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Rough-Part Sizes Needed from Lumber for Manufacturing Furniture and Kitchen Cabinets

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Abstract

This report summarizes the results from a recent survey of the rough-part sizes needed from lumber for manufacturing furniture and kitchen cabinets. Twenty furniture and twelve cabinet companies participated in the survey. Lumber thicknesses needed and rough-part qualities desired are presented along with distributions describing the required rough-part dimensions.

Can short lumber be used to produce the required rough parts for manufacturing furniture and kitchen cabinets? Or do we need 10-, 12-, 14-, or 16-foot lumber? What are the cutting sizes needed from lumber? The answers are always the same: "I don't know." To help answer these and other similar questions, in a cooperative effort between the International Woodworking Machinery and Furniture Supply Fair-USA and the USDA Forest Service,¹ we surveyed the furniture and cabinet industries to determine the rough-part requirements from lumber.

This report summarizes the survey findings on the furniture and kitchen cabinet rough-part needs. Lumber thicknesses needed and rough-part qualities desired are presented along with distributions describing the required rough-part lengths and widths.

The Industry Survey

To obtain data describing industrywide needs, 20 major furniture and 12 major kitchen cabinet companies were surveyed. The 20 furniture companies supplied rough-part size data on the following product types:

- Solid furniture
- Veneered furniture
- Upholstered furniture
- Recliners

The solid and veneered furniture data were collected by suite of furniture. Data on 8 solid and 17 veneered suites of furniture were received. Within each suite, we asked for the sizes of the rough parts produced for 12 different pieces of bedroom furniture, 12 different pieces of dining room furniture, and 13 different pieces of occasional furni-

ture. Along with length and width data, the manufacturers provided information on lumber thickness, part grade or quality, and the number of rough pieces per article. Some companies included data on more than 37 pieces of furniture; some less.

Similar data were supplied by five companies on 22 pieces of assorted upholstered furniture frames, and three companies supplied the data on 20 recliner frames.

Kitchen cabinet rough-part data were obtained on all cabinets that each of the 12 participating companies produced. These companies also provided an estimate on the number of rough parts needed based on their sales mixes.

Rough-Part Sizes by Product Type

Results by product type show the distribution of parts by lumber thickness and rough-part quality combination. All parts were in one of three quality categories:

- Clear quality—for C1F (clear-one-face), C2F (clear-two-faces), and upholstered exposed quality parts.
- Core quality—for core and banding quality parts.
- Sound quality—for sound interior and upholstered frame quality parts.

Part quality definitions are in the Appendix.

Tables for each product type show the distribution of rough-part lengths in 1-foot increments, and the distribution of rough-part widths in 1-inch increments to 6 inches and a 6- to 30-inch glued-up panel class.² The difference between the percent of total and 100 is the percentage of other thickness and quality combinations not listed.

All results in the tables are based on the percentage of total surface area of required rough-part sizes by product type and not on the board-foot volume of the rough-part sizes.

Solid Furniture

The major lumber thicknesses needed for solid furniture are 5/8 through 8/4 inches. Five percent of the required parts by surface area require 5/8-inch lumber, 59 percent 4/4-inch lumber, 16 percent 5/4-inch lumber, 7 percent 6/4-inch lumber, and 7 percent 8/4-inch lumber. Eighty percent of the requirements can be made from 5/4-inch or thinner lumber.

Only 15 percent of the required parts, by surface area, need sound cuttings and they are all 4/4 cuttings. The remaining 85 percent are clear cuttings. Of these, 57 percent are C1F cuttings and 43 percent are C2F cuttings.

The distribution of rough-part lengths for each thickness and quality combination is shown in Table 1. Rough lengths up to 7 feet long are needed, though 78 percent of the requirements are equal to or less than 4 feet long.

The distribution of rough-part widths for each thickness and quality combination is also shown in Table 2. Most rough-part widths are wide (6 to 30 inches), thus, random-width cuttings are edge glued to satisfy these needs. Many wide, edge-glued panels are used in solid furniture for table tops, case tops, and sides and drawer fronts. The 60 percent requirement for 6- to 30-inch-wide parts reflects this need and the practice by many manufacturers of ripping rough parts from wide, edge-glued panels.

Veneered Furniture

The lumber thickness requirements for veneered furniture are similar to the solid furniture requirements. Ten percent of the required parts by surface area require 5/8-inch lumber, 49 percent 4/4-inch lumber, 20 percent 5/4-inch lumber,

¹Araman, Philip A.; Gatchell, Charles J.; Reynolds, Hugh W. Meeting the solid wood needs of the furniture and cabinet industries: standard-size hardwood blanks. 1982; USDA For. Serv. Res. Pap. NE-494. 27 p.

