



TROPICAL HARDWOOD MACHINED
LUMBER PRODUCTS GRADING RULES
[IHPA – 1987]

Jointly Adopted By:

INTERNATIONAL WOOD PRODUCTS ASSOCIATION
(formerly International Hardwood Products Association)

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MALAYSIAN TIMBER INDUSTRY BOARD

&

MALAYSIAN WOOD MOULDING COUNCIL

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The International Wood Products Association (IWPA) and “IHPA Grade” Industry Standards of Quality

The Association’s name was changed in 1993 from International Hardwood Products Association (IHPA) to the International Wood Products Association (IWPA), reflecting more accurately the business activities of its members who deal with imported wood products of all types – both softwood and hardwood. IWPA is the only group in the United States organized to represent the interests of companies active in the import of wood and wood products. Membership also includes companies with interests allied to the trade (manufacturers, sales representatives, steamship lines, customs brokers, port authorities and others), and overseas producers and exporters of wood products to the U.S., as well as the major organizations to which these producers belong.

Although the Association has changed its name, IWPA continues to use the “IHPA” moniker to identify the group’s internationally recognized industry product standards of quality.

IHPA Trademark – The Mark of Quality

An integral part of IWPA’s mission is the development and promotion of voluntary industry standards. The “IHPA grade” mark clearly identifies products as meeting the highest standards of quality and consistency in the marketplace. We encourage all members to have crates truthfully, legibly, and clearly marked with the “IHPA grade” when supplying products for international consumption, provided they indeed do meet the guidelines outlined in the International Wood Products Association’s published voluntary standards.

Clearly marking crates with the “IHPA grade” benefits the entire industry, producers and consumers alike. From the consumers’ standpoint, they can develop brand loyalty, specify it for future purchases, and can hold the manufacturer to published quality standards. Improperly or deceptively marking products as meeting IHPA grade is a serious violation of the law and attacks the integrity of this industry. Any claims of misrepresentation can be brought to the attention of the Federal Trade Commission or state consumer protection agency.

IHPA Grade Stencils

Stencils have been produced in durable PVC plastic with the “IHPA Grade” to make it easier for members to have crates of materials which are produced in accordance with IHPA’s specifications clearly marked as “IHPA Grade.”

IWPA Members should contact the headquarters for more information on obtaining stencils.

SCOPE

The regions of tropical hardwood growth bridge countries and continents. The purpose of grades is to maintain a standard between mills manufacturing the same or similar species regardless of the character of the logs from which they are produced.

The lumber products whose quality levels are specifically addressed in these grading rules include door jambs, S4S, and general mouldings. Quality levels based upon intended use was the basis of establishing grade requirements. This permits lumber or lumber products of a given grade to be used for the same purpose, regardless of the mill of origin.

Uniform grades also provide the buyers and sellers of lumber with a measure by which each can be confident the other understands the grade (s) under consideration.

ACKNOWLEDGEMENTS

The Tropical Hardwood Machined Lumber Products Grading Rules was initiated by the International Wood Products Association. Through close collaboration with the Malaysian Timber Industry Board and the Malaysian Wood Moulding Council, a truly workable standard for manufacturers, as well as importers and end users was developed.

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1. GENERAL MOULDINGS, PREMIUM GRADE

1.1 Product and Profile

These standards are applicable to tropical hardwoods manufactured through processes of machining and sold as mouldings or items which have been identified with specific end use under various descriptions. Jamb shall not be graded under these rules.

Premium grade – This grade is ordered when the ultimate in fine appearance is desired. It is the highest grade produced and many of the pieces are absolutely clear and free of natural and machining defects. The grade will allow for a few minor characteristics that do not detract from their appearance and high quality. It is intended where a clear non-stain finish may be required.

1.2 Species

These standards are recommended for application in the production of general mouldings from tropical hardwoods. The species, or group of species, shall be that ordered, acknowledged, invoiced, marked, and shipped.

1.3 Grading Provisions

1.3.1 Grading face(s) – The grading of general mouldings shall be on the basis of allowable defects determined by grading on one face and two edges within the limits as specified in sections 4.0 and 5.0. Any piece of moulding showing a serious combination of the listed characteristics which might impair its intended use is excluded from the grade. Characteristics not specifically described shall be treated as an equivalent to listed characteristic.

1.3.2 Back or worse face – Since the products acquire specific shapes or profiles upon machining, the flexibility to choose between the better face and the worse face no longer exists as in the grading of S4S. The side either detailed in the profile drawing for the product given or generally regarded out of regular trade practice as the back or unexposed face, shall for the purposes of grading be the worse face. Characteristics that will not show (back) are not given the same consideration as characteristics elsewhere and do not require filling, plugging, or sanding so long that the characteristics do not impair the strength of the piece rendering it unsuitable for its intended use. The back will allow hit and miss, scant, and roller marks up to 0.75mm (1/32") deep. Where these machining defects occur, they shall not exceed 25% of the surface area of the back.

1.3.3 Cut out provisions – In random length mouldings, 3,700mm (12') and longer, pieces requiring one cut not to exceed 100mm (4") is permitted to remove characteristics in excess to that permitted for the grade. The cut out must be at least 900mm (3') from either end and are restricted to a maximum of 5% of the pieces. This is a pencil cut provision, the moulding is not actually cut.

1.3.4 Cut-to-length – Where the products are required and supplied in pre-determined lengths or sets, the characteristics permitted shall be pro-rated on the basis of 300mm (1') length multiples, with the provision that all cut-to-length items shall be furnished as completely usable.

1.3.5 Standard length specification – Random length is 2,400mm to 4,900mm, or 6,100mm (8' to 16', or 20'), with an average of 3,000mm (10'). There is to be a full assortment of developing lengths on odd and even foot basis.

1.4 Allowable Natural Characteristics on Better Face

1.4.1 Warp

1.4.1.1 Bow – Not exceeding 38mm (1-1/2") in every 2,130mm (7') length. Bow for other lengths in direct proportion to this requirement.

1.4.1.2 Crook (spring) – Not exceeding 19mm (3/4") in every 2,130mm (7') length for set length and for random length allowed within reasonable limit.

1.4.1.3 Cup – Not exceeding 1.5mm (1/16") in every 150mm (6") width (nominal).

1.4.1.4 Twist – Not exceeding 4mm (5/32") deviation from plane in every 50mm (2") width in 3,000mm (10') length. Twist for other lengths in direct proportion to this requirement.

1.4.2 Borer holes

1.4.2.1 Pin holes – Based on a board 50mm (2") wide, the maximum number of pin holes in the board shall not exceed the number of 1,800mm (6') multiples in each board, i.e., one pin hole per every 1,800mm (6') in length, or one pin hole per 925cm² (1'²) of surface area. This is subject to the overall allowance that only one pin hole is allowed to occur in any 650mm² (1''²) of surface area. Horizontal pin holes are not allowed.

1.4.2.2 Shot holes – Filled or unfilled not allowed.

1.4.2.3 Grub or large borer holes – Not allowed, whether filled or unfilled.

1.4.3 Resin pockets – Not allowed.

1.4.4 Knots

1.4.4.1. Sound knots – Maximum 2 smooth machined knots, or their equivalent smaller, the sum of their diameters not exceeding 1/8 the width to every length of 2,130mm (7') supplied.

1.4.4.2. Unsound knots – Not allowed.

1.4.5 Compression failure – Not allowed in any amount.

1.4.6 Brittle heart – Not allowed in any amount.

1.4.7 Checks – Based on a moulding 50mm (2") by 2,130mm (7') (approximately 925cm² (1'²) of surface area), one check is allowed if it does not extend to the opposite face and subject to size limit of 0.75mm (1/32") in width and 150mm (6") in length and their occurrence does not exceed 5% of the parcel or unit of delivery.

1.4.8 Splits – Allowed if the length of the split does not exceed the width of the moulding, and their occurrence does not exceed 5% of the parcel or unit of delivery. Splits are not allowed in cut-to-length items.

1.4.9 Sapwood – Bright sapwood allowed without limitation. Medium stained sapwood limited to 1/6 the surface of the face, and provided their occurrence does not exceed 5% of the pieces. Heavy stained sapwood is not allowed.

1.5 Allowable Machine Defects on Face

1.5.1 Skips – Allowed on face and either of the two edges provided they are light enough to allow sanding to remove traces of skip marks. After sanding there should be no area over 0.75mm (1/32") scant.

Skips shall however be limited in size to:

On face: 0.75mm (1/32") deep and 150mm (6") long

On edge: 0.75mm (1/32") deep and 300mm (1') long and their occurrence shall not exceed 5% of the parcel or unit of delivery.

1.5.2 Chipped grain – Allowed if occurrence does not exceed 10% of the surface of the piece in 10% of the parcel or unit of delivery.

1.5.3 Torn grain – Allowed if not exceeding 0.75mm (1/32") deep and not impairing the appearance of at least 90% of the exposed surface. Their occurrence shall not exceed 10% of the parcel or unit of delivery.

1.5.4 Raised grain – Allowed if sufficiently light to allow removal by casual sanding.

1.5.5 Chip marks – Allowed if not exceeding 0.4mm (1/64") deep and subject to their occurrence does not exceed 5% of the parcel or unit of delivery.

1.5.6 Burn marks – In 3,700mm (12') and longer mouldings one per piece is allowed, but burn marks may not occur in more than 3% of the parcel or unit of delivery. Burn marks are not allowed in lengths shorter than 3,700mm (12').

1.5.7 Cutter marks – Even and smooth to touch. Not less than 10 cutter marks per 25mm (1").

2. GENERAL MOULDINGS, STANDARD GRADE

2.1 Product and Profile

These standards are applicable to tropical hardwoods manufactured through processes of machining and sold as mouldings or items which have been identified with specific end use under various descriptions. Jambs shall not be graded under these rules.

