

Manufacturers must be members of such associations to qualify for their grading dispute service. In other cases, hardwood flooring manufacturers determine their own classifications and create their own grades, or "proprietary grades," by which they sell their flooring.



Grades were developed to bring a degree of consistency to wood floors.

NATIONAL OAK FLOORING MANUFACTURERS ASSOCIATION

WHO IS NOFMA

The National Oak Flooring Manufacturers Association traces its beginnings to Detroit in 1909, with the formation of the Oak Flooring Manufacturers of the United States. The organization had several goals: to administer and promote industry grading rules, to provide statistical data and to act as a general spokesman for the industry.

After being located in Chicago and Cincinnati, the headquarters were moved to Memphis in 1930 and in 1933 the group joined with the Southern Oak Flooring Industries organization to form NOFMA. The association was to act as an agency of the Lumber Code authority for the administration of a Code of Fair Competition under provisions of the National Industrial Recovery Act. In 1935, the association's charter was amended to authorize the organization to operate as a trade association for the benefit of the producers of oak flooring.

Membership and production through the years peaked in 1955, with 85 member manufacturers and 1.2 billion board feet shipped, and subsequently nose-dived in the 1960s with the popularity of carpeting. By 1979, membership was less than 10 percent of the 1955 peak. Since 1980, however, it has steadily increased, with shipments in 1997 hitting 416.6 million board feet — the most since 1969.

Today, NOFMA continues its purpose of administering standards, performing quarterly mill inspections, promoting the industry and gathering statistical information. Inspectors check for grade compliance, including milling, packaging length and acceptable moisture levels. NOFMA also strives to educate installers with semi-annual installation schools held in Memphis in conjunction with the National Wood Flooring Association and the Maple Flooring Manufacturers Association. The association provides technical assistance, such as advice on installation, as well.

NOFMA's grades are now accepted so widely that even non-member mills often separate their production of flooring along NOFMA guidelines. In addition to unfinished oak, beech, birch, maple, ash and hickory/pecan, NOFMA has grades for prefinished oak flooring.

Member mills pledge to support the NOFMA standards to ensure that a NOFMA grade from any member mill will be roughly the equivalent of the same grade from another member mill.

HANDLING OF GRADING DISPUTES

The NOFMA inspection department has the responsibility of rendering complaint inspection reports for member mills. According to NOFMA Rules & Regulations, an impartial opinion will be rendered on matters of controversy between users and member manufacturers.

Complaint inspections can be made only on NOFMA member flooring, and can be authorized only by a NOFMA member mill in good standing. The authorization must be received from the manufacturer whose product is in question. When making inspections, NOFMA inspectors review pertinent information and inspect job site conditions, installation procedures and the condition of the flooring at the designated site and warehouse, if necessary. They also may provide direction for the removal of sample flooring from the inspection site.

Payment to NOFMA for expenses of the complaint inspection is the responsibility of the manufacturer whose flooring is involved. Settlement of the cost of the complaint is determined by the parties involved.

Complaint inspection reports are sent to the member manufacturer involved, unless the member has authorized other distribution. When a complaint on grade involves a shipment or installation, if the complaint inspection results in a difference in favor of the purchaser of more than five percent in feet, then the shipper will be considered as being in the wrong. If the difference is only five percent or less in feet, then the party making the complaint is considered as being in the wrong. The quality and condition of the hardwood flooring as it leaves the manufacturer governs the inspection.

NOFMA does not accept any responsibility for:

- the arbitration of claims
- financial losses to anyone as a result of complaint inspections
- enforcement of agreements between buyer and seller
- collection of complaint inspection fees unpaid by flooring users to the manufacturer
- the future performance of flooring when suggestions for correction prove ineffective.

For complete NOFMA grade rules, see the appendix on page 15.



MAPLE FLOORING MANUFACTURERS ASSOCIATION

WHO IS MFMA

The Maple Flooring Manufacturers Association has strived to be the authoritative source of technical information about hard maple flooring since its founding in 1897, when most maple flooring was produced for industrial use. Until that year, maple flooring manufacturers had established their own grades, grade terms and dimensions of the flooring. The founding of the MFMA brought standardization of the grades and product to the industry.

In its beginnings, the association collected statistics from its member mills including sales volumes, prices and mill wages. By 1905, the association managed to guarantee the quality of the grading after an inspector was added to the staff. Grading standards evolved over the decades, with the basic standards used today (with minor revisions) having been established in the 1940s. The association also actively advertised



Sports floors are the main focus of the MFMA.

maple flooring to the public.

MFMA membership and production numbers followed the pattern of the industry, coming to a near standstill during the Depression and again in the 1960s as carpet entered the market. By then, the manufacturing focus had changed to production of sports floors, where it remains today, although maple has greatly increased in residential popularity, as well.

MFMA membership has been expanded over the years to include associate members (installers), distributor members (wholesalers involved in the sale of member mills' products), allied members (manufacturers of products utilized in the installation of maple, beech or birch flooring), and honorary members (determined by the Board of Directors).

Today, MFMA continues to actively promote the product (now including birch and beech flooring), as well as enforce grade standards. MFMA makes unannounced inspections to member mills four times a year. It publishes copies of its standards, floor care recommendations, athletic flooring sealer and finish specifications, and a game-line and court-markings guide.

HANDLING OF GRADING DISPUTES

MFMA inspectors are available to settle grading disputes. An inspection may be requested by any member or by the owner of the installation in question. Shipments will be considered to be the grade invoiced if 95 percent or more (in feet) is found to be of the grade invoiced. Where the degrades are in excess of 5 percent, the flooring shall be the property of the manufacturer.

If the amount of degrades is found to be 5 percent or less (in feet) of the total, the cost of reinspection shall be borne by the complainant. If more than 5 percent of the amount is degrades, the expense shall be borne by the manufacturer of the flooring. Specific "Guidelines for Reinspection" are available from MFMA.

For complete MFMA grade rules, see the appendix on page 21.

CANADIAN LUMBERMEN'S ASSOCIATION

WHO IS CLA

The Canadian Lumbermen's Association was founded in 1907 in Ottawa and incorporated in 1931, its purpose being "to promote the interests and conserve the rights of those engaged in lumbering operations or in the manufacture, sale or distribution of lumber."

Today's CLA is divided into four bureaus: the Hardwood Bureau, composed of hardwood manufacturers, hardwood flooring manufacturers and hardwood wholesalers; the Wood Products Manufacturing & Inspection Bureau, including softwood lumber manufacturers; the Wholesale & Export Bureau, including softwood wholesalers and exporters; and the Associate Bureau, composed of members who do not manufacture lumber but provide products and services to the lumber industry.

CLA is active in many capacities, among them representing member's views on issues such as tariff negotiations, import and export regulations, building codes and product standards. The association hosts an annual convention, and its members hail from

Canada, the United States and the United Kingdom.

CLA also has grade rules for oak, maple, birch and parquet hardwood flooring. Grading is self-policed — CLA does not employ hardwood flooring inspectors.

HANDLING OF GRADING DISPUTES

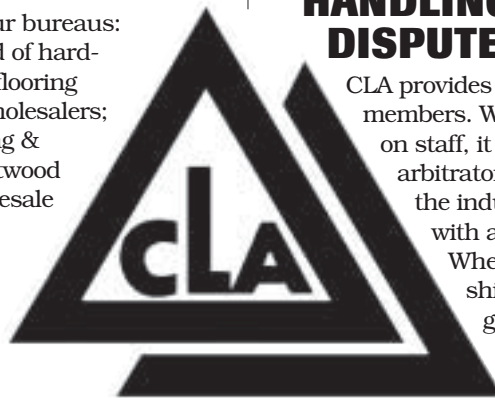
CLA provides a grading dispute service for its members. While it does not have inspectors on staff, it does contract with appointed arbitrators. These are impartial experts in the industry who are not associated with a particular manufacturer.

When a reinspection is requested, a shipment shall be considered the grade invoiced if upon official inspection by a CLA-appointed arbitrator, 95 percent or more (in feet) is found to be of the

grade invoiced. If degradates are in excess of 5 percent (in feet) of the shipment, the degradates in excess of 5 percent shall be the property of the manufacturer of the flooring.

The charge for reinspection shall be determined by the CLA and its appointed inspectors and will include both time and travel expenses. Unless otherwise agreed on, the cost of reinspection shall be borne by the complainant when the amount below grade is found to be 5 percent or less. When found to be more than 5 percent, the expense shall be borne by the manufacturer of the flooring. The quality of the flooring in the condition in which it leaves the manufacturer is held to govern the grade — subsequent lack of care and improper treatment in storage, laying, scraping or finishing is not chargeable to the manufacturer.

For complete CLA grade rules, see the appendix on page 23.



Maple floors are the majority of those manufactured by CLA-member mills.

OTHER GRADES

LUMBER GRADES

Lumber grades in the United States and Canada are determined by the National Hardwood Lumber Association, based in Memphis, Tenn. (CLA adopts the NHLA grades verbatim and distributes the rules in Canada on behalf of NHLA.) Although some of the grade names for lumber and flooring may be similar, choosing a grade of lumber will not determine the wood flooring grade.

