

# Wood Doors

## Sector Overview

In 2004 close to 90 million doors were demanded in the US. Residential demand makes up the majority of the door market, accounting for 79 million units in 2004.

Wood holds a 13.8% market share for residential entry doors and a 96% market share for residential interior doors. However, there are two common but distinctly different types of wood doors used. The stile and rail door is a solid wood core door making heavy use of softwoods. Flush doors contain much less wood and feature a wood veneer skin most often made of hardwoods and imported species. Therefore, the stile and rail door market for interior and exterior residential doors should be the main focus for softwood producers. Flush doors do, however, use finger-jointed softwoods for frame material.

Canada's combined wood window and door sector shipped C\$1.6 billion (U.S.\$1 billion) in 2002. Approximately 25 to 30% of Canadian shipments are exported to the U.S. The combined U.S. industry had shipments worth U.S. \$10.9 billion in the same year.

## Material Use

Wood Door Construction, 2003		
	Hollow core/flush (million)	Stile and Rail (million)
<b>RESIDENTIAL</b>		
Entry	0	2
Interior	56.8	4.9
<i>Total</i>	<i>56.8</i>	<i>6.9</i>
<b>NON-RESIDENTIAL</b>		
Entry	0	0.2
Interior	3	0.2
<i>Total</i>	<i>3</i>	<i>0.4</i>

Source: Ducker 2004

U.S. DOOR MARKET(RESIDENTIAL), 2004		
	UNITS (MILLION)	MARKET SHARE
<b>ENTRY DOORS</b>		
Wood	<b>2</b>	13.8%
Steel	<b>10</b>	69.0%
Fibreglass	<b>2.5</b>	17.2%
<b>INTERIOR DOORS</b>		
Wood	<b>61.7</b>	96.0%
Other	<b>2.6</b>	4.0%
<i>Total</i>	<b>78.8</b>	

U.S. DOOR MARKET(NON-RESIDENTIAL), 2004		
	UNITS (MILLION)	MARKET SHARE
<b>ENTRY DOORS</b>		
Wood	<b>0.2</b>	6.3%
Metal	<b>2.9</b>	90.6%
Other	<b>0.1</b>	3.1%
<b>INTERIOR DOORS</b>		
Wood	<b>3.2</b>	41.0%
Metal	<b>4</b>	51.3%
Other	<b>0.6</b>	7.7%
<i>Total</i>	<b>11</b>	

Source: Ducker 2005



## Wood Use

STILE AND RAIL DOORS BY SPECIES, U.S.

SPECIES	EXTERIOR	INTERIOR
Douglas-fir and Hemlock	53%	12%
Ponderosa Pine	8	13
Radiata Pine	5	35
Other Pines	2	9
Other Softwoods	1	0
Hardwoods	31	31
Total	100%	100%

Source: Ducker 2004

## Grades and Components

Lumber grades typically vary based on the end use of the finished door. If components are being cut in-house from lumber a combination of clear, Shop 1, Shop 2, and Shop 3 can be used to cut the necessary sizes to meet the range of finished product sizes. Many stile and rail doors are veneered. This allows for lower cost finger-jointed core material to be used. Flush panel doors use finger-jointed lumber almost exclusively.

All material must be dried to 6 to 12% moisture content, based on client specifications, and conditioned for stress relief.

Window and door manufacturers outsource an average 26% of total material input to component manufacturers. The share of component outsourcing is higher for U.S. window and door producers than for Canadian producers (34% and 18%, respectively)

COMPARATIVE SPECIES' PROPERTIES

		PONDEROSA PINE	RADIATA PINE	DOUGLAS-FIR	HEMLOCK
Density (kg/m <sup>3</sup> )	Green	390	420	450	420
	Air Dry	420	480.6	487	429
Specific Gravity		0.39	0.42	0.45	0.42
Hardness (N)	Side	2640	2100	2990	2740
	End	3360	3300	4020	4410
MOE (MPa)	Green	7790	8100	11100	10200
	Air Dry	9510	10200	13500	12300
MOR (MPa)	Green	39.3	42.1	52.0	48.0
	Air Dry	73.3	80.7	88.6	81.1
Shrinkage OD = oven dry air = air dry 12%	Radial (OD)	4.6%	3.4%	4.8%	5.4%
	Tangential (OD)	5.9%	6.4%	7.4%	8.5%
	Volumetric (OD)	10.5%	10.7%	11.9%	13.0%
	Volumetric (air)	6.1%	n/a	7.0%	8.1%