Standard grade – This grade is ordered when less demanding applications than premium grade are acceptable. It will include pieces that are repaired by plugging, filling, or sanding, or include natural or machining characteristics that are acceptable for a fine appearance. This grade is intended for uses where the products may be color stained in finishing, or a less demanding material finish than provided for in premium grade.

2.2 Species

These standards are recommended for application in the production of general mouldings from tropical hardwoods. The species, or group of species, shall be that ordered, acknowledged, invoiced, marked, and shipped.

2.3 Grading provisions

2.3.1 Grading face(s) – The grading of general mouldings shall be on the basis of allowable defects determined by grading on one face and two edges within the limits as specified in sections 4.0 and 5.0. Any piece of moulding showing a serious combination of the listed characteristics which might impair its intended use is excluded from the grade. Characteristics not specifically described shall be treated as an equivalent to listed characteristic.

2.3.2 Back or worse face – Since the products acquire specific shapes or profiles upon machining, the flexibility to choose between the better face and the worse face no longer exists as in the grading of S4S. The side either detailed in the profile drawing for the product given or generally regarded out of regular trade practice as the back or unexposed face, shall for the purposes of grading be the worse face. Characteristics that will not show (back) are not given the same consideration as characteristics elsewhere and do not require filling, plugging, or sanding so long that the characteristics do not impair the strength of the piece rendering it unsuitable for its intended use. The back will allow hit and miss, scant, and roller marks up to 0.75mm (1/32") deep. Where these machining defects occur, they shall not exceed 25% of the surface area of the back.

2.3.3 Cut out provisions – In random length mouldings, 3,700mm (12') and longer, pieces requiring one cut not to exceed 100mm (4") is permitted to remove characteristics in excess to that permitted for the grade. The cut out must be at least 900mm (3') from either end and are restricted to a maximum of 5% of the pieces. This is a pencil cut provision, the moulding is not actually cut.

2.3.4 Cut-to-length – Where the products are required and supplied in pre-determined lengths or sets, the characteristics permitted shall be pro-rated on the basis of 300mm (1') length multiples, with the provision that all cut-to-length items shall be furnished as completely usable.

2.3.5 Standard length specification – Random length is 2,400mm to 4,900mm, or 6,100mm (8' to 16', or 20'), with an average of 3,000mm (10'). There is to be a full assortment of developing lengths on odd and even foot basis.

2.4 Allowable Natural Characteristics on Better Face

2.4.1 Warp

2.4.1.1 Bow – Not exceeding 38mm (1-1/2") in every 2,130mm (7') length. Bow for other lengths in direct proportion to this requirement.

2.4.1.2 Crook (spring) – Not exceeding 19mm (3/4") in every 2,130mm (7') length for set length and for random length allowed within reasonable limit.

2.4.1.3 Cup – Not exceeding 1.5mm (1/16") in every 150mm (6") width (nominal).

2.4.1.4 Twist – Not exceeding 4mm (5/32") deviation from plane in every 50mm (2") width in 3,000mm (10') length. Twist for other lengths in direct proportion to this requirement.

2.4.2 Borer Holes

2.4.2.1 Pin holes – Based on a board 50mm (2") wide, the maximum number of pin holes in the board shall not exceed the number of 300mm (1') multiples in each board, i.e., one pin hole per every 300mm (1') in length, or six pin holes per 925cm² (1'²) of surface area. This is subject to the overall allowance that only two pin holes are allowed to occur in any 650mm² (1''²) of surface area.

However up to 5% of the total number of pieces in any parcel can include lightly scattered pin holes without clusters, i.e., not more than 3 pin holes per 650mm² (1''²) of surface area. Horizontal pin holes shall be repaired.

2.4.2.2 Shot holes – Limits shall be on the basis of width and for every 1,220mm (4') length supplied. Shot holes shall be unstained, scattered and repaired and not occur in more than 20% of the pieces.

<u>Width</u>	<u>Maximum number @ 1,220mm (4')</u>
25mm (1") & below	1 hole
26mm (1-1/32") – 75mm(3")	2 holes
76mm (3-1/32") – 150mm (6")	4 holes
153mm (6-1/32") – 300mm (1')	6 holes

The limits on pieces measuring 2,130mm (7') and below but forming part of the random length parcel supplied, shall be determined on proportionate basis.

2.4.2.3 Grub or large borer holes – Not allowed, whether filled or unfilled.

2.4.3 Resin pockets – Based on a moulding 50mm (2") by 2,130mm (7') (approximately 925cm² (1'²) of surface area), maximum two very small resin pockets not exceeding 3mm (1/8") wide and 50mm (2") long in each piece well filled and sanded. This is subject their occurrence does not exceed 5% of the parcel or unit of delivery.

2.4.4 Knots

2.4.4.1 Sound knots – Maximum 2 smooth machined knots, or their equivalent smaller, the sum of their diameters not exceeding 1/4 the width to every length of 2,130mm (7') supplied. Checked knots to be filled and sanded.

2.4.4.2 Unsound knots – Not allowed.

2.4.5 Compression failure – Maximum one compression failure to every 900mm (3') of length and subject that no one compression failure shall be allowed to exceed 1/3 the width of the piece supplied.

2.4.6 Brittle heart – Not allowed in any amount.

2.4.7 Checks – Based on a moulding 50mm (2") by 2,130mm (7') (approximately 925cm² (1'²) of surface area), one check is allowed if it does not extend to the opposite face and subject to size limit of 0.75mm (1/32") in width and 150mm (6") in length and their occurrence does not exceed 10% of the parcel or unit of delivery.

2.4.8 Splits – Allowed if the length of the split does not exceed the width of the moulding, and their occurrence does not exceed 10% of the parcel or unit of delivery. Splits are not allowed in cut-to-length items.

2.4.9 Sapwood – Medium stained sapwood allowed without limitation.

2.5 Allowable Machine Defects on Face

2.5.1 Skips – Allowed on face and either of the two edges provided they are light enough to allow sanding to remove traces of skip marks. After sanding there should be no area over 0.75mm (1/32") scant.

Skips shall however be limited in size to:

On face: 0.75mm (1/32") deep and 150mm (6") long

On edge: 0.75mm (1/32") deep and 300mm (1') long and their occurrence shall not exceed 10% of the parcel or unit of delivery.

2.5.2 Chipped grain – Allowed if occurrence does not exceed 10% of the surface of the piece.

2.5.3 Torn grain – Allowed if not exceeding 0.75mm (1/32") deep and not impairing the appearance of at least 90% of the exposed surface. Their occurrence shall not exceed 10% of the parcel or unit of delivery.

2.5.4 Raised grain – Allowed if sufficiently light to allow removal by casual sanding.

2.5.5 Chip marks – Allowed if not exceeding 0.4mm (1/64") deep and subject to their occurrence does not exceed 5% of the parcel or unit of delivery.

2.5.6 Burn marks – In 3,700mm (12') and longer mouldings one per piece is allowed, but burn marks may not occur in more than 5% of the parcel or unit of delivery. Burn marks are not allowed in 3,700mm (12') and shorter mouldings.

2.5.7 Cutter marks – Even and smooth to touch. Not less than 10 cutter marks per 25mm (1").

3. GENERAL MOULDINGS, UTILITY GRADE

3.1 Product and Profile

These standards are applicable to tropical hardwoods manufactured through processes of machining and sold as mouldings or items which have been identified with specific end use under various descriptions. Jambs shall not be graded under these rules.

Utility grade – This grade has many of the same characteristics present in standard grade but generally is less restrictive in natural and machining characteristics. The product however must be able to perform for the use intended. The grade is intended for low cost applications and will provide an acceptable product when it is painted with an opaque finish. Filling and sanding of characteristics is permitted to provide a quality suitable for opaque paint finishes.

3.2 Species

These standards are recommended for application in the production of general mouldings from tropical hardwoods. The species, or group of species, shall be that ordered, acknowledged, invoiced, marked, and shipped.

3.3 Grading Provisions

3.3.1 Grading face(s) The grading of general mouldings shall be on the basis of allowable defects determined by grading on one face and two edges within the limits as specified in sections 4.0 and 5.0. Any piece of moulding showing a serious combination of the listed characteristics which might impair its intended use is excluded from the grade. Characteristics not specifically described shall be treated as an equivalent to listed characteristic.

3.3.2 Back or worse face – Since the products acquire specific shapes or profiles upon machining, the flexibility to choose between the better face and the worse face no longer exists as in the grading of S4S. The side either detailed in the profile drawing for the product given or generally regarded out of regular trade practice as the back or unexposed face, shall for the purposes of grading be the worse face. Characteristics that will not show (back) are not given the same consideration as characteristics elsewhere and do not require filling, plugging, or sanding so long that the characteristics do not impair the strength of the piece rendering it unsuitable for its intended use. The back will allow hit and miss, scant, and roller marks up to 0.75mm (1/32") deep. Where these machining defects occur, they shall not exceed 25% of the surface area of the back.

3.3.3 Cut out provisions – In random length mouldings, 3,700mm (12') and longer, pieces requiring one cut not to exceed 100mm (4") is permitted to remove characteristics in excess to that permitted for the grade. The cut out must be at least 900mm (3') from either end and are restricted to a maximum of 5% of the pieces. This is a pencil cut provision, the moulding is not actually cut.

3.3.4 Cut-to-length – Where the products are required and supplied in pre-determined lengths or sets, the characteristics permitted shall be pro-rated on the basis of 300mm (1') length multiples, with the provision that all cut-to-length items shall be furnished as completely usable.

3.3.5 Standard length specification – Random length is 2,400mm to 4,900mm, or 6,100mm (8' to 16', or 20'), with an average of 3,000mm (10'). There is to be a full assortment of developing lengths on odd and even foot basis.

3.4 Allowable Natural Characteristics on Better Face

3.4.1 Warp

3.4.1.1 Bow – Not exceeding 38mm (1-1/2") in every 2,130mm (7') length. Bow for other lengths in direct proportion to this requirement.