SOFTWOODS

Softwood flooring grades are established by the Southern Pine Inspection Bureau, the Western Wood Products Association and the West Coast Lumber Inspection Bureau. Specifically, southern pine flooring grades are formulated and published by the Southern Pine Inspection Bureau (in conformity with the basic provisions of the American Lumber Standard). SPIB maintains a staff of quality supervisors for the inspection and certification of members' lumber and flooring. (Additionally, the Timber Products Inspection is a grading agency that can inspect lumber and flooring according to, among others, SPIB rules.) Like hardwood flooring

grades, the SPIB grades are based on appearance criteria. The grades are, from highest to lowest: B&B, C, C&BTR, D, D&BTR, No. 1, No. 2 and No. 3. C&BTR (C and Better) and D&BTR are the most typical southern pine flooring grades available. B&B (B and Better) material is relatively scarce. The most common thicknesses of southern pine flooring are 1 and 1¼ inches nominal (actual is ¾ and 1 inch). Standard widths range from 2 inches nominal (1½ inches actual) to 6 inches nominal (5½ inches actual).

In the western United States, there are softwood flooring grades administered by the Western Wood Products Association and the West Coast Lumber Inspection Bureau. The WWPA flooring grades are the same as those customarily used by WWPA for select and finish lumber. From highest to lowest select grades, the grades are B & Better Select, C Select and D Select. In finish grades, there are Superior, Prime and E grades. The WWPA grades apply to a long list of softwood species, among them Douglas fir and western hemlock. The rules apply in 12 western states and in Alaska. The WCLIB grading rules for flooring apply to "all western species" and include three levels:

C&BTR, D and E. There are also several agencies in the western states that can be hired to grade according to the WWPA or WCLIB grades.



Southern pine floors such as this one are graded according to standards established by the Southern Pine Inspection Bureau.

MILL RUN

Some lumber mills, as well as some wood flooring manufacturers, will take a particular grade of lumber — typically 2A or 3A — and run it into a flooring profile, without dividing the flooring into grades. This is typically called "mill run" or "run of the mill." Thus, instead of separating the flooring into grades such as clear, select,

common, etc., the flooring is a mix of grades. Because individual pieces do not have to be cut to divide them into different grades, mill run flooring is typically longer than other flooring. The only flooring sometimes rejected is that with either a manufacturing defect or an unsound board. Due to its mix of grades, mill run flooring is more economical — for both the manufacturer and the consumer.

PROPRIETARY GRADES

In addition to using standard flooring grades such as those developed by NOFMA, MFMA and CLA, many manufacturers may have their own, or proprietary, grades. There are various reasons for doing this — some producers pick names that are more marketing-friendly and further compare them to NOFMA or other grades. Others wish to be either more specific or more general than the industry standards. In other cases, manufacturer standards have been created in response to a void of general standards for specific products. For example, a $\frac{3}{4}$ -inch engineered floor could be sold as “Vintage” or “Cabin” grades. Because proprietary grades are created by the manufacturer, written descriptions of the grades may not be available to the consumer.

PLANK

Wide-width flooring is usually sold under proprietary grade names; however, NOFMA does have grades for plank flooring. Many U.S. manufacturers have chosen to name their grades using the same terms that are familiar to us from the NOFMA or MFMA standards, such as saying that a product “has some No. 2 Common characteristics.” However, these grades are not certified or verified. If plank producers are NOFMA member mills, they may register their own grade names and detailed descriptions (including average length) with the NOFMA office to qualify for complaint inspection services.

PREFINISHED SOLID

NOFMA does have grading rules for prefinished solid products, but most manufacturers also create their own proprietary grade names, as well. Other manufacturers may describe the product by the grade of flooring it was before it was finished, i.e., No. 1 Common, etc. Still others may have brand names such as “Classic” or “Rustic.”

PREFINISHED ENGINEERED

NOFMA now covers engineered flooring under its certification program. Contact NOFMA (contact information is on page 14) for the current information. Also, the Hardwood Plywood & Veneer Association, along with the American National Standards Institute, adopted standards in 1996.

Most manufacturers of engineered product do not create “grades” per se. Instead, they create product names. The products are categorized

according to veneer, finish and milling.

While most solid wood flooring products have average length requirements, most engineered floors do not. Generally, many manufacturers’ product names reflect three levels or more of quality ranging from a premium level down to what is generically referred to as cabin grade. At the top level, or premium, the flooring has almost no milling defects and minimal character marks such as knots, mineral streaks or pin worm holes. The next grade, typically a character grade, allows more natural character marks and some minor milling defects that may cause overwood, small finish skips and shorter average lengths. Wood with character marks such as mineral streaks may be used for darker-colored floors. Cabin-grade floors allow unlimited character marks and milling defects.

Because the industry does not have established grades for engineered floors (aside from the ANSI/HPVA standards), many purchasers make their decisions about product quality based on the value and the warranty offered. The scope of the warranties decrease accordingly with the quality of the flooring. Oftentimes, cabin-grade floors offer no warranty.

Complaint Resolution

Most prefinished engineered flooring manufacturers have a set process for dealing with complaints about the flooring. If a problem cannot be settled between the contractor and consumer, complaint forms are usually routed to the distributor of the product. If they are not settled there, they are sent to the manufacturer, where the flooring — either actual samples from the job site or photographs, along with a written description — is analyzed and a final determination is made.

PARQUET

There also are no standard grades in the United States for parquet flooring, although the now-inactive American Parquet Association used to have grades for that segment of the industry. Some parquet manufacturers may still use the names of the APA grades. For unfinished parquet flooring, in ascending order of quality, they are Rustic, Select and Better, and Premium. For prefinished parquet, they are Cabin, Natural and Better, and Choice. In Canada, CLA grading includes rules for grading the face surface of parquet flooring.

IMPORTED WOOD

Other countries that produce large amounts of hardwood flooring may have their own grades for hardwood floors. In Australia, for example, grades are developed by the Standards Association of Australia and are the same as those used for any hardwood milled products in the country. Australian grades are determined primarily by the face appearance of the products and include, from highest to lowest: clear, select, standard and utility grades.

MEASURING WOOD FLOORING

SQUARE FOOT

Most wood flooring is ordered in square feet — the area that the flooring will cover.

BOARD FOOT

A board foot is a measurement of volume — 12 by 12 by 1 inch thick. This is really a lumber measurement, but it is still commonly used to order strip flooring. Just as a 2-by-4 doesn't really measure 2 by 4 inches, a board foot of flooring doesn't really measure 12 by 12 by 1 inch. The board foot measures the amount of lumber it took to create the flooring. For example, a board foot of lumber would yield four pieces of lumber measuring 1 by 3 by 12 inches, from which four lineal feet of $\frac{3}{4}$ -by-2 $\frac{1}{4}$ -inch strip flooring would be milled.

LINEAL FOOT

Lineal foot is a useful measurement for ordering material when length is the only concern. Baseboards, feature strips and borders are examples of materials commonly ordered by the lineal foot.

EQUAL LINEAL FOOT

In addition to being ordered by the square foot, random-width plank flooring is also ordered by the equal lineal foot to ensure that the installer gets the same length of each width of flooring. A floor of 12 square feet that will be installed in a 3-, 5- and 7-inch pattern will require equal lineal quantities of each width. However, equal lineal amounts of 3-, 5- and 7-inch flooring will equal different square foot totals. A 120-square-foot floor will need 24 square feet of 3-inch planks, 40 square feet of 5-inch planks, and 56 square feet of 7-inch planks.

CUBIC FOOT

A cubic foot (or 12 by 12 by 12 inches) is a measurement not commonly used in the hardwood flooring industry. It is sometimes used when flooring is being shipped in containers or via air freight, making volume a concern.

SQUARE METER

A square meter is a unit of measurement used for most areas outside the United States.

PACKAGING

Hardwood flooring may be sold in cartons marked

in square feet, or it is packaged into bundles. Prefinished, engineered and parquet flooring are usually packaged in cartons that are marked with the package's square footage or square meterage. Unfinished flooring is usually packaged in bundles, which contain "runs" (not to be confused with run/lot numbers). Typical packages of unfinished solid 2 $\frac{1}{4}$ -by- $\frac{3}{4}$ -inch flooring contain 12 runs in a bundle. That is, if you look at the end of the bundle, you see 12 ends. Depending on the manufacturer, bundles may have different numbers of runs. This is especially true when dealing with varying dimensions of the flooring. Plank flooring, for example, may have only 6 or 8 runs in a bundle.

Bundles are available in two types: bundled flooring (also referred to as "random-length bundles") and nested bundles.

Originally, bundled flooring was the packaging method commonly used for unfinished strip flooring. Since the mid to late 1980s, however, nested bundles have become an increasingly popular method of packaging hardwood flooring.