²For additional information or further breakdowns, send request to the Forestry Sciences Laboratory, P.O. Box 152, Princeton, WV 24740.

**Table 1. Distribution of rough-part lengths needed for solid furniture,
by required input lumber thickness and required part quality**

Lumber thickness (inches)	Quality of parts	Length grouping (feet)							Percent of total
		0-1	1.01-2	2.01-3	3.01-4	4.01-5	5.01-6	6.01-7	
----- <i>Percent^a</i> -----									
5/8	Clear	0.1	3.6	1.3	—	—	—	—	5
4/4	Clear	.5	13.6	12.3	9.2	3.5	2.2	2.7	44
	Sound	.3	10.2	1.9	.8	1.0	.6	.2	15
5/4	Clear	—	5.3	3.8	3.7	.8	2.2	.2	16
6/4	Clear	.1	2.5	1.8	1.0	.6	.8	.2	7
8/4	Clear	.1	3.4	1.3	1.6	.5	.1	—	7
Percent of total		1.1	38.6	22.4	16.3	6.4	5.9	3.3	94

^aPercentage of total surface area of required parts.

**Table 2. Distribution of rough-part widths needed for solid furniture,
by required input lumber thickness and required part quality**

Lumber thickness (inches)	Quality of parts	Width grouping (inches)							Percent of total
		0-1	1.01-2	2.01-3	3.01-4	4.01-5	5.01-6	6.01-30	
----- <i>Percent^a</i> -----									
5/8	Clear	—	—	0.1	0.6	0.3	1.2	2.8	5
4/4	Clear	0.4	3.0	3.0	1.8	.8	.8	34.2	44
	Sound	.9	4.0	3.6	.9	.2	—	5.4	15
5/4	Clear	—	.8	1.9	2.1	.8	.3	10.1	16
6/4	Clear	—	.4	.8	.4	.3	.3	4.8	7
8/4	Clear	—	1.7	1.1	.5	.4	.1	3.2	7
Percent of total		1.3	9.9	10.5	6.3	2.8	2.7	60.5	94

^aPercentage of total surface area of required parts.

9 percent 6/4-inch lumber, and 8 percent 8/4-inch lumber. Eighty percent of the part requirements need 5/8-, 4/4-, and 5/4-inch lumber.

Based on the surface area, the requirements by part quality include 56 percent clear, 29 percent core, and 11 percent sound material. Eighty-four percent of the clear cuttings need C1F cuttings and 16 percent need C2F cuttings. Trends in the veneered furniture industry may reduce the 4/4- and 5/4-inch core material requirements as more particleboard and medium-density fiberboard are used as core material. Similar changes are occurring with 5/8-inch lumber use. Plywood and particleboard have been replacing solid wood drawer sides and backs. These trends will decrease the 4/4- and 5/4-inch core requirements and the 5/8-inch clear requirements, which will increase the percentages for the other combinations.

The distribution of rough-part lengths shows that over 60 percent of all length requirements are equal to or less than 3 feet long and that most required lengths are less than 7 feet (Table 3). A small amount of 4/4-inch clear, 5/4-inch core, and 8/4-inch clear cuttings is needed between 7 and 8 feet long.

Rough-part widths of clear quality are generally narrow because of the basic veneered panel construction of veneered furniture (Table 4). The 4/4- and 5/4-inch core rough parts are mostly wide and are made from gluing random-width cuttings into wide panels. The panels are then used or cut back to narrow core banding parts. The 5/8-inch clear rough parts are also wide and generally ripped to make drawer sides and backs.

Upholstered Furniture

Eighty-four percent of the rough-part requirements for upholstered furniture, by surface area, come from 4/4- and 5/4-inch lumber. Because these parts are not visible in the finished goods, most are made of sound (upholstered frame) material.

Table 3. Distribution of rough-part lengths needed for veneered furniture, by required input lumber thickness and required part quality

Lumber thickness (inches)	Quality of parts	Length grouping (feet)							Percent of total	
		0-1	1.01-2	2.01-3	3.01-4	4.01-5	5.01-6	6.01-7		7.01-8
----- Percent ^a -----										
5/8 4/4	Clear	0.1	7.9	1.8	0.2	—	—	—	—	10
	Clear	—	5.7	2.8	2.1	1.4	1.1	0.6	0.3	14
	Core	—	7.7	6.2	3.6	2.4	1.9	2.1	.1	24
5/4	Sound	.1	4.7	1.9	2.0	.8	1.0	.5	—	11
	Clear	—	5.8	4.1	1.5	1.5	.6	1.5	—	15
	Core	—	1.1	.7	1.0	1.2	.3	.7	—	5
6/4 8/4	Clear	—	3.4	2.2	1.2	.9	.5	.8	—	9
	Clear	—	2.4	2.4	1.3	.7	.4	.7	.1	8

Percent of total										

^a Percentage of total surface area of required parts.