3.4.1.2 Crook (spring) – Not exceeding 19mm (3/4") in every 2,130mm (7') length for set length and for random length allowed within reasonable limit.

3.4.1.3 Cup – Not exceeding 1.5mm (1/16") in every 150mm (6") width (nominal).

3.4.1.4 Twist – Not exceeding 8mm (5/16") deviation from plane in every 50mm (2") width in 3,000mm (10') length. Twist for other lengths in direct proportion to this requirement.

3.4.2 Borer holes

3.4.2.1 Pin holes – Scattered pin holes are allowed provided they are neither so numerous nor so grouped as to materially affect the appearance of the piece.

3.4.2.2 Shot holes – Scattered shot holes, whether stained or unstained, allowed if plugged or filled and smooth sanded.

3.4.2.3 Grub or large borer holes – Not allowed, whether filled or unfilled.

3.4.3 Resin pockets – Based on a moulding 50mm (2") by 2,130mm (7') (approximately 925cm² (1'²) of surface area), maximum two medium resin pockets not exceeding 3mm (1/8") wide and 200mm (8") long in each piece well filled and sanded. This is subject their occurrence does not exceed 10% of the parcel or unit of delivery.

3.4.4 Knots

3.4.4.1 Sound Knots – Maximum 2 smooth machined knots, or their equivalent smaller, the sum of their diameters not exceeding 1/3 the width to every length of 2,130mm (7') supplied. Checked knots to be filled and sanded.

3.4.4.2 Unsound knots – Maximum 2 smooth machined knots, or their equivalent smaller, the sum of their diameters not exceeding 1/4 the width to every length of 2,130mm (7') supplied. The unsound portion must be removed and then filled and smooth sanded.

3.4.5 Compression failure – Maximum two compression failures to every 900mm (3') of length and subject that no one compression failure shall be allowed to exceed 1/3 the width of the piece supplied.

3.4.6 Brittle heart – Allowed in any amount provided it does not impair strength.

3.4.7 Checks – Based on a moulding 50mm (2") by 2,130mm (7') (approximately 925cm² (1'²) of surface area), one check is allowed if it does not extend to the opposite face and subject to size limit of 1.5mm (1/16") in width and 300mm (1') in length and their occurrence does not exceed 10% of the parcel or unit of delivery.

3.4.8 Splits – Allowed if the length of the split does not exceed twice the width of the moulding, and their occurrence does not exceed 10% of the parcel or unit of delivery. Splits cannot exceed 1/6 the length of the moulding. Splits are not allowed in cut-to-length items.

3.4.9 Sapwood – Bright sapwood or stained sapwood not restricted.

3.5 Allowable Machine Defects on Face

3.5.1 Skips – Allowed on face and either of the two edges provided they are light enough to allow sanding to remove traces of skip marks. After sanding there should be no area over 1.5mm (1/16") scant.

Skips shall however be limited in size to:

On face: 1.5mm (1/16") deep and 150mm (6") long

On edge: 1.5mm (1/16") deep and 300mm (1') long and their occurrence shall not exceed 10% of the parcel or unit of delivery.

3.5.2 Chipped grain – No restrictions.

3.5.3 Torn grain – Allowed if not exceeding 1.5mm (1/16") deep and not impairing the appearance of at least 90% of the exposed surface. Their occurrence shall not exceed 10% of the parcel or unit of delivery.

3.5.4 Raised grain – Allowed if not exceeding 1.5mm (1/16") deep.

3.5.5 Chip marks – Allowed if not exceeding 0.75mm (1/32") deep and subject to their occurrence does not exceed 5% of the parcel or unit of delivery.

3.5.6 Burn marks – Allowed, provided non-indented.

3.5.7 Cutter marks – Even and smooth to touch. Not less than 10 cutter marks per 25mm (1").

4. SURFACED-FOUR SIDES (S4S), PREMIUM GRADE

4.1 Product and Profile

These standards are applicable to tropical hardwoods manufactured and sold as surfaced-four-sides (S4S) or under any other description.

Premium grade – This grade is ordered when the ultimate in fine appearance is desired. It is the highest grade produced and many of the pieces are absolutely clear and free of natural and machining defects. The grade will allow for a few minor characteristics that do not detract from their appearance and high quality. It is intended where a clear non-stain finish may be required.

4.2 Species

These standards are recommended for application in the production of S4S from tropical hardwoods. The species, or group of species, shall be that ordered, acknowledged, invoiced, marked, and shipped.

4.3 Grading provisions

4.3.1 Grading face(s) – The grading of S4S shall be on the basis of allowable defects determined by grading on the best face and two edges within the limits as specified in sections 4.0 and 5.0. Any piece of S4S showing a serious combination of the listed characteristics which might impair its intended use is excluded from the grade. Characteristics not specifically described shall be treated as an equivalent to listed characteristic.

4.3.2 Back or worse face – Characteristics that will not show (back) are not given the same consideration as characteristics elsewhere and do not require filling, plugging, or sanding so long that the characteristics do not impair the strength of the piece rendering it unsuitable for its intended use. The back will allow hit and miss, scant, and roller marks up to 0.75mm (1/32") deep. Where these machining defects occur, they shall not exceed 25% of the surface area of the back.

4.3.3 Cutout provisions – In random length S4S, 3,700mm (12') and longer, pieces requiring one cut not to exceed 100mm (4") is permitted to remove characteristics in excess to that permitted for the grade. The cut out must be at least 900mm (3') from either end and are restricted to a maximum of 5% of the pieces. This is a pencil cut provision, the moulding is not actually cut.

4.3.4 Cut-to-length – Where the products are required and supplied in pre-determined lengths, the characteristics permitted shall be pro-rated on the basis of 300mm (1') length multiples, with the provision that all cut-to-length items shall be furnished as completely usable.

4.3.5 Standard length specification – Random length is 2,400mm to 4,900mm, or 6,100mm (8' to 16', or 20'), with an average of 3,000mm (10'). There is to be a full assortment of developing lengths on odd and even foot basis.

4.4 Allowable Natural Characteristics on Better Face

4.4.1 Warp

4.4.1.1 Bow – Not exceeding 38mm (1-1/2") in every 2,130mm (7') length. Bow for other lengths in direct proportion to this requirement.

4.4.1.2 Crook (spring) – Not exceeding 13mm (1/2") in 2,130mm (7') length for set length and for random length allowed within reasonable limit.

4.4.1.3 Cup – 0.75mm (1/32") in widths less than 150mm (6"); 1.5mm (1/16") in widths greater than 150mm (6") but less than 250mm (10"); 3mm (1/8") in widths greater than 250mm (10").

4.4.1.4 Twist – Not exceeding 4mm (5/32") deviation from plane in every 50mm (2") width in 3,000mm (10') length. Twist for other lengths in direct proportion to this requirement.

4.4.2 Borer holes

4.4.2.1 Pin holes – Based on a board 50mm (2") wide, the maximum number of pin holes in the board shall not exceed the number of 1,800mm (6') multiples in each board, i.e., one pin hole per every 1,800mm (6') in length, or one pin hole per 925cm² (1'²) of surface area. This is subject to the overall allowance that only one pin hole is allowed to occur in any 650mm² (1''²) of surface area. Horizontal pin holes are not allowed.

4.4.2.2 Shot holes – Not allowed.

4.4.2.3 Grub or large borer holes – Not allowed.

4.4.3 Resin pockets – Based on a board 50mm (2") by 2,130mm (7') (approximately 925cm² (1'²) of surface area), maximum one very small resin pocket not exceeding 3mm (1/8") wide and 50mm (2") long in each piece. This is subject their occurrence does not exceed 5% of the parcel or unit of delivery.

4.4.4 Knots

4.4.4.1. Sound knots – Maximum 2 smooth machined knots, or their equivalent smaller, the sum of their diameters not exceeding 1/8 the width to every length of 2,130mm (7') supplied.

4.4.4.2 Unsound knots – Not allowed.

4.4.5 Compression failure – Not allowed.

4.4.6 Brittle heart – Not allowed in any amount.

4.4.7 Checks – Based on a board 50mm (2") by 2,130mm (7') (approximately 925cm² (1'²) of surface area), one check is allowed if it does not extend to the opposite face and subject to size limit of 0.75mm (1/32") in width and 150mm (6") in length and their occurrence does not exceed 5% of the parcel or unit of delivery.

4.4.8 Splits – Allowed if the length of the split does not exceed the width of the moulding, and their occurrence does not exceed 5% of the parcel or unit of delivery. Splits are not allowed in cut-to-length items.

4.4.9 Sapwood – Bright sapwood allowed without limitation. Medium stained sapwood limited to 1/6 the surface of the face, and provided their occurrence does not exceed 5% of the pieces. Heavy stained sapwood is not allowed.

4.5 Allowable Machine Defects on Face

4.5.1 Skips – Allowed on face and either of the two edges provided they are light enough to allow sanding to remove traces of skip marks.

Skips shall however be limited in size to:

On face: 0.75mm (1/32") deep and 150mm (6") long.

On edge: 0.75mm (1/32") deep and 300mm (1') long and their occurrence shall not exceed 10% of the parcel or unit of delivery.

4.5.2 Chipped grain – Allowed if occurrence does not exceed 10% of the surface of the piece in 10% of the parcel or unit of delivery.

4.5.3 Torn grain – Allowed if not exceeding 0.75mm (1/32") deep and not impairing the appearance of at least 85% of the exposed surface. Their occurrence shall not exceed 5% of the parcel or unit of delivery.

4.5.4 Raised grain – Allowed if 1mm (1/32") deep, not to exceed 5% of the pieces.

4.5.5 Chip marks – Allowed if not exceeding 0.4mm (1/64") deep and subject to their occurrence does not exceed 5% of the parcel or unit of delivery.