BUNDLED FLOORING

Bundled flooring consists of flooring pieces that range from 6 inches plus or minus the nominal



NESTED BUNDLES

In nested bundles, flooring is placed end to end continuously in runs with the run length



USEFUL FORMULAS

METRIC CONVERSIONS:

3.28 feet = 1 meter
10.76 ft² = 1 meter²

BOARD FOOT TO SQUARE FOOT:

To compute square feet from board feet, simply find the flooring dimensions and divide the board footage by the following conversion factors:

½" x 2"	divide BF by 1.25
½" x 1½"	divide BF by 1.33
¾" x 2"	divide BF by 1.25
¾" x 1½"	divide BF by 1.33
¾" x 3¼"	divide BF by 1.23
¾" x 2¼"	divide BF by 1.33
¾" x 2"	divide BF by 1.38
¾" x 1½"	divide BF by 1.50

Ex: If you have 186 board feet of ¾" x 2" wood flooring, you compute:

$$\frac{186}{1.38} = 134.8 \text{ ft.}^2$$

SQUARE FOOTAGE IN A BUNDLE:

$$= \frac{(\# \text{ of runs} \times \text{bundle length in feet} \times \text{width in inches})}{12}$$

Ex: If you have 16 runs of 2¼-inch flooring in a bundle that is 8 feet long, you compute:

$$\frac{(16 \times 8 \times 2.25)}{12} = 24 \text{ ft.}^2$$

LINEAL TO SQUARE FOOTAGE:

$$\frac{(\text{lineal feet} \times \text{width in inches})}{12} = \text{square footage}$$

Ex: If you have 40 lineal feet of a 2-inch-wide feature strip, you would compute:

$$\frac{(40 \times 2)}{12} = 6.66 \text{ ft.}^2$$

SQUARE TO LINEAL FOOTAGE:

$$\frac{(\text{square feet} \times 12)}{\text{width in inches}} = \text{lineal footage}$$

Ex: If you have 8 square feet of a 1½-inch feature strip, to get lineal feet you would compute:

$$\frac{(8 \text{ ft.}^2 \times 12)}{1.5 \text{ inches}} = 64 \text{ lineal ft.}$$

CALCULATING EQUAL LINEAL FOOTAGE

(for Multiple-Width Flooring):

$$\frac{\text{total square footage}}{\text{total pattern width}} \times \text{width in question} = \text{ft}^2$$

Ex: If you are creating a 240-square-foot, random-width floor with 3-, 5-, and 7-inch planks, to calculate square footage of the 5-inch planks, you compute:

$$\frac{240 \text{ ft.}^2}{3 + 5 + 7} \times 5 = 80 \text{ ft.}^2$$

CALCULATING AVERAGE LENGTH

(with nested bundles):

$$\frac{\text{total lineal feet}}{\# \text{ pieces}}$$

Ex: If a nested bundle is 8 feet long and has 16 runs, its total lineal feet would be 128 feet. If it has 33 pieces, to get the average length, you would compute:

$$\frac{128 \text{ feet}}{33} = 3.88 \text{ ft.}$$

CALCULATING AVERAGE BUNDLE LENGTH (of bundled flooring):

$$\frac{\text{total lineal bundle feet}}{\# \text{ of bundles}}$$

Ex: If you have 8 random-length bundles that are 3, 3, 4, 5, 5, 6, 6, and 7 feet long, you would add them up to equal 39 feet and divide that by the number of bundles. So:

$$\frac{39 \text{ feet}}{8} = 4.875 \text{ bundle ft.}$$

THE TALLY SHEET

SQUARE FOOTAGE IN A BUNDLE:

<p>Ⓐ</p> <p># RUNS IN BUNDLE</p>	<p>Ⓑ</p> <p>BUNDLE LENGTH (feet)</p>	<p>Ⓒ</p> <p>FLOORING WIDTH (inches)</p>	<p>Ⓓ</p> <p>A x B x C = D</p>	<p>Ⓔ</p> <p>D ÷ 12 = SQUARE FOOTAGE IN A BUNDLE</p>
16	8	2.25	288	24
TOTAL IN COLUMN E = TOTAL SQUARE FOOTAGE				

SQUARE FOOTAGE OF BROKEN BUNDLES:

<p style="text-align: center;">ⓕ</p> <p>TOTAL LINEAL FOOTAGE OF LEFTOVER PIECES</p>	<p style="text-align: center;">ⓖ</p> <p>X FLOORING WIDTH</p>	<p style="text-align: center;">ⓓ</p> <p>F x G = H</p>	<p style="text-align: center;">ⓔ</p> <p>H ÷ 12 = I</p>
<p>3+4.25+2.4+2.25+4+6+5.4 = 27.3</p>	<p>2.25</p>	<p>61.4</p>	<p>5.1</p>
<p>TOTAL IN COLUMN I = TOTAL SQUARE FOOTAGE</p>			<p> </p>

GLOSSARY

Burl A swirl or twist of the grain of the wood that usually occurs near a knot, but doesn't contain a knot.

Character Marks Naturally occurring marks in the wood, such as burls, flags and flecks, that give a unique appearance.

Check A lengthwise separation of the wood that usually extends across the rings of annual growth and commonly results from stress set up in wood during air or kiln drying.

Crook The distortion of a board in which there is a deviation, in a direction perpendicular to the edge, from a straight line from end to end of the piece.

Degrades Wood flooring that is not of the grade being inspected. Also called "outs."

Engineered Wood Flooring An assembly made by bonding layers of veneer or lumber with an adhesive.

Figure Inherent markings, designs or configurations on the surface of the wood produced by the annual growth rings, rays, knots and deviations from regular grain.

Finish Skip An interruption in the finish on the wood flooring.

Flag A heavy dark mineral streak shaped like a banner.

Flag Worm Hole One or more worm holes surrounded by a mineral streak.

Flecks The wide irregular, conspicuous figure in quartersawn oak flooring. See **Medullary Rays**.

Heavy Streaks Spots and streaks of sufficient size and density to severely mar the appearance of wood.

Honeycombing Checks often not visible at the surface that occur in the interior of a piece of wood, usually along the wood rays.

Knot The portion of a branch or limb that has been surrounded by subsequent growth of the stem. The

shape of the knot as it appears on a cut surface depends on the angle of the cut relative to the long axis of the knot. In hardwood strip flooring, small and pin knots aren't more than one-half inch in diameter. A sound knot is a knot cut approximately parallel to its long axis so that the exposed section is definitely elongated.

Medullary Rays Strips of cells extending radially within a tree and varying in height from a few cells in some species to four or more inches in oak. The rays serve primarily to store food and transport it horizontally in the tree. On quartersawn oak, the rays form a conspicuous figure, sometimes referred to as flecks.

Mill Run (Run of the Mill) Flooring that is milled from one grade of lumber, without being further separated by flooring grades.

Milling Defects Blemishes produced in milling flooring, such as chipped grain, torn grain, variation in machining, machine burn and mismatching.

Mineral Streak Wood containing an accumulation of mineral matter introduced by sap flow, causing an unnatural color ranging from greenish brown to black.

Pin Worm Hole In hardwood flooring, a small round hole not more than 1/6-inch in diameter, made by a small wood-boring insect.

Run/Lot Number Finish or packaging numbers used to identify wood flooring.

Shake A separation along the grain, the greater part of which occurs between the annual growth rings.

Split Separations of wood fiber running parallel to the grain.

Sound Wood Wood that will create a usable floor, and therefore not including soft wood due to rot, loose pieces that will fall out, or splits throughout the piece.

Streaks See **Mineral Streaks**.

RESOURCE LIST

Contact the following associations for more information on the grading rules contained or discussed in this publication:

Canadian Lumbermen's Association (CLA)

27 Goulburn Ave.
Ottawa, ON K1N 8C7
613/233-6205
Fax: 613/233-1929
E-mail: info@cla-ca.ca
Website: www.cla-ca.ca

Hardwood Plywood & Veneer Association (HPVA)

P.O. Box 2789
Reston, VA 20195-0789
703/435-2900
Fax: 703/435-2537
E-mail: hpva@hpva.org
Website: www.hpva.org

Maple Flooring Manufacturers Association (MFMA)

60 Revere Drive, Suite 500
Northbrook, IL 60062
847/480-9138
Fax: 847/480-9282

National Hardwood Lumber Association (NHLA)

P.O. Box 34518
Memphis, TN 38184-0518
901/377-1818
Fax: 901/382-6419
E-mail: info@natlhardwood.org
Website: www.natlhardwood.org

National Oak Flooring Manufacturers Association (NOFMA)

P.O. Box 3009
Memphis, TN 38173-0009
901/526-5016
Fax: 901/526-7022
E-mail: info@nofma.org
Website: www.nofma.org

Southern Pine Inspection Bureau (SPIB)

4709 Scenic Highway
Pensacola, FL 32504
904/434-2611
Fax: 850/433-5594
E-mail: spib@spib.org
Website: www.spib.org

Southern Forest Products Association (SFPA)

P.O. Box 641700
Kenner, LA 70064-1700
504/443-4464
Fax: 504/443-6612
E-mail: info@sfpa.org
Website: www.sfpa.org

Standards Australia

1 The Crescent
Homebush, NSW 2140
Australia
61-2-746-4748
Fax: 61-2-746-8450

Timber Products Inspection (TPI)

P.O. Box 919
Conyers, GA 30207
770/922-8000
Fax: 770/922-1290

West Coast Lumber Inspection Bureau (WCLIB)

Box 23145
Portland, OR 97281
503/639-0651
Fax: 503/684-8928
E-mail: info@wclib.org

Western Wood Products Association (WWPA)

522 S.W. Fifth Ave., Suite 500
Portland, OR 97204-2122
503/224-3930
Fax: 503/224-3934
E-mail: info@wwpa.org
Website: www.wwpa.org

APPENDIX

OF FLOORING GRADES

NOFMA GRADES

Note: The following rules are current as of the printing of this publication. For the most recent rules, consult NOFMA's "Official Flooring Grading Rules."

GRADING CHARACTERISTICS for OAK: PLAIN SAWN, QUARTER SAWN, RIFT SAWN, QUARTER/RIFT SAWN

PLAIN SAWN: Flooring that is marked or specified as PLAIN SAWN or PLAIN, may contain any combination of the following types of grain classification: Plain Sawn, Rift Sawn, and Quarter Sawn.



QUARTER SAWN: Flooring that is marked or specified as QUARTER SAWN or QUARTERED; at least 50% of the piece must contain Quartered characteristics. Quartered characteristics as defined by NOFMA are: In cross section the angle of the annual ring tangent to the face of the piece to be between 45° and 90°. Grain lines to be mostly parallel to the length of strips,

and medullary ray flecks present and more than 1/16" wide.

RIFT SAWN: Flooring that is marked or specified as RIFT SAWN or RIFT; at least 75% of the piece must contain Rift characteristics. Rift characteristics as defined by NOFMA are: In cross section the angle of the annual ring tangent to the face of the piece to be between 30° to 60°. Grain lines to be mostly parallel to the length of strips and medullary ray flecks less than 1/16" wide.