## Terminology

### DESCRIPTION OF COMMON DOOR DESIGNS

DOOR DESIGN	DESCRIPTION
Flush door	Stressed skin construction consisting of a core, stiles, rails, edge banding, and two face panels. Flush doors can be solid or hollow core
Stile & rail door	Door with several panels, interspersed with horizontal strips (rails) and/or vertical strips (stiles) with the result being a three-dimensional appearance
French door	Door consisting of panes of glass separated by vertical and horizontal framing members
Patio door	Glazed exterior door that may either be hinged or sliding
Louver door	Door with a series of slats, usually arranged horizontally and fastened between vertical structural pieces
Exterior entrance door	Wood exterior entrance doors are commonly of stile & rail construction. An exterior door must be finished so that it resists the elements and manufactured of materials that are weather-resistant

Source: WDMA

### GENERAL DOOR GRADES

GRADE	DESCRIPTION
Stain Grade	Lumber must be grain and colour matched, and be clear of defects that affect the appearance of the door. Slight discolouration (heartwood) is allowed, except no blue stain is allowed. No repair pitch pockets, bark pockets or boat patches.
Select Grade	Lumber for stiles, rails, panels, and mullions shall be grain and colour matched, and shall be clear of defects that affect the appearance of the door, except that not more than one well repaired pitch or bark pocket per door face maximum 4" in length may be included. Slight discolouration (heartwood) is acceptable, except no blue stain. No boat patches.
Standard Grade	Lumber shall be grain and colour matched with 50% of the door face allowing flat grain. Well repaired pitch and bark pockets to a maximum of 2 per door face are allowed, to a maximum of 4". Slight discolouration is allowed (heartwood). Slight blue stain to 25% of the door face is acceptable. No boat patches.
Paint Grade	Lumber shall be of any grain and colour. Multiple patches allowed, to repair pitch and bark pockets. Blue stain acceptable to 60% of the door face. Brown stain not acceptable. Exposed finger joints are acceptable for some door applications, such as screen doors and garage entrance doors. Boat patches allowed.

Source: Fiedler, 2003

## Associations and Standards

### ASSOCIATIONS

Canadian Window and Door Manufacturers Association	<a href="http://www.cwdma.ca">www.cwdma.ca</a>
Window and Door Manufacturers Association	<a href="http://www.wdma.com">www.wdma.com</a>
Association of Millwork Distributors	<a href="http://www.amdweb.com">www.amdweb.com</a>
Wood Components Manufacturers Association	<a href="http://www.woodcomponents.org">www.woodcomponents.org</a>

### Standards

There is no single binding performance standard for wood windows and doors in Canada and the U.S.; thus all standards are voluntary. The weight and importance of standards stems from their inclusion in building codes and architecture plans.

Voluntary standards in Canada reside with CSA international. In the U.S. the WDMA administers a set of voluntary standards and test methods.

Wood doors come in three-architectural performance classes: standard duty, heavy duty and extra heavy duty. There are two appearance grades, the higher of which requires no wood defects.



## Prospect Summary

Stile and rail doors make heavy use of solid and finger-jointed softwoods. These doors represent a premium product in the exterior door market. In this market wood competes against steel and new wood-look fibreglass doors. Natural and paint grade stile and rail doors hold 14% of the residential exterior door market. These doors are made of domestic softwoods and are often semi-custom in nature making them the top domestic prospect.

The advent of the wood-look fibreglass door is both a threat and opportunity to wood. It is a threat if it further displaces wood in the market. However, it is more likely to threaten the steel door market where durability and price are factors. Further, as homeowners become reacquainted with “wood-look” doors real wood doors may benefit as a prestige item.

Interior doors are almost all made of wood. However, less than 10% are stile and rail doors. Due to the sheer volume of interior doors in a house, this still accounts for 4.9 million stile and rail doors. These doors can be paint or stain grade but are most often made of non-domestic species. Mass volumes of interior stile and rail doors are now being imported from China.

## Sources

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