4.5.6 Burn marks – In 3,700mm (12') and longer mouldings one per piece is allowed, but burn marks may not occur in more than 3% of the parcel or unit of delivery. Burn marks are not allowed in lengths shorter than 3,700mm (12').

4.5.7 Cutter marks – Even and smooth to touch and not less than 10 cutter marks per 25mm (1").

5. SURFACED-FOUR SIDES (S4S), STANDARD GRADE

5.1 Product and Profile

These standards are applicable to tropical hardwoods manufactured and sold as surfaced-four-sides (S4S) or under any other description.

Standard grade – This grade is ordered when less demanding applications than premium grade are acceptable. It will include pieces that are repaired by plugging, filling, or sanding, or include natural or machining characteristics that are acceptable for a fine appearance. This grade is intended for uses where the products may be color stained in finishing, or a less demanding material finish than provided for in premium grade.

5.2 Species

These standards are recommended for application in the production of S4S from tropical hardwoods. The species, or group of species, shall be that ordered, acknowledged, invoiced, marked, and shipped.

5.3 Grading Provisions

5.3.1 Grading face(s) – The grading of S4S shall be on the basis of allowable defects determined by grading on the best face and two edges within the limits as specified in sections 4.0 and 5.0. Any piece of S4S showing a serious combination of the listed characteristics which might impair its intended use is excluded from the grade. Characteristics not specifically described shall be treated as an equivalent to listed characteristic.

5.3.2 Back or worse face – Characteristics that will not show (back) are not given the same consideration as characteristics elsewhere and do not require filling, plugging, or sanding so long that the characteristics do not impair the strength of the piece rendering it unsuitable for its intended use. The back will allow hit and miss, scant, and roller marks up to 0.75mm (1/32") deep. Where these machining defects occur, they shall not exceed 25% of the surface area of the back.

5.3.3 Cut out provisions – In random length S4S, 3,700mm (12') and longer, pieces requiring one cut not to exceed 100mm (4") is permitted to remove characteristics in excess to that permitted for the grade. The cut out must be at least 900mm (3') from either end and are restricted to a maximum of 5% of the pieces. This is a pencil cut provision, the moulding is not actually cut.

5.3.4 Cut-to-length – Where the products are required and supplied in pre-determined lengths, the characteristics permitted shall be pro-rated on the basis of 300mm (1') length multiples, with the provision that all cut-to-length items shall be furnished as completely usable.

5.3.5 Standard length specification – Random length is 2,400mm to 4,900mm, or 6,100mm (8' to 16', or 20'), with an average of 3,000mm (10'). There is to be a full assortment of developing lengths on odd and even foot basis.

5.4 Allowable Natural Characteristics on Better Face

5.4.1 Warp

5.4.1.1 Bow – Not exceeding 38mm (1-1/2") in every 2,130mm (7') length. Bow for other lengths in direct proportion to this requirement.

5.4.1.2 Crook (spring) – Not exceeding 19mm (3/4") in 2,130mm (7') length for set length and for random length allowed within reasonable limit.

5.4.1.3 Cup – 0.75mm (1/32") in widths less than 150mm (6"); 1.5mm (1/16") in widths greater than 150mm (6") but less than 250mm (10"); 3mm (1/8") in widths greater than 250mm (10")

5.4.1.4 Twist – Not exceeding 4mm (5/32") deviation from plane in every 50mm (2") width in 3,000mm (10') length. Twist for other lengths in direct proportion to this requirement.

5.4.2 Borer holes

5.4.2.1 Pin holes – Based on a board 50mm (2") wide, the maximum number of pin holes in the board shall not exceed the number of 300mm (1') multiples in each board, i.e., one pin hole per every 300mm (1') in length, or six pin holes per 925cm² (1'²) of surface area. This is subject to the overall allowance that only two pin holes are allowed to occur in any 650mm² (1"²) of surface area.

However up to 5% of the total number of pieces in any parcel can include lightly scattered pin holes without clusters, i.e., not more than 3 pin holes per 650mm² (1"²) of surface area. Horizontal pin holes shall be repaired.

5.4.2.2 Shot holes – Limits shall be on the basis of width and for every 1,220mm (4') length supplied. Shot holes shall be unstained, scattered and repaired.

<u>Width</u>	<u>Maximum number @1,220mm (4')</u>
25mm (1") & below	1 hole
26mm (1-1/32") – 75mm (3")	2 holes
76mm (3-1/32") – 150 mm (6")	4 holes
153mm (6-1/32") – 300mm (1')	6 holes

The limits on pieces measuring 2,130mm (7') and below but forming part of the random length parcel supplied, shall be determined on proportionate basis.

5.4.2.3 Grub or large borer holes – Not allowed.

5.4.3 Resin pockets – Based on a board 50mm (2") by 2,130mm (7') (approximately 925cm² (1'²) of surface area), maximum two very small resin pockets not exceeding 3mm (1/8") wide and 50mm (2") long in each piece well filled and sanded. This is subject their occurrence does not exceed 5% of the parcel or unit of delivery.

5.4.4 Knots

5.4.4.1 Sound knots – Maximum 2 smooth machined knots, or their equivalent smaller, the sum of their diameters not exceeding 1/4 the width to every length of 2,130mm (7') supplied. Checked knots to be filled and sanded.

5.4.4.2 Unsound knots – Not allowed.

5.4.5 Compression failure – Maximum one compression failure to every 900mm (3') of length and subject that no one compression failure shall be allowed to exceed 1/3 the width of the piece supplied.

5.4.6 Brittle heart – Not allowed in any amount.

5.4.7 Checks – Based on a board 50mm (2") by 2,130mm (7') (approximately 925cm² (1'²) of surface area), one check is allowed if it does not extend to the opposite face and subject to size limit of 0.75mm (1/32") in width and 150mm (6") in length and their occurrence does not exceed 10% of the parcel or unit of delivery.

5.4.8 Splits – Allowed if the length of the split does not exceed the width of the board, and their occurrence does not exceed 10% of the parcel or unit of delivery. Splits are not allowed in cut-to-length items.

5.4.9 Sapwood – Medium stained sapwood allowed without limitation.

5.5 Allowable Machine Defects on Face

5.5.1 Skips – Allowed on face and either of the two edges provided they are light enough to allow sanding to remove traces of skip marks.

Skips shall however be limited in size to:

On face: 0.75mm (1/32") deep and 300mm (1') long

On edge: 0.75mm (1/32") deep and 600mm (2') long and their occurrence shall not exceed 10% of the parcel or unit of delivery.

5.5.2 Chipped grain – Allowed if occurrence does not exceed 20% of the surface of the piece.

5.5.3 Torn grain – Allowed if not exceeding 0.75mm (1/32") deep and not impairing the appearance of at least 85% of the exposed surface. Their occurrence shall not exceed 15% of the parcel or unit of delivery.

5.5.4 Raised grain – Allowed if 1.5mm (1/16") deep, not to exceed 10% of the pieces.

5.5.5 Chip marks – Allowed if not exceeding 0.4mm (1/64") deep and subject to their occurrence does not exceed 10% of the parcel or unit of delivery.

5.5.6 Burn marks – In 3,700mm (12') and longer mouldings one per piece is allowed, but burn marks may not occur in more than 5% of the parcel or unit of delivery. Burn marks are not allowed in 3,700mm (12') and shorter mouldings.

5.5.7 Cutter marks – Even and smooth to touch and not less than 10 cutter marks per 25mm (1").

6. SURFACED-FOUR SIDES (S4S), UTILITY GRADE

6.1 Product and Profile

These standards are applicable to tropical hardwoods manufactured and sold as surfaced-four-sides (S4S) or under any other description.

Utility grade – This grade has many of the same characteristics present in standard grade but generally is less restrictive in natural and machining characteristics. The product however must be able to perform for the use intended. The grade is intended for low cost applications and will provide an acceptable product when it is painted with an opaque finish. Filling and sanding of characteristics is permitted to provide a quality suitable for opaque paint finishes.

6.2 Species

These standards are recommended for application in the production of S4S from tropical hardwoods. The species, or group of species, shall be that ordered, acknowledged, invoiced, marked, and shipped.

6.3 Grading Provisions

6.3.1 Grading face(s) The grading of S4S shall be on the basis of allowable defects determined by grading on the best face and two edges within the limits as specified in sections 4.0 and 5.0. Any piece of S4S showing a serious combination of the listed characteristics which might impair its intended use is excluded from the grade. Characteristics not specifically described shall be treated as an equivalent to listed characteristic.

6.3.2 Back or worse face – Characteristics that will not show (back) are not given the same consideration as characteristics elsewhere and do not require filling, plugging, or sanding so long that the characteristics do not impair the strength of the piece rendering it unsuitable for its intended use. The back will allow hit and miss, scant, and roller marks up to 0.75mm (1/32”) deep. Where these machining defects occur, they shall not exceed 25% of the surface area of the back.

6.3.3 Cut out provisions – In random length S4S, 3,700mm (12') and longer, pieces requiring one cut not to exceed 100mm (4") is permitted to remove characteristics in excess to that permitted for the grade. The cut out must be at least 900mm (3') from either end and are restricted to a maximum of 5% of the pieces. This is a pencil cut provision, the moulding is not actually cut.

6.3.4 Cut-to-length – Where the products are required and supplied in pre-determined lengths, the characteristics permitted shall be pro-rated on the basis of 300mm (1') length multiples, with the provision that all cut-to-length items shall be furnished as completely usable.

6.3.5 Standard length specification – Random length is 2,400mm to 4,900mm, or 6,100mm (8' to 16', or 20'), with an average of 3,000mm (10'). There is to be a full assortment of developing lengths on odd and even foot basis.

6.4 Allowable Natural Characteristics on Better Face

6.4.1 Warp

6.4.1.1 Bow – Not exceeding 38mm (1-1/2") in every 2,130mm (7') length. Bow for other lengths in direct proportion to this requirement.