QUARTER/RIFT SAWN: Flooring that is marked or specified as QUARTER/RIFT SAWN or QUARTER/RIFT, is a combination of QUARTER SAWN and RIFT SAWN developing from the production run.

OAK FLOORING GRADING RULES

(NOTE: Characters included in a higher grade are automatically accepted in lower grades.)

Clear Oak

A flooring product of mostly heartwood with a minimum number of character marks and discoloration, providing a uniform appearance while allowing for all heartwood natural color variations.

Will admit the following: 3/8" bright sapwood entire length of strip or equivalent if not extending further than 1" for 1/2 length of piece; small burls and fine pin worm holes; and equivalent characters



Select Oak



such as small tight checks; in the absence of these, one thin brown streak 3" long to be allowed every 6'.

Standard Packaging - Bundles to be 1 1/4' and longer; Average length, bundled or nested, 3 3/4'. **Shorter Packaging -** Average length for 7' and shorter packages, nested or otherwise, 3 1/2'.

A flooring product with coloration variations produced by differences of natural heartwood and sapwood, along with characters described.

The face may contain: unlimited sound sapwood; slight imperfections in milling; a small tight knot every 3'; pin worm holes; burls and a reasonable amount of slightly open checks. Brown streaks should not extend

the entire length of a piece. Two flag worm holes to every 8' are permitted. Slight imperfections in face work (torn grain) admitted. An intermittent, brown machine burn across the face not exceeding 1/4" width admitted. Also, a slight quantity of bark on the back or sides admitted. Will admit pieces with 1/2 tongue. Spot filling is generally required for open characters.

Standard Packaging - Bundles to be 1 1/4' and longer; Average length, bundled or nested, 3 3/4'. **Shorter Packaging -** Average length for 7' and shorter packages, nested or otherwise, 3'.

No. 1 Common Oak



A flooring product which contains prominent variations in coloration and varying characters.

The following are not admitted: broken knots over 1/2" in diameter, large grub worm holes; and splits extending through the piece. Open characters such as checks and knot holes are admitted, but must be sound and readily fill.

Not more than 20" scant stock in thickness allowed to every 5'. Minor imperfections in machining permitted. Shall admit sticker stain; varying wood characteristics, such as flag worm holes, heavy streaks, checks, and worm holes; and an occasional dark machine burn across the face not exceeding 1/2" wide, 1/16" deep and

not more than two each 3'. $\frac{1}{4}$ " tongue allowed. Extremely dark pieces are not to be included.

Standard Packaging - Bundles to be 1½' and longer; Average length, bundled or nested, 2¾'. Shorter Packaging - Average length for 7' and shorter packages, nested or otherwise, 2½'.

No. 2 Common Oak



May contain sound natural variations of the forest product and manufacturing imperfections. The purpose of this grade is to furnish a floor suitable for homes, general utility use, or where character marks and contrasting appearance is desired.

The following are not admitted: shattered or rotten ends, large broken knots, excessive bad

millwork, shake, advanced rot, and similar unsound defects. Dark machine burns exceeding $\frac{3}{4}$ " deep not admitted. Knot holes and open characters which will readily fill are admitted. A limited number of pieces with no tongue which may be face nailed are admitted.

Standard Packaging - Bundles to be 1½' and longer; Average length, bundled or nested, 2¾'. Shorter Packaging - Average length for 7' and shorter packages, nested or otherwise, 2'.

1½' Shorts Oak

Pieces 9" to 18" long are to be bundled together and designated as 1½' Shorts. Pieces graded NO. 1 COMMON, SELECT and CLEAR to be bundled together and designated NO. 1 COMMON & BETTER with pieces grading NO. 2 COMMON bundled separately and designated as such. Although pieces 6" under and only 3" over the nominal length of the bundle may be included, the pieces must average 1½', which is achieved through the natural preponderance of longer lengths.

PREFINISHED OAK GRADING RULES

White Oak and Red Oak in STANDARD & BETTER Grades with a natural coloration, to be separated. All other colors and grades may be mixed Red Oak and White Oak. Grades are established after the flooring has been sanded and finished.

Prime Prefinished Oak

This is the top grade and the overall appearance shall be good. The face of strips shall be selected for appearance after finishing. This grade includes characteristics found in the unfinished grades of CLEAR and SELECT grade.

The following characters are admitted: Unlimited Sapwood and the natural variations of color; Occasional small Burls; Light

brown Steaks not more than $\frac{1}{8}$ " in width and 6" in length or the equivalent; an occasional very small tight $\frac{1}{8}$ " Knot; and limited $\frac{1}{32}$ " fine Pinworm Holes, may be included in any one piece when properly filled. Will not admit pieces with less than $\frac{3}{4}$ full tongue.

Minimum average length 3¾'. Bundles 1½' and up.

Standard Prefinished Oak

The face of strips may contain sound wood characteristics which are even and smooth after filling and finishing. This grade includes some characteristics found in the unfinished grades SELECT, NO.1 COMMON, and NO. 2 COMMON.

The following characters are admitted; Worm holes; Season and Kiln Checks, Broken Knots up to $\frac{3}{8}$ " in diameter, minor imperfections in machining, Torn Grain and Burns. Other characters will be admitted if they do not impair the soundness of the floor. All larger admitted open characters are to be properly filled and finished. Limited unfinished/unfilled small open grade characters permitted.

Large Grub Worm Holes, Splits extending through the piece, Shake and similar unsound defects not admitted.

For naturally finished coloration- All the varying color characteristics of the wood admitted to include, Sticker Stain, and Dark Streaks up to $\frac{3}{8}$ " in width not to exceed 1" in length for each lineal foot.

For stained finishes- All varying colorations and streaks permitted, predominantly dark boards not permitted.

Minimum average length 2½'. Bundles 1½' and up.

Standard & Better Prefinished Oak

A combination of PRIME and STANDARD grade developing from the production run.

Minimum average length 2½'. Bundles 1½' and up.

Tavern Prefinished Oak

Should lay a serviceable floor.

A limited amount of unfilled/unfinished open characters admitted. A limited amount of pieces with finish irregularities such as bubbles, small skips, lines, stain/color variation, surface handling scratches, minor trash, and the like are allowed.

The following characters are NOT admitted: Mis-manufactured boards; shattered or rotten ends; large open Knots and other unsound defects of a similar nature; pieces with less than $\frac{1}{4}$ full tongue.

Minimum average length 2'. Bundles 1½' and up.

Tavern & Better Prefinished Oak

A combination of PRIME, STANDARD and TAVERN grades developing from the production run. Minimum average length 2'.

BEECH, BIRCH & HARD MAPLE GRADING RULES

NOFMA recognizes $\frac{3}{4}$ ", $\frac{2}{2}$ " and $\frac{3}{2}$ " as standard thicknesses for the manufacture of Hard Maple, Beech, and Birch flooring. NOFMA members may, at their option, produce either $\frac{2}{2}$ " or $\frac{3}{4}$ " thick Hard Maple, Beech, and Birch flooring.

First Grade Beech, Birch & Hard Maple

Shall have the face practically free of all defects, but the natural color of the wood shall not be considered a defect. The highest standard grade, combines appearance and durability.

Will admit the following: variations in the Natural Color of the wood (with use of some finishes, slight shadows and color variation may appear); an occasional small, firm Pin Knot, not over $\frac{1}{8}$ " in diameter, provided it does not occur on edges or ends of strips; occasional dark Green or Black Spots or Streaks not over $\frac{1}{4}$ " wide and 3" long (or its equivalent) which may contain a tight check not over $\frac{1}{2}$ " long, provided it is boxed within the piece; Bird's Eyes and small Burls; slightly Torn Grain; or similar defect which can be readily removed by the ordinary method of sanding the floor after it is laid; a slightly Shallow Place not over 12" long on underside of the flooring if it does not extend to either end of the piece. Pieces with $\frac{1}{2}$ " Tongue for no more than 25% of the length are allowed. The wood must be sound and free of Shake. Bark Streaks shall not be permitted.

Bundles shall be 1'- $\frac{1}{4}$ " and longer through 7' or 8' as the stock will produce. Not over 55% of the total footage shall be in bundles under 4'; Not more than 25% of the total footage shall be in 2' bundles, and not more than 10% of the footage shall be in 1'- $\frac{1}{4}$ " bundles.

Nested bundles: Maximum average number of pieces under 1'- $\frac{1}{4}$ " shall be 8 pieces. Average length is 3'.

Second Grade Beech, Birch & Hard Maple

A floor with varying wood characteristics and colors to include distinct color variations, numerous Streaks, stained Sapwood, sound Knots, and Checks. All defects must readily fill.

Will admit the following: sound tight Knots, provided they do not occur on edges or ends of strips; slight Imperfections in machining; distinct Color Variations; Sticker Stain/Shadow; numerous dark Green or Black Spots or Streaks, provided they do not occur in combination with predominantly dark heartwood; slight Checks not exceeding 3" in length (may be slightly open) and running parallel with and well inside the edges and ends of the strips; dark Spots or Streaks with slight Checks in center; small Rough Spots (Torn Grain) which cannot be wholly removed by ordinary method of sanding the floor after it is laid; slightly Torn Edges; Short Tongue if sufficient to hold properly in the floor; Shallow or Waney Back, if piece has sufficient bearing of full thickness to support it in the floor; small bark Streaks where bark is as sound as surrounding wood; and slight variation in Angle of End Matching. The face shall be free of Shake and wood must be sound.