6.4.1.2 Crook (spring) – Not exceeding 25mm (1") in 2,130mm (7') length for set length and for random length allowed within reasonable limit.

6.4.1.3 Cup – 1.5mm (1/16") in widths less than 150mm (6"); 3mm (1/8") in widths greater than 150mm (6") but less than 250mm (10"); 6mm (1/4") in widths greater than 250mm (10").

6.4.1.4 Twist – Not exceeding 8mm (5/16") deviation from plane in every 50mm (2") width in 3,000mm (10') length. Twist for other lengths in direct proportion to this requirement.

6.4.2 Borer holes

6.4.2.1 Pin holes – Scattered pin holes are allowed provided they are neither so numerous nor so grouped as to materially affect the appearance of the piece.

6.4.2.2 Shot holes – Scattered shot holes, whether stained or unstained, allowed if plugged or filled and smooth sanded.

6.4.2.3 Grub or large borer holes – Not allowed.

6.4.3 Resin pockets – Based on a board 50mm (2") by 2,130mm (7') (approximately 925cm² (1'²) of surface area), maximum two medium resin pockets not exceeding 3mm (1/8") wide and 200mm (8") long in each piece well filled and sanded. This is subject their occurrence does not exceed 10% of the parcel or unit of delivery.

6.4.4 Knots

6.4.4.1 Sound knots – Maximum 2 smooth machined knots, or their equivalent smaller, the sum of their diameters not exceeding 1/3 the width to every length of 2,130mm (7') supplied. Checked knots to be filled and sanded.

6.4.4.2 Unsound knots – Maximum 2 smooth machined knots, or their equivalent smaller, the sum of their diameters not exceeding 1/4 the width to every length of 2,130mm (7') supplied. The unsound portion must be removed and then filled and smooth sanded.

6.4.5 Compression failure – Maximum two compression failures to every 900mm (3') of length and subject that no one compression failure shall be allowed to exceed 1/3 the width of the piece supplied.

6.4.6 Brittle heart – Allowed in any amount, provided it does not impair strength.

6.4.7 Checks – Based on a board 50mm (2") by 2,130mm (7') (approximately 925cm² (1'²) of surface area), one check is allowed if it does not extend to the opposite face and subject to size limit of 1.5mm (1/16") in width and 300mm (1') in length and their occurrence does not exceed 10% of the parcel or unit of delivery.

6.4.8 Splits – Allowed if the length of the split does not exceed twice the width of the board, and their occurrence does not exceed 10% of the parcel or unit of delivery. Splits cannot exceed 1/6 the length of the board. Splits are not allowed in cut-to-length items.

6.4.9 Sapwood – Bright sapwood or stained sapwood not restricted.

6.5 Allowable Machine Defects on Face

6.5.1 Skips – Allowed on face and either of the two edges provided they are light enough to allow sanding to remove traces of skip marks.

Skips shall however be limited in size to:

On face: 1.5mm (1/16") deep and 300mm (1') long

On edge: 1.5mm (1/16") deep and 600mm (2') long and their occurrence shall not exceed 10% of the parcel or unit of delivery.

6.5.2 Chipped grain – No restrictions

6.5.3 Torn grain – Allowed if not exceeding 1.5mm (1/16") deep and not impairing the appearance of at least 85% of the exposed surface. Their occurrence shall not exceed 10% of the parcel, or unit of delivery.

6.5.4 Raised grain – Allowed if not exceeding 1.5mm (1/16") deep.

6.5.5 Chip marks – Allowed if not exceeding 0.75mm (1/32") deep.

6.5.6 Burn marks – Allowed, provided non-indented.

6.5.7 Cutter marks – Even and smooth to touch and not less than 10 cutter marks per 25mm (1").

7. PREMIUM GRADE, DOOR JAMBS

7.1 Product and Profile

These standards are applicable to tropical hardwoods manufactured through processes of machining and sold as door jambs eased or un-eased sides, beveled or non-beveled, single or double rabated and split jambs.

Premium grade – This grade is ordered when the ultimate in fine appearance is desired. It is the highest grade produced and many of the pieces are absolutely clear and free of natural and machining defects. The grade will allow for a few minor characteristics that do not detract from their appearance and high quality. It is intended where a clear non-stain finish may be required.

7.2 Species

These standards are recommended for application in the production of door jambs from tropical hardwoods. The species, or group of species, shall be that ordered, acknowledged, invoiced, marked, and shipped.

7.3 Grading provisions

7.3.1 Grading face(s) – The grading of door jambs shall be on the basis of allowable defects determined by grading on one face and two edges within the limits as specified in sections 4.0 and 5.0. Any piece of jamb showing a serious combination of the listed characteristics which might impair its intended use is excluded from the grade. Characteristics not specifically described shall be treated as an equivalent to listed characteristic.

7.3.2 Back or worse face – Since beveled jambs acquire specific shapes upon machining, the flexibility to choose between the better face and the worse face no longer exists as in the grading of S4S. The only exception to this is in the case of S4S/E4E jambs, which are graded from their better face. The side either detailed in the profile drawing for the product given or generally regarded out of regular trade practice as the back or unexposed face, shall for the purposes of grading be the worse face. Characteristics that will not show (back) are not given the same consideration as characteristics elsewhere and do not require filling, plugging, or sanding so long that the characteristics do not impair the strength of the piece rendering it unsuitable for its intended use. The back will allow hit and miss, scant, and roller marks up to 0.75mm (1/32") deep. Where these machining defects occur, they shall not exceed 25% of the surface area of the back.

7.4 Allowable Natural Characteristics on Better Face

7.4.1 Warp

7.4.1.1 Bow – Not exceeding 25mm (1") in every 2,130mm (7') length.

7.4.1.2 Crook (spring) – Not exceeding 3mm (1/8") in 2,130mm (7') length.

7.4.1.3 Cup – Not exceeding 0.75mm (1/32") in 125mm (5") width or less, or not exceeding 1.5mm (1/16") in widths greater than 125mm (5").

7.4.1.4 Twist – Not exceeding 4mm (5/32") deviation from plane in every 125mm (5") width in 2,130mm (7') length. Twist for other lengths in direct proportion to this requirement.

7.4.2 Borer holes

7.4.2.1 Pin holes – Based on a 125mm (5") nominal wide jamb, the maximum number of pin holes in the jamb shall not exceed three times the number of 2,130mm (7') multiples in each jamb, i.e., three pin holes per every 2,130mm (7') in length, or approximately one pin hole per 925cm² (1'²) of surface area. This is subject to the overall allowance that only one pin hole is allowed to occur in any 650mm² (1''²) of surface area. Horizontal pin holes are not allowed.

7.4.2.2 Shot holes – Not allowed.

7.4.2.3 Grub or large borer holes – Not allowed.

7.4.3 Resin pockets – Not allowed.

7.4.4 Knots

7.4.4.1. Sound knots – Maximum 2 smooth machined knots, or their equivalent smaller, the sum of their diameters not exceeding 1/8 the width to every length of 2,130mm (7') supplied.

7.4.4.2 Unsound knots – Not allowed.

7.4.5 Compression failure – Not allowed in any amount.

7.4.6 Brittle heart – Not allowed in any amount.

7.4.7 Checks – Based on a jamb 50mm (2") by 2,130mm (7') (approximately 925cm² (1'²) of surface area), one check is allowed if it does not extend to the opposite face and subject to size limit of 0.75mm (1/32") in width and 150mm (6") in length and their occurrence does not exceed 5% of the parcel or unit of delivery.

7.4.8 Splits – Not allowed.

7.4.9 Sapwood – Bright sapwood allowed without limitation. Medium stained sapwood limited to 1/6 the surface of the face and provided their occurrence does not exceed 5% of the pieces. Heavy stained sapwood is not allowed.

7.5 Allowable Machine Defects on Face

7.5.1 Skips – Allowed on face and either of the two edges provided they are light enough to allow sanding to remove traces of skip marks. After sanding there should be no area over 0.75mm (1/32") scant.

Skips shall however be limited in size to:

On face: 0.75mm (1/32") deep and 150mm (6") long

On edge: 0.75mm (1/32") deep and 300mm (1') long and their occurrence shall not exceed 5% of the parcel or unit of delivery.

7.5.2 Chipped grain – Allowed if occurrence does not exceed 10% of the surface of the piece in 10% of the parcel or unit of delivery.

7.5.3 Torn grain – Allowed if not exceeding 0.75mm (1/32") deep and not impairing the appearance of at least 90% of the exposed surface. Their occurrence shall not exceed 10% of the parcel or unit of delivery.

7.5.4 Raised grain – Allowed if sufficiently light to allow removal by casual sanding.

7.5.5 Chip marks – Allowed if not exceeding 0.4mm (1/64") deep and subject to their occurrence does not exceed 5% of the parcel or unit of delivery.

7.5.6 Burn marks – Not allowed.

7.5.7 Cutter marks – Even and smooth to touch. Not less than 10 cutter marks per 25mm (1").

8. STANDARD GRADE, DOOR JAMBS

8.1 Product and Profile

These standards are applicable to tropical hardwoods manufactured through processes of machining and sold as door jambs eased or un-eased sides, beveled or non-beveled, single or double rabated and split jambs.

Standard grade – This grade is ordered when less demanding applications than premium grade are acceptable. It will include pieces that are repaired by plugging, filling, or sanding, or include natural or machining characteristics that are acceptable for a fine appearance. This grade is intended for uses where the products may be color stained in finishing, or a less demanding material finish than provided for in premium grade.

8.2 Species

These standards are recommended for application in the production of door jambs from tropical hardwoods. The species, or group of species, shall be that ordered, acknowledged, invoiced, marked, and shipped.

8.3 Grading provisions

8.3.1 Grading face(s) – The grading of door jambs shall be on the basis of allowable defects determined by grading on one face and two edges within the limits as specified in sections 4.0 and 5.0. Any piece of jamb showing a serious combination of the listed characteristics which might impair its intended use is excluded from the grade. Characteristics not specifically described shall be treated as an equivalent to listed characteristic.

8.3.2 Back or worse face – Since beveled jambs acquire specific shapes upon machining, the flexibility to choose between the better face and the worse face no longer exists as in the grading of S4S. The only exception to this is in the case of S4S/E4E jambs, which are graded from their better face. The side either detailed in the profile drawing for the product given or generally regarded out of regular trade practice as the back or unexposed face, shall for the purposes of grading be the worse face. Characteristics that will not show (back) are not given the same consideration as characteristics elsewhere and do not require filling, plugging, or sanding so long that the characteristics do not impair the strength of the piece rendering it unsuitable for its intended use. The back will allow hit and miss, scant, and roller marks up to 0.75mm (1/32") deep. Where these machining defects occur, they shall not exceed 25% of the surface area of the back.

8.4 Allowable Natural Characteristics on Better Face

8.4.1 Warp

8.4.1.1 Bow – Not exceeding 25mm (1") in every 2,130mm (7') length.

8.4.1.2 Crook (spring) – Not exceeding 3mm (1/8") in 2,130mm (7') length.

8.4.1.3 Cup – Not exceeding 0.75mm (1/32") in 125mm (5") width or less, or not exceeding 1.5mm (1/16") in widths greater than 125mm (5").

8.4.1.4 Twist – Not exceeding 4mm (5/32") deviation from plane in every 125mm (5") width in 2,130mm (7') length. Twist for other lengths in direct proportion to this requirement.

8.4.2 Borer holes

8.4.2.1 Pin holes – Based on a 125mm (5") nominal wide jamb, the maximum number of pin holes in the jamb shall not exceed three times the number of running 300mm (1') multiples in each jamb, i.e., three pin holes per every 300mm (1') in length. This is subject to the overall allowance that only two pin holes are allowed to occur in any 650mm² (1"²) of surface area.

However up to 5% of the total number of pieces in any parcel can include lightly scattered pin holes without clusters, i.e., not more than 3 pin holes per 650mm² (1"²) of surface area. Horizontal pin holes shall be repaired.

8.4.2.2 Shot holes – Limits shall be on the basis of width and for every 1,220mm (4') length supplied. Shot holes shall be unstained, scattered and repaired and not occur in more than 20% of the pieces.

<u>Width</u>	<u>Maximum number @ 1,220mm (4')</u>
25mm (1") & below	1 hole
26mm (1-1/32") – 75mm (3")	2 holes
76mm (3-1/32") – 150mm (6")	4 holes
153mm (6-1/32") – 300mm (1')	6 holes

The limits on pieces measuring 2,130mm (7') and below shall be determined on proportionate basis.

8.4.2.3 Grub or large borer holes – Not allowed.

8.4.3 Resin pockets – Based on a jamb 50mm (2") by 2,130mm (7') (approximately 925cm² (1"²) of surface area), maximum two very small resin pockets not exceeding 3mm (1/8") wide and 50mm (2") long in each piece well filled and sanded. This is subject their occurrence does not exceed 5% of the parcel or unit of delivery.

8.4.4 Knots

8.4.4.1 Sound knots – Maximum 2 smooth machined knots, or their equivalent smaller, the sum of their diameters not exceeding 1/4 the width to every length of 2,130mm (7') supplied. Checked knots to be filled and sanded.

8.4.4.2 Unsound knots – Not allowed.

8.4.5 Compression failure – Maximum one compression failure to every 900mm (3') of length and subject that no one compression failure shall be allowed to exceed 1/3 the width of the piece supplied.

8.4.6 Brittle heart – Not allowed in any amount.

8.4.7 Checks – Based on a jamb 50mm (2") by 2,130mm (7') (approximately 925cm² (1'²) of surface area), one check is allowed if it does not extend to the opposite face and subject to size limit of 0.75mm (1/32") in width and 150mm (6") in length and their occurrence does not exceed 10% of the parcel or unit of delivery.

8.4.8 Splits – Not allowed.

8.4.9 Sapwood – Medium stained sapwood allowed without limitation.

8.5 Allowable Machine Defects on Face

8.5.1 Skips – Allowed on face and either of the two edges provided they are light enough to allow sanding to remove traces of skip marks. After sanding there should be no area over 0.75mm (1/32") scant.

Skips shall however be limited in size to:

On face: 0.75mm (1/32") deep and 150mm (6") long

On edge: 0.75mm (1/32") deep and 300mm (1') long and their occurrence shall not exceed 10% of the parcel or unit of delivery.

8.5.2 Chipped grain – Allowed if occurrence does not exceed 10% of the surface of the piece.

8.5.3 Torn grain – Allowed if not exceeding 0.75mm (1/32") deep and not impairing the appearance of at least 90% of the exposed surface. Their occurrence shall not exceed 10% of the parcel or unit of delivery.

8.5.4 Raised grain – Allowed if sufficiently light to allow removal by casual sanding.

8.5.5 Chip marks – Allowed if not exceeding 0.4mm (1/64") deep and subject to their occurrence does not exceed 5% of the parcel or unit of delivery.

8.5.6 Burn marks – One per piece and not exceeding 3% of the parcel or unit of delivery.

8.5.7 Cutter marks – Even and smooth to touch. Not less than 10 cutter marks per 25mm (1").

9. UTILITY GRADE, DOOR JAMBS

9.1 Product and Profile

These standards are applicable to tropical hardwoods manufactured through processes of machining and sold as door jambs eased or un-eased sides, beveled or non-beveled, single or double rabated and split jambs.

Utility grade – This grade has many of the same characteristics present in standard grade but generally is less restrictive in natural and machining characteristics. The product however must be able to perform for the use intended. The grade is intended for low cost applications and will provide an acceptable product when it is painted with an opaque finish. Filling and sanding of characteristics is permitted to provide a quality suitable for opaque paint finishes.

9.2 Species

These standards are recommended for application in the production of door jambs from tropical hardwoods. The species, or group of species, shall be that ordered, acknowledged, invoiced, marked, and shipped.

9.3 Grading Provisions

9.3.1 Grading face(s) – The grading of door jambs shall be on the basis of allowable defects determined by grading on one face and two edges within the limits as specified in sections 4.0 and 5.0. Any piece of jamb showing a serious combination of the listed characteristics which might impair its intended use is excluded from the grade. Characteristics not specifically described shall be treated as an equivalent to listed characteristic.

9.3.2 Back or worse face – Since beveled jambs acquire specific shapes upon machining, the flexibility to choose between the better face and the worse face no longer exists as in the grading of S4S. The only exception to this is in the case of S4S/E4E jambs, which are graded from their better face. The side either detailed in the profile drawing for the product given or generally regarded out of regular trade practice as the back or unexposed face, shall for the purposes of grading be the worse face. Characteristics that will not show (back) are not given the same consideration as characteristics elsewhere and do not require filling, plugging, or sanding so long that the characteristics do not impair the strength of the piece rendering it unsuitable for its intended use. The back will allow hit and miss, scant, and roller marks up to 0.75mm (1/32") deep. Where these machining defects occur, they shall not exceed 25% of the surface area of the back.

9.4. Allowable Natural Characteristics on Better Face

9.4.1 Warp

9.4.1.1 Bow – Not exceeding 25mm (1") in every 2,130mm (7') length.

9.4.1.2 Crook (spring) – Not exceeding 3mm (1/8") in 2,130mm (7') length.

9.4.1.3 Cup – Not exceeding 0.75mm (1/32") in 125mm (5") width or less, or not exceeding 1.5mm (1/16") in widths greater than 125mm (5").

9.4.1.4 Twist – Not exceeding 4mm (5/32") deviation from plane in every 125mm (5") width in 2,130mm (7') length. Twist for other lengths in direct proportion to this requirement.

9.4.2 Borer holes

9.4.2.1 Pin holes – Scattered pin holes are allowed provided they are neither so numerous nor so grouped as to materially affect the appearance of the piece.

9.4.2.2 Shot holes – Scattered shot holes, whether stained or unstained, allowed if plugged or filled and smooth sanded.

9.4.2.3 Grub or large borer holes – Not allowed.

9.4.3 Resin pockets – Based on a jamb 50mm (2") by 2,130mm (7') (approximately 925cm² (1'²) of surface area), maximum two medium resin pockets not exceeding 3mm (1/8") wide and 200mm (8") long in each piece well filled and sanded. This is subject their occurrence does not exceed 10% of the parcel or unit of delivery.

9.4.4 Knots

9.4.4.1 Sound knots – Maximum 2 smooth machined knots, or their equivalent smaller, the sum of their diameters not exceeding 1/3 the width to every length of 2,130mm (7') supplied. Checked knots to be filled and sanded.

9.4.4.2 Unsound knots – Maximum 2 smooth machined knots, or their equivalent smaller, the sum of their diameters not exceeding 1/4 the width to every length of 2,130mm (7') supplied. The unsound portion must be removed and then filled and smooth sanded.

9.4.5 Compression failure – Maximum two compression failures to every 900mm (3') of length and subject that no one compression failure shall be allowed to exceed 1/3 the width of the piece supplied.

9.4.6 Brittle heart – Allowed in any amount provided it does not impair strength.

9.4.7 Checks – Based on a jamb 50mm (2") by 2,130mm (7') (approximately 925cm² (1'²) of surface area), one check is allowed if it does not extend to the opposite face and subject to size limit of 1.5mm (1/16") in width and 300mm (1') in length and their occurrence does not exceed 10% of the parcel or unit of delivery.

9.4.8 Splits – Not allowed.

9.4.9 Sapwood – Bright sapwood or stained sapwood not restricted.

9.5 Allowable Machine Defects on Face

9.5.1 Skips – Allowed on face and either of the two edges provided they are light enough to allow sanding to remove traces of skip marks. After sanding there should be no area over 0.75mm (1/32") scant.