Bundles shall be 1'- $\frac{1}{4}$ " and longer through 7' or 8', as the stock will produce. Not over 60% of the total footage shall be in bundles under

4', Not more than 27% of the total footage shall be in 2' bundles; and not more than 15% of the footage shall be in 1'- $\frac{1}{4}$ " bundles.

Nested bundles: Maximum average number of pieces under 1'- $\frac{1}{4}$ " shall be 12 pieces. Average length 2 $\frac{3}{4}$ '.

Third Grade Beech, Birch & Hard Maple

Must be of such character as will lay and give a good serviceable floor. The wood must be firm, serviceable and may contain all defects common to Maple. Pieces with $\frac{1}{4}$ " full Tongue admitted.

Third Grade will not admit- Knot Holes over $\frac{3}{8}$ " in diameter or unsound Knots where the unsound portion is over 1" in diameter; Voids on Ends or Edges; or Shake, Heart Checks, badly Split Ends and Imperfections in Manufacture which would materially impair the serviceability of the floor.

Bundles shall be 1'- $\frac{1}{4}$ " and longer through 7' or 8', as the stock will produce. Not over 85% of the total footage shall be in bundles under 4'; and not more than 55% of the total footage shall be 1'- $\frac{1}{4}$ " bundles.

Nested bundles: Maximum average number of pieces under 1'- $\frac{1}{4}$ " shall be 42. Average length 2 $\frac{1}{4}$ '.

Second & Better Beech, Birch & Hard Maple

A combination of FIRST GRADE and SECOND GRADE developing from the production run. The lowest grade pieces admissible shall not be less than SECOND GRADE.

Bundles shall be 1'- $\frac{1}{4}$ " and longer through 7' or 8' as the stock will produce. Not over 60% of the total footage shall be in bundles under 4'. Not more than 27% of the total footage shall be in 2' bundles, and not more than 15% of the footage shall be 1'- $\frac{1}{4}$ " bundles.

Nested bundles: Maximum average number of pieces under 1'- $\frac{1}{4}$ " shall be 12 pieces. Average length 2 $\frac{3}{4}$ '.

Third & Better Beech, Birch & Hard Maple

A combination of FIRST GRADE, SECOND GRADE, and THIRD GRADE developing from the production run. The lowest grade pieces admissible shall not be less than THIRD GRADE.

Bundles shall be 1'- $\frac{1}{4}$ " and longer through 7' or 8', as the stock will produce. Not over 60% of the total footage shall be in bundles under 4'.

Nested bundles: Maximum average number of pieces under 1'- $\frac{1}{4}$ " shall be 42. Average length 2 $\frac{1}{4}$ '.

SPECIAL GRADES for Beech, Birch & Hard Maple

First Grade White Hard Maple

Is special stock, selected for uniformity of color. It is almost ivory white and is the finest grade of Hard Maple flooring that can be produced. Sapwood/Heartwood pieces must have 95% Sapwood on the face. Strips must be free from stain and Heartwood portion must be nearly white. All FIRST GRADE rules apply.

EXCEPTIONS: Streaks- should be light brown or light green, not over $\frac{1}{4}$ " wide and 3" long (or equivalent) one per 3'. Black Spots, Sticker Stain/Shadow- not admitted.

First Grade Red Beech & Birch

Are special grades produced from all red faced stock, and are specially selected for color. The color is rich, being a soft tint which lends these two woods an individuality found in no other species. Strips must have 95% red faced characteristics. All FIRST GRADE rules apply.

EXCEPTIONS: Streaks- Should be light brown, Black Spots, Sticker Stain/Shadow- not admitted.

HICKORY / PECAN

First Grade Hickory / Pecan

Shall have the face practically free of all defects, but the natural color of the wood shall not be considered a defect. The highest standard grade, combines a nearly uniform appearance with exceptional durability.

The following characters are admitted: variations in the Natural Color of the wood, Heartwood and Sapwood: an occasional small, firm Pin Knot or Bird Peck, not over $\frac{1}{8}$ " in diameter, provided it does not occur on edges or ends of strips; dark Streaks not over $\frac{1}{4}$ " wide and 3" long (or its equivalent one for every 3 ft. in length); slight Checks not over $\frac{1}{2}$ " long, provided Check is boxed within the piece; small Burls; slight Torn Grain or slight intermittent Machine Burn; or similar defect which can be readily removed by the ordinary method of sanding the floor after it is laid; a slightly Shallow Place not over 12" long on underside of the flooring if it does not extend to either end of the piece. Pieces with $\frac{1}{2}$ " tongue for no more than 25% of the length are allowed. The wood must be free of Shake. Bark Streaks shall not be permitted.

Packaging: 8' or shorter, Nested or bundled. Pieces/Bundles shall be $1\frac{1}{4}$ " and longer through 7' or 8' as the stock will produce (9" Minimum, 102" Maximum). Average length $3\frac{3}{4}$ ". Average length for 7' and shorter packages, nested or otherwise - 3'.

Second Grade Hickory / Pecan

A floor with varying wood characteristics and colors to include heavy Streaks, stained Sapwood, sound Knots, Checks and small Splits. All defects must readily fill and be sound.

The following characteristics are admitted: Broken Knots up to $\frac{1}{2}$ " in diameter; distinct Color Variations (predominantly dark, discolored pieces not allowed); Sticker Stain/Shadow; numerous dark Streaks or black spots; Checks to $\frac{1}{8}$ " not exceeding 3" in length, and running parallel and well inside the strip edges; small End Split $\frac{1}{8}$ " x $\frac{1}{2}$ " showing no movement; Bird Pecks to $\frac{1}{2}$ " where bark is sound and as hard as surrounding wood.

Minor imperfections in machining permitted; Torn Grain (less than $\frac{1}{8}$ " deep and 3" long for full width); slightly Torn Edges, and an occasional dark Machine Burn $\frac{1}{2}$ " in width (1 per 3').

Will admit pieces with $\frac{1}{2}$ " full Tongue entire length of piece.

Packaging: 8' or shorter, Nested or bundled. Pieces/Bundles shall be $1\frac{1}{4}$ " and longer through 7' or 8' as the stock will produce (9"

Minimum, 102" Maximum). Average length $2\frac{3}{4}$ ". Average length for 7' and shorter packages, nested or otherwise- $2\frac{1}{2}$ ".

Second & Better Hickory / Pecan

A combination of FIRST GRADE and SECOND GRADE developing from the production run. The lowest graded pieces allowed are SECOND GRADE.

Packaging: 8' or shorter, Nested or bundled. Pieces/Bundles shall be $1\frac{1}{4}$ " and longer through 7' or 8' as the stock will produce (9" Minimum, 102" Maximum). Average length $2\frac{3}{4}$ ". Average length for 7' and shorter packages, nested or otherwise- $2\frac{1}{2}$ ".

Third Grade Hickory / Pecan

Must be of such character as will lay and give a good serviceable floor. The wood must be firm, and may contain defects of every character. This grade is intended to give a "rustic" appearance.

The following defects are not allowed: Knot Holes over $\frac{3}{8}$ " in diameter or unsound Knots where the unsound portion is over 1" in diameter (the unsound portion can not extend through piece); Shake, Soft Rot, Splits and open defects which extend through piece or show movement, Torn Grain more than $\frac{1}{4}$ " deep, Edge Splinters, and Imperfections in Manufacture which would materially impair the serviceability of the floor.

Knot Holes, Bird Pecks, Worm Holes, and the like which will readily fill are admitted. Pieces with $\frac{1}{4}$ " full tongue admitted.

Packaging: 8' or shorter, Nested or bundled. Pieces/Bundles shall be $1\frac{1}{4}$ " and longer through 7' or 8' as the stock will produce (9" Minimum, 102" Maximum). Average length $2\frac{3}{4}$ ". Average length 7' and shorter packages, nested or otherwise- 2'.

Third & Better Hickory / Pecan

A combination of FIRST GRADE, SECOND GRADE, and THIRD GRADE developing from the production run. The lowest graded pieces allowed are THIRD GRADE.

Packaging: 8' or shorter, Nested or bundled. Pieces/Bundles shall be $1\frac{1}{4}$ " and longer through 7' or 8' as the stock will produce (9" Minimum, 102" Maximum). Average length $2\frac{3}{4}$ ". Average length for 7' and shorter packages, nested or otherwise- 2'.

Special Grades Hickory/Pecan

First Grade Red Hickory / Pecan

Is a special stock selected for its deep red/brown color with the minimal contrast of the lighter Sapwood.

Face of pieces shall be Heartwood (95%). All First Grade Rules apply.

First Grade White Hickory / Pecan

Is special stock selected for its creamy color with the minimal contrast of the darker Heartwood. The face of pieces shall be bright Sapwood (95%). All First Grade rules apply.

EXCEPTIONS: Streaks should be light brown not over $\frac{1}{4}$ " wide and 3" long (or equivalent) one per 3'. Black Spots not allowed, Sticker

Stain/Shadow none allowed.

Second Grade Red Hickory / Pecan

Is special stock selected for minimal contrasting lighter Sapwood. The face of pieces shall be Heartwood (85%). All Second Grade rules apply.

ASH GRADING RULES

Clear Ash

The face shall be practically free of defects.

The following characters are admitted: Small burls (less than $\frac{1}{8}$ " in diameter); fine pin worm holes with no discoloration (1 for every 3' in length); or in the absence of these, one (1) thin light brown streak (3" long to be allowed for every 6' of length or equivalent).

Brown Heartwood is allowed as follows; $\frac{3}{8}$ " entire length or 1" for one-third the length of the strip.

Clear Ash is usually chosen for its light color. Bundles to be 1 $\frac{1}{4}$ ' and up. Average length (Standard Packaging) 3 $\frac{3}{4}$ '. Average length for shorter packaging, nested or otherwise, 3 $\frac{1}{2}$ '.

Select Ash

The face shall contain mostly Sapwood, unstained.

The following characters are admitted: Narrow streaks not running entire length of the strip; pin worm holes (up to 3 every 3' in length); imperfection in milling (Torn grain) which will sand out; One (1) small tight knot ($\frac{1}{4}$ " in diameter) to every 3' in length; Small pith fleck (less than $\frac{1}{4}$ " diameter); An intermittent brown machine burn across the face not exceeding $\frac{1}{4}$ " in width; and Unlimited cambium miners. Brown Heartwood is allowed as follows: $\frac{3}{8}$ " entire length or 1" for one-third the length of the strip.

Will admit pieces with $\frac{1}{2}$ " tongue. Most defect are lost sight of after the floor is laid and finished, giving a good appearance.

Bundles to be 1 $\frac{1}{4}$ ' and up. Average Length (Standard Packaging) 3 $\frac{3}{4}$ '. Average length for Shorter packaging, nested or otherwise, 3'.

No. 1 Common Ash

A floor with varying wood characteristics such as Heavy streaks, Stained sapwood, and Sound knots typical of this grade. All defects must readily fill and be sound.

The following characters are admitted: Broken knots up to $\frac{1}{2}$ " in diameter; Pith flecks less than $\frac{3}{16}$ " in diameter; Worm holes up to $\frac{3}{16}$ "; Checks and End splits less than $\frac{1}{16}$ " wide and not extending through the piece; and Sticker stain.

Minor imperfections in machining permitted; Torn grain (not over one-fourth ($\frac{1}{4}$) of the surface, less than $\frac{1}{16}$ " in depth); One (1) dark machine burn across the face for every 3' of length, not exceeding $\frac{1}{2}$ " in width, $\frac{1}{4}$ " in depth.

Will admit pieces with $\frac{1}{4}$ " tongue. Bundles to be 1 $\frac{1}{4}$ ' and up. Average Length (Standard Packaging) 2 $\frac{3}{4}$ '. Average Length for

Shorter Packaging, nested or otherwise, 2 $\frac{1}{2}$ '.

No. 2 Common Ash

Defects of every character admitted, but should lay a serviceable floor.

The following defects are NOT allowed: Saft rat; Broken knots where the unsound portion extends through piece; Torn grain over $\frac{3}{16}$ " in depth; Splits and Open defects extending through the piece; Shake and Pith flecks that are saft if over $\frac{1}{4}$ " in diameter.

Knot holes and defects which will readily fill are admitted.

A limited number of pieces with no tongue and limited number of pieces that are thin (scant) in thickness but will End Match admitted. Bundles to be 1 $\frac{1}{4}$ ' and up. Average Length (Standard Packaging) 2 $\frac{3}{4}$ '. Average length for Shorter Packaging, nested or otherwise, 2'.

GENERAL RULES (ALL SPECIES)

(NOTE: Characters included in a higher grade are automatically accepted in lower grades)

Flooring shall be Tongued and Grooved and End Matched (unless otherwise indicated). Flooring shall not be considered of standard grade unless the lumber from which the flooring is manufactured has been properly kiln dried. The NOFMA standard is that flooring is manufactured at a 6% - 9% Moisture Content with a 5% allowance for pieces outside that range up to 12% Moisture Content, and to fit a "GO NO-GO" NOFMA flooring gauge.

NOFMA members are required to mark all bundles of standard grade flooring with the grade and color (or species if applicable).

Plank Flooring designated by a grade name listed in this Grading Rule Book must conform to that grade description.

Members may manufacture Plank Flooring under other grade names and descriptions which are registered with the NOFMA office to qualify for Complaint Inspection Services.

PACKAGING

To determine the (nominal) length of a piece of flooring, $\frac{3}{8}$ " end match allowance shall be added to the actual face length when measuring.

Individual strips may range in length from 9" minimum to 102" maximum.

The average length as referred to in the Official Flooring Grading Rules apply to the total footage of any one shipment consisting of 1,000 sq. ft. or greater amounts.

The percentages under 4', as referred to in the Official Flooring Grading Rules apply to the total footage of any one shipment

consisting of 1,000 sq. ft. or greater amount.

Bundled flooring- An individual bundle contains pieces from 6" over to 6" under the nominal length of the bundle. Bundle lengths ranging from 1 1/4' to 7' or 8', as the stock will produce, and placed (nested) end to end in units (pallets) of 8' nominal length are designated "Standard Packaging"; or units of 7' and shorter nominal length are designated "Shorter Packaging".

Nested Flooring- A nested bundle contains flooring strips positioned end to end continuously in runs measuring from 6" over to 6" under the nominal length of the nested bundle.

For 3/4 x 2 1/4" Flooring- A 12 run, 8' nominal length bundle, containing 24 bd. ft. of flooring is designated "Standard Packaging".

Nested bundles shorter than 8' nominal length are designated "Shorter Packaging".

Shorter Nested Bundles or Boxes- Bundles or Boxes containing more or fewer runs of flooring are "Non Standard Packaging" and considered acceptable packaging where the average length is maintained.

GUIDE TO HARDWOOD FLOORING GRADES

(NOTE: Characters included in a higher grade are automatically accepted in lower grades)

Appearance alone determines the grades of hardwood flooring since all grades are equally strong and serviceable in any application. Oak, the most popular of the hardwoods, has four basic grades, "CLEAR" is mostly uniform in appearance, has a limited number of character marks and is mostly heartwood. "SELECT" also has a uniform appearance, but this grade contains more of the natural characteristics such as knots and color variations, particularly variation associated with heartwood, sapwood differences. The "COMMON" grades have more character markings than either of the other two grades and are often specified because of these natural features and the character they bring to the installation. Grades are sometimes combined (i.e. SELECT & BETTER). Also, grades of short pieces (SHORTS) produced in manufacturing can be combined (i.e. NO. 1 COMMON & BETTER SHORTS).

STANDARD THICKNESS AND WIDTH

Strip Flooring

3/4" Thickness: Face Widths 1 1/2", 2", 2 1/4" & 3 1/4".

1/2" Thickness: Face Widths 1 1/2", & 2".

Maple, Beech & Birch Flooring ONLY

3/4", 25/32" & 33/32" Thickness: Standard Widths.

Plank Flooring

3/4" Thickness: Face Widths 3", 4", 5", 6", 7", or 8"

Square Edge Strip Flooring

5/16" Thickness: Face Widths 7/8", 1", 1 1/8", 1 1/4", 1 1/2", 1 3/4", 2".

1/2" Thickness: Face Widths 1 1/2", 2".

(All faces in 5/16" square edge are finished 3/16" over face.)

Square Edge Bundling

CLEAR	1 1/4' and up	Average Length 5'
SELECT	1 1/4' and up	Average Length 4'
NO. 1 COMMON	1 1/4' and up	Average Length 3'
NO. 2 COMMON*	1 1/4' and up	Average Length 2 1/2'

(*May contain defects of all characters but will lay a serviceable floor.)

Special Order ONLY

3/8" Thickness: Face Widths 1 1/2" & 2".

MFMA GRADES

Note: The following rules are current as of the printing of this publication. For the most recent rules, consult MFMA's "Grading Rules for Hard Maple."

GENERAL RULES

Moisture Control

We recommend maintenance of 6 percent to 9 percent average moisture content following manufacture. Upon receipt of shipment proper moisture controls must be exercised to maintain proper moisture content.

Edge-Grain Flooring

Edge-grain hardwood flooring is specially selected and consists of pieces in which the annual rings range from 30 degrees horizontal to 90 degrees vertical. Since hard maple is generally produced from lumber sawn out of relatively small logs with varying knurls, resulting in considerable variation in a single piece, flooring shall be considered to be all edge-grain if 75 percent of each piece falls within the above-mentioned range.

Standard Measurement

Flooring 25/32" and thicker, all faces, is measured 3/4" waste for side and end-matching.

Bundling

Hardwood flooring is bundled by averaging the lengths. A bundle may include pieces from 6 inches under to 6 inches over the nominal length of the bundle. No piece shorter than 9" is admitted.

Nesting-For 25/32" x 2-1/4"

Nested flooring is random length flooring bundled end to end continuously in 7' or 8' bundles (6-1/2' to 8-1/2' actual length). Flooring is bundled by grade in conformance with regular grade requirements except those pertaining to length. No piece shorter than 9" is admitted. Maximum average number of pieces under 1-1/4' per bundle by grade shall be:

FIRST GRADE	8
SECOND AND BETTER GRADE	12
THIRD GRADE	42

Kiln Drying

Flooring shall not be considered of specified grade unless the lumber from which the flooring is manufactured has been properly kiln-dried.

End Matching

All flooring shall be end-matched unless otherwise specified.

Beech and Birch Flooring

These rules also apply to beech (*fagus grandifolia*) and birch (*betula alleghaniensis*) flooring.

GRADING RULES

Competition Grade



(First Grade MFMA Hard Maple)

25/32" and thicker shall have the face practically free of all defects, but the varying natural color of the wood shall not be considered a defect. Standard lengths in this grade shall be in 1-1/4' bundles and longer through 7' or 8', as the stock will produce. Not over 55 percent of the total footage shall be in bundles under 4', not more

than 25 percent of the total footage shall be in 2' bundles, and not more than 10 percent of the footage shall be in 1-1/4' bundles.