Skips shall however be limited in size to:

On face: 1.5mm (1/16") deep and 150mm (6") long

On edge: 1.5mm (1/16") deep and 300mm (1') long and their occurrence shall not exceed 10% of the parcel or unit of delivery.

9.5.2 Chipped grain – No restrictions.

9.5.3 Torn grain – Allowed if not exceeding 1.5mm (1/16") deep and not impairing the appearance of at least 90% of the exposed surface. Their occurrence shall not exceed 10% of the parcel or unit of delivery.

9.5.4 Raised grain – Allowed if not exceeding 1.5mm (1/16") deep.

9.5.5 Chip marks – Allowed if not exceeding 0.75mm (1/32") deep and subject to their occurrence does not exceed 5% of the parcel or unit of delivery.

9.5.6 Burn marks – Allowed, provided non-indented.

9.5.7 Cutter marks – Even and smooth to touch. Not less than 10 cutter marks per 25mm (1").

APPENDIX A

TERMINOLOGY

Bark pockets: Patches of bark partially or wholly enclosed within the wood; sometimes known as inbark. Resin or gum may sometimes be present in the pocket.

Beetle, powder post: A member of the families bostrychidae or lyctidae, whose larvae bores in the sapwood of partially seasoned timber.

Better face grading: The grade of the board is determined from the better face.

Borer holes: Holes in timber caused by boring insects (or their larvae), either in the living tree (e.g. some ambrosia beetles), or after felling or sawing (e.g. Lyctus beetles); or by marine borers. In these rules three sizes are recognized namely:

(A) **Pin (and needle) hole:** Not over 1.5mm (1/16") in diameter, usually about 0.75mm (1/32") or less, sometimes stained around the edges.

(B) **Shot hole:** Over 1.5mm (1/16") in diameter but not exceeding 3mm (1/8") in diameter. If the edges of the holes are not stained they are known as unstained shot holes.

(C) **Large borer hole (grub hole):** Over 3mm (1/8") in diameter, caused by longhorn beetles, usually averaging about 6mm (1/4") in diameter.

Bow (bowing): The curvature of a piece of sawn timber in the direction of its length (see warp).

Brittle heart: The defective core of a log, characterized by abnormal brittleness, which occurs in certain kinds of tropical hardwoods. There is no difference in color from unaffected wood and a sawn cross section shows a pitted condition, but the limits of the defect are never sharply defined. Also known as spongy heart, punky heart, or soft heart.

Burl: A distortion of grain, usually caused by abnormal growth due to injury of the tree. The effect of burls is assessed in relation to knots.

Checks: Small separations of the wood fibers in a longitudinal direction, not penetrating as far as the opposite or adjoining side of a piece of sawn timber (see shake and split). They usually result from strains developing during seasoning.

(A) A surface check occurs only on one surface of a piece.

(B) A through check extends from one surface of a piece to the opposite or adjoining surface.

(C) Small checks are not over 0.75mm (1/32") wide and not over 100mm (4") long.

(D) Medium checks are not over 0.75mm (1/32") wide and not over 250mm (10") long.

(E) Large checks are larger than medium.

(F) A roller check is a crack in the wood structure caused by a piece of cupped lumber being flattened in passing between the machine rollers. A light roller check is a perceptible opening not over 600mm (2') long but not exceeding 1,220mm (4') in length. A heavy roller check is over 1,220mm (4') in length.

Clear: Free from all visible defects, (see sound).

Compression failures: They are fractures across the grain in which the fibers are broken transversely or are crushed by compression. Various causes are suggested, such as felling across obstructions, and failure inside the growing tree caused by high winds, growth stresses, etc. They are also known as felling shakes, thunder, rupture, lightning, and transverse shakes, upsets, cross breaks, or cross fractures. Very often they are difficult to detect until the timber is dressed.

Cup (cupping): The curvature of a piece of sawn timber across its widths (see warp).

Decay: The decomposition of wood substance by fungi.

Defect: Any features that adversely affects the technical quality of timber. Whether a particular feature is classed as a defect or a blemish depends on the purpose for which the timber is to be used. Defects are also referred to as characteristics.

Dressed (surfaced, planed) lumber (timber): Sawn timber planed or otherwise machined on one or more surfaces. Also known as wrought timber.

Edge: There are three meanings for edge:

1. The narrow face of rectangular-shaped pieces.
2. Usually in stress grades that part of the wide face nearest the corner of the piece.
3. The corner of a piece at the intersection of two longitudinal faces. There are four common types of edges under this definition:
 - (A) Eased edges means slightly rounded surfacing on pieces of lumber to remove sharp corners.
 - (B) Square edged means free from wane and without eased edges.
 - (C) Free of wane means without wane but may have eased edges.
 - (D) Square corners means without eased edges but may permit wane allowance.

Faces: Applied only to the two wider surfaces of a piece of sawn timber. In the case of a square, it has four faces. The term better face means the face with the fewest defects on it, and the worst face means the face with the most defects on it. If machined one side only (S1S), the surfaced face becomes the grading face.

Flat sawn: Applied to timber sawn approximately parallel to the growth rings, i.e., so that the angle of the rays with the wide-face is more than 45 degrees (see quarter sawn).

General mouldings: These include lumber which have been dressed or machined in a like manner to S4S and usually shaped to a profile that is no longer square or rectangular in shape. General mouldings regardless of shapes or profiles are commonly manufactured to random length as well as to sets or fixed length. Cut-to-length shall be graded as entirely usable.

Heart: A term applied to the central portion of a log including the pith and the adjacent wood which may be defective.

Knot: A portion of a branch which has become embedded in the wood by the natural growth of the tree; the cross section of a knot is usually circular or oval in shape, and is measured by taking the mean of the longest and shortest diameter. In these rules knots are classified as follows:

(A) **Sound knot:** It is solid across its face and except for its own pith, it is as hard as or harder than the surrounding wood to which it is firmly joined; it shows no indication of decay and is usually darker in color than the surrounding wood. (See burl)

(B) **Unsound knot:** It is a knot which is softer than the surrounding wood because it contains decay. If the decay is advanced there may be a hole in the center of the knot and the sides of the hole contain decay. (See hollow knot).

(C) **Hollow knot:** It is a knot which has fallen out leaving a hole whose sides are free from decay. (See unsound knot).

(D) **Pin knot:** It is a knot not over 13mm (1/2")

(E) **Small knot:** It is a knot not over 19mm (3/4")

(F) **Medium knot:** It is a knot not over 38mm (1-1/2")

(G) **Large knot:** It is a knot over 38mm (1-1/2")

Latex traces and leaf traces: These are lens-shaped or slit-like passages containing shrivelled up tissue and running radially through the wood. They are structural features characteristic of certain species, i.e., Jelutong, Pulai, originating from the traces of leaves and axial buds which produce a pock-marked or flecked appearance on longitudinal surfaces. The two terms are not synonymous. "Latex traces" refers to the traces of the leaves and axial buds occurring in latex bearing and non-latex bearing trees. They both resemble borer holes with which they should not be confused.

Length, Standard specification: Unless otherwise specified by the buyer the following average length guidance shall apply in random length parcels. Subject to agreement between buyer and seller, an allowance for a small percentage of shorts, 900mm-1,500mm (3'-5'), can be included whenever possible for S4S and mouldings.

S4S: 1,800mm (6') - 6,100mm (20') average length shall be 3,300mm (11') or longer.

General mouldings: 1,800mm (6') - 6,100mm (20') average length shall be 3,300mm (11') or longer.

Panelling: 2,130mm (7') - 6,100mm (20'). Average length shall be 3,300mm (11') or longer.

PHND (Pin holes, no defect): Pin holes are not considered a defect (no mass pin wormy).

Plugs and fillers: Wood plugs and fillers are inserted into pieces of lumber to improve their appearance and usefulness. Quality of the inserts and workmanship must be in keeping with the quality of the grade.

Quarter sawn: Applied to timber sawn approximately at right angles to the growth rings, i.e., so that the angle of the rays with the wide-face is less than 45 degrees (see flat sawn). Pieces shall be considered quarter-sawn under these rules when, at one end of the piece, the angle between the rays in the timber and the wide-face is nowhere more than 45 degrees.

Resin pocket: Cavities in wood which have become wholly or partially filled with solid or semi-solid resinous or gummy substance; also known as dammar (agathis) pockets, or pitch pockets. Bark may also sometimes be present in the pocket.

A well-defined opening between the rings of annual growth which develops during the growth of the tree. It usually contains pitch or bark.

Pockets are described approximately as follows with equivalent areas being permissible:

(A) Very small pocket - 1.5mm (1/16") in width and 75mm (3") in length, or 3mm (1/8") in width and 50mm (2") in length.

(B) Small pocket - 1.5mm (1/16") in width and 150mm (6") in length, or 3mm (1/8") in width and 100mm (4") in length, or 6mm (1/4") in width and 50mm (2") in length.

(C) Medium pocket - 1.5mm (1/16") in width and 300mm (1') in length, or 3mm (1/8") in width and 200mm (8") in length, or 10mm (3/8") in width and 100mm (4") in length.

(D) A large pocket is not over 260mm (4") square in area.

(E) A very large pocket is over 260mm (4") square in area.

S4S- Surfaced Four Sides or D4S- Dressed Four Sides or Planed All Around: These include timbers dressed or machined by the use of a planer or moulder to give a smooth surface on four sides.

(A) The corners of items manufactured in the S4S product grouping may either be eased or square edged as specified by the contract.

(B) Lumber surfaced four sides should be graded from the best surfaced face.

Sapwood: The outer layers of wood adjacent to the bark, which in the living tree contains living cells and reserve materials (e.g. starch). It is not inferior to heartwood in mechanical properties, and except in some timbers like ramin and jelutong, it is lighter color than heartwood and is clearly demarcated.

Sapwood stains more readily and is not so durable as heartwood but it can be readily impregnated with preservatives by which means it can be made at least as durable as the heartwood and often more durable. Therefore, sapwood is not considered a defect in timber that is to be pressure impregnated. Bright sapwood is sapwood of natural color or from which any discoloration could be removed by surfacing to standard thickness.

Scant: Any undersize in thickness or width exceeding 0.75mm (1/32")

Shake: An expression used to describe a split, crack or deep check. If it completely encircles the pith (heart) it is called round shake; if it does not encircle the pith it is called cup shake; if it extends from the pith outward it is called a heart or star shake; if it is an irregular zig-zag on the log end it is known as shatter or shatter shake.

Sloping grain (slope of grain): A deviation of the grain (fibers) from the longitudinal axis of the timber, when the deviation is in the same direction throughout the depth of the piece. Careful inspection is required to distinguish it from interlocked grain, in which the grain runs in different directions in alternate layers of the timber, and from purely local grain distortions. Interlocked grain, a common feature in tropical timbers, has been found to have a negligible effect on their strength except in sizes less than about 100mm (4") x 50mm (2").

Sound defect: Means any defect free from decay

Splits: A separation of the wood due to the tearing apart of the wood cells.

(A) A very short split is equal in length to 1/2 the width of the piece.

(B) A short split is equal in length to the width of the piece and in no case exceeds 1/6 the length.

(C) A medium split is equal in length to twice the width of the piece and in no case exceeds 1/6 the length.

(D) A long split is longer than a medium split.

Stained sapwood: Stained sapwood similarly has no effect on the intended use of the pieces in which it is permitted but affects appearance in varying degrees.

(A) **Light** stained sapwood is so slightly discolored that it does not materially affect natural finishes.

(B) **Medium** stained sapwood has a pronounced difference in coloring, which sometimes affects its usefulness for natural finishes but not for paint finishes.

(C) **Heavy** stained sapwood has so pronounced a difference in color that the grain may be obscured but the lumber containing it is acceptable for paint finishes.

Trim: Trimming of timber is an act of cross-cutting it either to a given length or merely to square off either at one or both ends. The degree of accuracy shall depend on whether pieces supplied are subject to further re-trimming, for which standards to be maintained are set out into the following classes of finish:

(A) **Double-end trim (DET):** To tolerance - 0mm , + 25mm (1").

(B) **Precision end trim (PET):** To be trimmed square and smooth on both ends to uniform length, with a tolerance of 1.5mm (1/16") over or under in length in 20% of the pieces.

(C) **Square-end trim (SET):** To be trimmed square permitting slight manufacturing tolerance of 0.4mm (1/64") for each nominal 50mm (2") of thickness or width.

(D) **Equalized:** Passed through a tenonor with +/- 0.75mm (1/32") tolerance.

Twisting: The spiral distortion of a piece of sawn timber; it may be accompanied by either bowing, or spring or both.

Wane: Bark or lack of wood from any cause, except eased edges, on the edge or corner of a piece of lumber.

Warp: Any deviation from a true or plane surface, including bow, crook, cup and twist or any combination thereof. Warp restrictions are based on the average form of warp as it occurs normally,

and any variation from this average form, such as short kinks, shall be appraised according to its equivalent effect. Pieces containing two or more forms shall be appraised according to the combined effect in determining the amount permissible. In these rules, warp is classified to each width and length as set forth in the various grades in accordance with the following provisions:

(A) **Bow** is a deviation flatwise from a straight line drawn from end to end of a piece. It is measured at the point of greatest distance from the straight line. The amount permitted according to the grade is as follows: If under 50mm (2") thick, three times as much as crook permitted for 50mm (2") faces. If 50mm (2") thick and under 75mm (3") twice as much as crook permitted for 50mm (2") faces. If 75mm (3") thick or over, the same as the amount of crook permitted for that thickness.

(B) **Crook (spring)** is a deviation edgewise from a straight line drawn from end to end of a piece. It is measured at the point of greatest distance from the straight line.

(C) **Cup** is a deviation in the face of a piece from a straight line drawn from edge to edge of a piece. It is measured at the point of greatest distance from the straight line.

(D) **Twist** is a deviation flatwise, or a combination of flatwise and edgewise, in the form of a curl or spiral, and the amount is the distance an edge of a piece at one end is raised above a flat surface against which both edges at the opposite end are resting snugly.

Manufacturing Imperfections

Means all imperfections or blemishes which are the result of manufacturing, such as the following:

(A) **Chipped grain** is a barely perceptible irregularity in the surface of a piece caused when particles of wood are chipped or broken below the line of cut. It is too small to be classed as torn grain and as usually found is not considered a defect unless in excess of 25% of the surface is involved.

(B) **Torn grain** is an irregularity in the surface of a piece where wood has been torn or broken out by surfacing. Torn grain is described as follows:

Very light torn grain - not over 0.4mm (1/64") deep.

Light torn grain - not over 0.75mm (1/32") deep.

Medium torn grain - not over 1.5mm (1/16") deep.

Heavy torn grain - not over 3mm (1/8") deep.

Very heavy torn grain - over 3mm (1/8") deep.

(C) **Raised grain** is an unevenness between springwood and summerwood on the surface of dressed lumber. Slight raised grain is an unevenness somewhat less than 0.4mm (1/64").

Very light raised grain is not over 0.4mm (1/64").

Light raised grain is not over 0.75mm (1/32").

Medium raised grain is not over 1.5mm (1/16").

Heavy raised grain is not over 3mm (1/8").

(D) **Skips** are areas on a piece that failed to surface clean. Skips are described as follows with equivalent areas being permissible:

Very light skip is not over 0.4mm (1/64") deep, and approximately 150mm (6") in length.

Light skip is not over 0.75mm (1/32") deep. (On face, may be 300mm (1') in length and on edge may be 600mm (2') long.)

Medium skip is not over 1.5mm (1/16") deep. (On face, may be 300mm (1') in length and on edge may be 600mm (2') long.)

Heavy skip is not over 3mm (1/8") deep.

Provisions in brackets apply to all except dimension lumber.

(E) **Hit and miss** is a series of skips not over 1/16" deep with surfaced areas between.

(F) **Hit or miss** means completely surfaced or partly surfaced or entirely rough. Scantness may be 1/16".

(G) **Mismatch** is an uneven fit in worked lumber when adjoining pieces do not meet tightly at all points of contact or when the surfaces of adjoining pieces are not in the same plane.

Slightly mismatch is a barely evident case of mismatch.

Very light mismatch is not over 0.4mm (1/64")

Light mismatch is not over 0.75mm (1/32")

Medium mismatch is not over 1.5mm (1/16")

Heavy mismatch is not over 3mm (1/8")

(H) **Machine burn** is a darkening of the wood due to overheating by machine knives or rolls when pieces are stopped in a machine.

(I) **Machine bite (snipe)** is a depressed cut of the machine knives at the end of the piece.

Very light machine bite is not over 0.4mm (1/64") deep.

Light machine bite is not over 0.75mm (1/32") deep.

Medium machine bite is not over 1.5mm (1/16") deep.

Heavy machine bite is not over 3mm (1/8") deep.

Very heavy machine bite is over 3mm (1/8") deep.

(J) **Machine gouge** is a groove cut by the machine below the desired line.

Slight machine gouge is less than 0.4mm (1/64") deep.

Very light machine gouge is not over 0.4mm (1/64") deep

Light machine gouge is not over 0.75mm (1/32") deep.

Medium machine gouge is not over 1.5mm (1/16") deep.

Heavy machine gouge is not over 3mm (1/8") deep.

(K) **Machine offset** is an abrupt dressing variation in the edge surface which usually occurs near the end of the piece and without reducing the width or without changing the plane of the wide surface.

Very light machine offset is a variation not over 0.4mm (1/64").

Light machine offset is a variation not over 0.75mm (1/32").

Medium machine offset is a variation not over 1.5mm (1/16").

Heavy machine offset is a variation not over 3mm (1/8").

Very heavy machine offset is a variation over 3mm (1/8").

(L) **Chip marks** are shallow depressions or indentations on or in the surface of dressed lumber caused by shavings or chips getting embedded in the surface during dressing.

Slight chip marks are less than 0.4mm (1/64") deep.

Very light chip marks are not over 0.4mm (1/64") deep.

Light chip marks are not over 0.75mm (1/32") deep.

Medium chip marks are not over 1.5mm (1/16") deep.

Heavy chip marks are not over 3mm (1/8") deep.

(M) **Knife marks** are the imprints or markings of the machine knives on the surface of dressed lumber.

Very slight knife marks are visible only from a favorable angle and are perfectly smooth to the touch.

Slight knife marks are readily visible but evidence no unevenness to the touch.

APPENDIX B

Soft Metric Conversion table of sizes used in rules

Inches	Millimeters	Feet	Millimeters
1/64"	0.4mm	1'	300mm
1/32"	0.75mm	2'	600mm
1/16"	1.5mm	3'	900mm
1/8"	3.0mm	4'	1,220mm
5/32"	4.0mm	5'	1,500mm
3/16"	5.0mm	6'	1,800mm
1/4"	6.0mm	7'	2,130mm
5/16"	8.0mm	8'	2,400mm
3/8"	10.0mm	10'	3,000mm
1/2"	13.0mm	11'	3,300mm
3/4"	19.0mm	12'	3,700mm
1"	25.0mm	14'	4,300mm
1-1/32"	26.0mm	16'	4,900mm
1-1/8"	30.0mm	20'	6,100mm
1-1/2"	38.0mm		
2"	50.0mm		
3"	75.0mm		
3-1/32"	76.0mm		
4"	100.0mm		
6"	150.0mm		
6-1/32"	153.0mm		
8"	200.0mm		
10"	250.0mm		