The highest standard grade. An extremely durable and desirable floor for any building; particularly suitable for fine homes, apartments, churches, clubs, dance floors, gymnasiums, handball and racquetball courts, school classrooms, hospitals, hotels, offices, roller-skating rinks, and other applications where fine appearance and long wear are desired. With the use of some finishes, slight shadows and color variations may appear.

This grade combines appearance and durability and has a face free of defects that will materially mar the appearance of the finished floor or impair its durability. A practical application of this rule will admit variations in the natural color of the wood; an occasional small, firm pin knot not over 1/8" in diameter, provided it does not occur on edges or ends of strips; occasional dark green or black spots or streaks not over 1/4" wide and 3" long (or its equivalent) which may contain a slight check not over 1/2" long, providing it is boxed within the piece; bird's-eyes and small burls; a slightly torn grain; or similar defect which can be readily removed by the ordinary method of smoothing the floor when it is laid.

Bark streaks shall not be permitted. A slightly shallow place not over 12" long on underside of flooring, if it does not extend to either end of the piece, and an otherwise perfect tongue which is one-half short for 25 percent of length of piece are admissible, but the face must be free of shake, and the wood must be live and sound.

Standard Grade

(Second and Better Grade MFMA Hard Maple)

25/32" and thicker, will admit tight, sound knots and slight imperfections



in dressing, but must lay without waste. Standard lengths in this grade shall be in 1½ bundles and longer through 7' or 8', as the stock will produce. Not over 60 percent of the total footage shall be in bundles under 4', not more than 27 percent of the total shall be in 2' bundles, and not more than 15 percent of the footage shall be in 1½ bundles.

This grade will provide the same long life and low maintenance performance as Competition Grade. Standard (Second and Better) Grade is an ideal choice for gymnasiums, handball and racquetball courts, multipurpose rooms, cafeterias, and shops in schools, industrial plants, offices, commercial buildings, and residences. With the use of some finishes, slight shadows and color variations may appear.

This grade admits tight, sound knots, provided they do not occur on edges or ends of strips; distinct color variations; numerous dark green or black spots or streaks – provided they do not occur in combination with predominately dark heartwood; slight checks not exceeding 3" in length and running parallel with and well inside the edges and ends of the strip; dark spots or streaks with slight checks in center; small rough spots which cannot be wholly removed by the ordinary method of smoothing the floor when it is laid; slightly torn edges; short tongue if sufficient to hold properly in the floor, shallow or waney back if piece has sufficient bearings of full thickness to support it in the floor; and slight variation in angle of end matching. While these and similar features are admissible, sufficient attention is given to appearance to make this grade desirable and satisfactory for use in stores, schools, factories, and similar places where superficial defects and blemishes are not a real factor of consideration. The face must be free of shake, and the wood must be live and sound. Bark streaks shall not be permitted.

Multipurpose Grade

(Third Grade MFMA Hard Maple)



²⁵/₃₂" and thicker, must be of such character as will lay and give a good serviceable floor. Standard lengths in this grade shall be in 1-½ bundles and longer through 7' or 8', as the stock will produce. Not over 85 percent of the total footage shall be in bundles under 4', and not more than 55 percent of the total footage shall be in 1-1/4' bundles.

This grade is an ideal choice for gymnasiums, multi-purpose rooms, cafeterias, and shops in schools, industrial plants, offices, commercial

buildings and residences. Third Grade MFMA Maple gives excellent performance in recreation rooms, factories, warehouses, grain storage and other farm buildings, and rooms of antique decoration where a unique floor is desired. Multipurpose (Third) Grade is suitable for factories, warehouses, and kindred uses where good wearing qualities are required together with medium cost and appearance. This grade may contain all defects common to maple, but the wood must be firm and serviceable. It will not admit voids on edges or ends, or knot holes over ³/₈" in diameter, partially unsound knots where the unsound portion is over 1" in diameter; or shakes, heart checks, badly split ends and imperfections in manufacture which materially impair the serviceability of the flooring for the purpose intended.

Third and Better Grade MFMA Hard Maple

In all thicknesses and widths is a combination of Competition, Standard and Multipurpose Grades developing in a strip standard without crosscutting. The lowest grade pieces admissible shall not be less than Multipurpose Grade and no more than 40 percent of the footage shall be Multipurpose Grade. Standard lengths in this grade shall be in 1½ bundles and longer through 7' or 8', as the stock will produce. Not over 60 percent of the total footage shall be in bundles under 4'.

The percentage rules noted above for all grades do not apply to nested bundles. Rules for nested bundles are noted on page 2.

SIZES OF MFMA HARD MAPLE FLOORING

Tongued and Grooved Flooring

Thicknesses

²⁵ / ₃₂ "	1.984 cm (19.84 mm)
³³ / ₃₂ "	2.619 cm (26.19 mm)

Face Widths

1½"	3.81 cm (38.1 mm)
2¼"	5.715 cm (57.15 mm)
3¼"	8.255 cm (82.55 mm)

Jointed Flooring

Thicknesses

²⁵ / ₃₂ "	1.984 cm (19.84 mm)
³³ / ₃₂ "	2.619 cm (26.19 mm)

Face Widths

2¼"	5.715 cm (57.15 mm)
3¼"	8.255 cm (82.55 mm)
3½"	8.89 cm (88.9 mm)

CLA Grading Rules

Note: The following rules are current as of the printing of this publication. For the most recent rules, consult CLA's "Canadian Hardwood Flooring Grading Rules."

MAPLE/BIRCH

First Grade Northern Hard Maple/Clear Grade Canadian Birch

(Maple Shown)



In all thicknesses and widths face shall be reasonably free of defects. Varying natural colour, or faint seasoning shadows shall not be considered a defect. Standard lengths in all widths shall be bundled 2 feet and longer as the stock produces; the proportion of bundles 2 or 3 feet* inclusive, shall be what the stock produces up to 30% of the footage. Combines

appearance and durability; free of facial defects that materially mar the finished floor appearance, or impair durability.

Standard appearance is that of a finished floor, not a piano top. Practical application of this rule will admit mild discolourations, but not in such frequency as to detract from the intended general appearance, such as an occasional pin knot not exceeding $\frac{1}{8}$ inch in diameter; occasional dark green or black spot or streak not over $\frac{1}{4}$ inch in width and 3 inches long, (or its equivalent that may contain a slight check not over $\frac{1}{2}$ inch long), bird's-eye and small burls, slightly torn grain, or similar defect which can be readily removed by the normal sanding of the floor. A moderately shallow area, not exceeding 12 inches long on the underside of the flooring, if it does not extend to either end of the piece, and an otherwise perfect tongue that is one-half short for 25% of the length of the piece, are admissible. However face must be free of shake, and wood must be live and sound.

Second Grade Northern Hard Maple/ Select Grade Canadian Birch

(Maple Shown)

In all thicknesses and face widths, will admit tight, sound knots and slight imperfections in dressing, but must lay without waste. Standard lengths in all widths shall be bundled $1\frac{1}{2}$ feet and longer, as the stock will produce; the proportion of bundles $1\frac{1}{2}$ to 3 feet* inclusive shall be what the stock will produce up to 45% of footage.



Admits minor defects which exclude strips from Clear or First grades, but which do not materially impair floor appearance and serviceability. Admits tight, sound knots, prominent discolourations, seasoning stains, dark green or black spots and streaks, or slight checks not exceeding 3 inches in length, and running parallel with and well within strip edges; dark spots or

streaks, with slight checks in the centre, small rough spots which cannot be wholly removed by usual floor sanding when laid, shallow or wany back if the piece has sufficient areas of full thickness to provide support. While these and similar features are admissible, careful attention is given to appearance to make this grade desirable for many uses.



Factory Grade Northern Hard Maple/ Third Grade Canadian Birch

(Birch Shown)

In all thicknesses and face widths, must be of such character as will lay and give a good serviceable floor with some cutting. Standard lengths in all widths shall be bundled 1 foot and longer, as

the stock will produce; proportion of bundles 1 to 3 feet* inclusive, shall be what the stock produces up to 60% of the footage. Excellent for low cost housing where utility, strength and appearance are required.

Suitable for factories, warehouses and kindred uses where good wearing qualities are required at reasonable cost. May contain all defects common to Northern Hard Maple and Canadian Birch, but must be firm and serviceable. Will not admit voids on the edges, or knot holes over $\frac{3}{8}$ inch in diameter; partially unsound knots where the unsound portion exceeds 1 inch in diameter; or shakes, heart checks, badly split ends and imperfections in manufacture, which materially impair the serviceability and end-use.

Combination Grades

Shorts

Shall be of such quality as the stock will produce in lengths 9 to 18 inches. Well-suited floor for small rooms in residences requiring good appearance at low cost.

* $\frac{1}{8}$ inch flooring minimum length is 6 inches shorter than designated.

Prime Northern Hard Maple, Second and Better Northern Hard Maple

A combination of First and Second grades developing in production without cross-cutting for each grade. Shall contain approximate percentages of 60% First and 40% Second. The average length bundle in prime grade shall not be less than 3½ feet.

Select & Better Canadian Birch

A combination of Clear and Select Canadian Birch developing in production, without cross-cutting for each grade. Standard lengths in all widths in this grade shall be bundled 1½ feet and longer, as the stock will produce; the proportion of bundles 1½ feet to 3 feet inclusive shall be what the stock produces up to 40% of footage.

Third & Better (Mill Run Grade)

A combination of grades developing in production without cross-cutting for each grade. Standard lengths in all widths shall be bundled 1 foot and longer as the stock will produce; proportion of bundles 1 to 3 feet inclusive, shall be what the stock will produce up to 50% of the footage. The leading choice where utility and economy are required. Appearance and serviceability is further enhanced by careful laying.

Plank Flooring

A specialty item as per buyer/seller agreement.

NORTHERN RED AND WHITE OAK



Plain Sawn Grades/Clear Grade

Shall be practically free of facial defects (¾ inch of bright sapwood is permissible). Varying natural colour of the wood shall not be considered a defect, but must be reasonably uniform. Bundles shall be 2 feet or more in length*, and must not exceed 25% under 4 feet. This is a favourite with those

who prefer the richness of oak, without excessive colour variation.



Plain Sawn Grades/Select Grade

Face may contain sapwood, and will permit occasional pinworm holes of not more than ⅛ inch in diameter, as well as slight working imperfections and occasional small, tight knots. Varying natural colour is not a defect. Bundles 1½ to 3 feet*

inclusive, shall be what the stock produces up to 40% of footage.



#1 Common Grade

#1 Common Grade shall be of such quality as to lay a sound residential floor. Wood characteristics: flags, heavy streaks, scattered pinworm holes, tight knots and minor working imperfections. Will admit all discolourations, stains and black natural colour prevalent in this species. Bundles 1 to 3 feet* inclusive, shall be what the stock produces up to 50% of footage.

#2 Common Grade

#2 Common Grade may contain defects of any character, but shall be of such nature as to enable the laying of a serviceable floor.

Combination Grades

Shorts

Shall be of such Clear and Select grade quality as the stock produces in lengths 9 to 18 inches. Well-suited floor for small rooms requiring acceptable appearance at low cost.

Select and Better

Included in all thicknesses and widths is a combination of clear and select grades developing in a strip without crosscutting for each grade. The lowest grade pieces admissible shall not be less than select grade. The proportion of bundles 1½ feet to 3 feet inclusive shall conform to those established in the select grade.

#1 Common & Better (Mill Run Grade)

Clear-Select-1 Common grade combination developing in a strip without cross-cutting. Lowest grade pieces admissible shall not be less than standard 1 Common grade. Lengths and proportions of bundles 1 to 3 feet inclusive, shall be what the stock produces up to 50% of the footage. The percentage of 1 Common grade must not exceed 50% in any shipment.

Plank Flooring

A specialty item as per buyer/seller agreement.

* ¾ inch flooring, minimum length is 6 inches shorter than designated.

HARDWOOD PARQUET FLOORING RULES

Parquet is a patterned floor, assembled in a conveniently sized unit. Manufactured in square or rectangular shape, it features either square-edged or tongue and grooved. The following rules are applicable for grading the face surface of the sheet.



Select and Better Grade

Five percent (5%) of the slats may have two (2) sound knots per slat, 1/8 inch or less in diameter, except on the edge or end which must be clear. Slight streaks, not to exceed 25% of the slat surface accepted on 10% of the slats. Wane not accepted. Natural variability of colour between the slats of sapwood or heartwood accepted. Sheets

not selected for colour. End chip not accepted. All clear slats that the wood develops in manufacture shall be included.



Natural Grade

Two (2) sound knots per slat up to 1/4 inch in diameter accepted. Streaks accepted without limit. Pinworm holes not to exceed four (4) per slat. Wane on slats not to exceed 1/32 inch. Natural variability of colour between heartwood and sapwood accepted without limit. Sheets not selected for colour. End chip of slat not to exceed 1/16 inch depth, the area

of the chip not to exceed 1% of the surface of the slat, measured on the flat surface of the slat, not the contour of the chip. Minor imperfections in machining, such as saw score, planer burn, offset and knife mark, which do not affect the serviceability of the floor accepted.



Rustic Grade

Two (2) knots per slat, the greatest not to exceed 1/2 width of slat, accepted. Streaks and pinworm holes accepted without limit. Wane of slats not to exceed 1/16 inch. Check and split accepted to maximum separation of 1/2 inch wide. Maximum length of split not to exceed 1/4 length of slat. Natural variability of colour between heartwood and

sapwood accepted without limit. Sheets not selected for colour. End chip of slat not to exceed 1/8 inch depth, the area of the chip not to exceed 2% of the surface of the slat, measured on the flat surface of the slat, not the contour of the chip.

Parquet patterns may vary in size according to the manufacturers.

THICKNESSES AND WIDTHS

Hardwood flooring is usually manufactured as follows:

3/32" & 25/32" and 3/4" thicknesses:

widths: 1 1/2" - 1 3/4" - 2" - 2 1/4" and 3 1/4" faces.

1/2" (15/32") thicknesses:

widths: 1 1/2" - 1 3/4" and 2" faces.

3/8" (11/32") thicknesses:

widths: 1 1/2" - 1 3/4" faces.

STANDARD MEASUREMENTS

Flooring 3/4" and thicker (all faces) measured 3/4" over face measure. Flooring 3/8" (11/32") and 1/2" (15/32") thick, all faces, measured 1/2" over face measure.

Jointed flooring square edge all thicknesses and faces; measured 3/4" over face measure.

BUNDLING BY LENGTHS

Hardwood flooring is bundled by averaging lengths. A bundle may include pieces from 6 inches under to 6 inches over the nominal length of the bundle. No piece shorter than 9 inches is admitted.

NESTED BUNDLE

All random length grades rules apply with the exception of reference to length. In nested bundles, 9 inch to 18 inch pieces are limited as follows:

GRADE	MAX. NO. PIECES UNDER 18 IN.
First/Clear	4
Second/Select	8
Factory/No. 1 Common	as developed

INDEX

Appendix15

CLA6, 23

- bundling by lengths25
- description6
- grading disputes6
- grading rules23
- maple/birch23
- nested bundles25
- northern red and white oak ...24
- parquet flooring25
- standard measurements25
- thicknesses and widths25

MFMA5, 21

- description5
- general rules21
- grading disputes5
- grading rules21
- sizes of flooring22

NOFMA4, 15

- ash19
- beech, birch & hard maple ...17
- description4
- general rules19
- grading characteristics15
- grading disputes4
- grading rules15
- guide to hardwood flooring grades ..20
- hickory/pecan18
- oak flooring15
- packaging19
- prefinished oak16
- standard thickness and width .20

Bundles9

- bundled flooring9
- nested bundles9

Formulas10

- average bundle length10
- average length10
- board foot to square foot10
- equal lineal footage10
- lineal to square footage10
- metric conversions10
- square footage in a bundle10
- square to lineal footage10

Glossary3

Grades3-25

- history3
- imported wood8
- lumber7
- mill run flooring7
- parquet8
- plank flooring8
- prefinished engineered flooring ..8
- prefinished solid flooring8
- proprietary grades8
- softwoods7

Measuring Wood Flooring9

- board foot9
- cubic foot9
- equal lineal foot9
- lineal foot9
- square foot9
- square meter9

Resource List14

Tally Sheet11

SOURCES AND CREDITS

NWFA TECHNICAL MANUAL COMMITTEE

- John Hoopes, 3M Company, Chair
- Daniel Boone, NWFA Director of Technical Training
- Coley Armstrong, Basic Coatings
- Joe Audino, Rode Bros. Floors
- Don Bollinger, Wood Floor Products
- Jeff Buysse, Minuteman International
- Chris Coates, Golden State Flooring
- Don Conner, Harris-Tarkett
- Tom Conser, The Roane Company
- Bill Costello, Dura Seal
- Tom Derleth, Indiana Hardwood Specialists
- Galen Fitzel, 3M Company
- Jim Garth, Decorative Flooring
- John Goss, Woodwise/Design Hardwood Products
- Kevin Hacke, Maple Flooring Manufacturers Association
- Woody Hilscher, BonaKemi USA
- Mel Hollis, Basic Coatings
- Tim McCool, Dri-Tac Adhesive Group
- Mickey Moore, National Oak Flooring Manufacturers Association
- Neil Moss, Robbins Hardwood Flooring
- Brian Roberts, Franklin International
- Bob Vanderlinden, Bruce Hardwood Floors

PUBLICATION EDITORS AND CONTRIBUTORS

- Kim Wahlgren, *Hardwood Floors* magazine
- Rick Berg, *Hardwood Floors* magazine
- Richard Lipman, Canadian Lumbermen's Association

- Jim Stann, Southern Forest Products Association
- Jim Mathews, Western Wood Products Association

ART DIRECTORS AND ILLUSTRATORS

- Jennifer Molander, *Hardwood Floors* magazine
- Marj Schultz, *Hardwood Floors* magazine
- Amy Mazar, *Hardwood Floors* magazine

PHOTO AND ILLUSTRATION CREDITS

- Cover: Photos by Dale Hall Photography, Middleton, Wis. Materials courtesy of Blake-Stevens Wood Flooring Inc., Madison, Wis.
- Page 3: Photo courtesy of Somerset Wood Products, Somerset, Ky.
- Page 5: Photo courtesy of Action Floor Systems Inc., Mercer, Wis.
- Page 6: Photo courtesy of Canadian Lumbermen's Association.
- Page 7: Photo courtesy of Southern Forest Products Association, Kenner, La.
- Page 9: Illustrations by *Hardwood Floors* magazine.
- Pages 15-16: Photos courtesy of National Oak Flooring Manufacturers Association, Memphis, Tenn.
- Pages 21-22: Photos courtesy of Maple Flooring Manufacturers Association, Northbrook, Ill.
- Pages 23-25: Photos courtesy of Canadian Lumbermen's Association, Ottawa, Ont.



For more information, contact:

National Wood Flooring Association

16388 Westwoods Business Park
Ellisville, MO 63011

Phone: 800/422-4556 (U.S.)
800/848-8824 (Canada)

636/391-5161 (Local and International)
Fax: 636/391-6137