Table 4. Distribution of rough-part widths needed for veneered furniture, by required input lumber thickness and required part quality

Lumber thickness (inches)	Quality of parts	Percent of total						
		0-1	1.01-2	2.01-3	3.01-4	4.01-5	5.01-6	6.01-30
5/8 4/4	Clear	—	0.1	0.2	0.5	1.0	1.7	6.5
	Clear	0.6	3.4	3.6	1.5	.8	.6	3.5
	Core	—	.5	.3	.7	.2	—	22.3
	Sound	1.2	7.0	1.7	.6	.3	.1	.1
5/4	Clear	.3	1.7	4.0	3.6	1.6	.7	3.1
	Core	—	—	.1	.2	.1	—	4.6
6/4	Clear	.1	1.2	3.0	2.1	.6	.4	1.6
8/4	Clear	.1	1.1	1.8	2.0	1.0	.2	1.8
Percent of total		2.3	15.0	14.7	11.2	5.6	3.7	43.5
								96

^a Percentage of total surface area of required parts.

Rough-part lengths up to 9 feet long are needed, though most are less than 7 feet long (Table 5). Seventy-five percent of upholstered furniture parts are equal to or less than 3 feet long.

Rough-part widths are widely distributed (Table 6). Some upholstery frame manufacturers rip narrow to wide width parts (up to 6 inches) directly from lumber, and some glue-up wide panels and rerip. Other manufacturers use both techniques.

Recliners

Eighty-five percent of the rough-part requirements for recliners come from 4/4- and 5/4-inch lumber. The only other major lumber thickness required is 8/4 lumber. Most parts are made of sound (upholstered frame) material.

Only rough-part lengths up to 3 feet are needed due to the size of recliners (Table 7).

The rough-part widths for recliners (Table 8) are similar to those for upholstered furniture. Recliner manufacturers rip required parts from lumber or edge-glue random-width pieces into panels and rerip, or both.

Kitchen Cabinets

Most kitchen cabinet requirements are cut from 4/4-inch lumber. Most of the remaining requirements use 3/4- and 5/4-inch lumber. Most of the parts cut from lumber for cabinets are used in front frames, doors, and drawer fronts; therefore, they are made from clear cuttings. Sixty-four percent of the clear cuttings need C1F cuttings and 36 percent need C2F cuttings.

Table 5. Distribution of rough-part lengths needed for upholstered furniture, by required input lumber thickness and required part quality

Lumber thickness (inches)	Quality of parts	Length grouping (feet)									Percent of total
		0-1	1.01-2	2.01-3	3.01-4	4.01-5	5.01-6	6.01-7	7.01-8	8.01-9	
----- <i>Percent^a</i> -----											
4/4	Clear	0.1	1.8	0.8	—	—	0.1	—	0.2	—	3
	Sound	1.2	18.9	25.9	1.8	2.4	2.9	5.3	.3	0.3	59
5/4	Sound	—	5.3	7.7	.2	2.4	1.1	4.4	.7	.2	22
6/4	Clear	—	1.5	2.1	.1	.5	—	.8	—	—	5
	Sound	—	1.1	1.8	.1	—	—	—	—	—	3
8/4	Clear	.3	.3	.8	.1	—	—	—	—	—	3
	Sound	.6	2.6	.8	—	—	—	—	—	—	4
Percent of total		2.2	33.0	39.9	2.3	5.3	4.1	10.5	1.2	0.5	99

^aPercentage of total surface area of required parts.

Table 6. Distribution of rough-part widths needed for upholstered furniture, by required input lumber thickness and required part quality

Lumber thickness (inches)	Quality of parts	Width grouping (inches)							Percent of total
		0-1	1.01-2	2.01-3	3.01-4	4.01-5	5.01-6	6.01-30	
----- <i>Percent^a</i> -----									
4/4	Clear	—	—	0.1	0.4	1.1	—	1.4	3
	Sound	1.2	17.1	15.9	11.2	5.3	1.2	7.1	59
5/4	Sound	—	2.4	4.8	4.4	2.0	1.3	7.1	22
6/4	Clear	—	—	.9	2.4	.4	—	1.3	5
	Sound	—	.8	1.2	.4	.1	—	.5	3
8/4	Clear	—	.7	.2	.8	.4	—	.9	3
	Sound	—	1.4	1.0	.8	.1	.2	.5	4
Percent of total		1.2	22.4	24.1	20.4	9.4	2.7	18.8	99

^aPercentage of total surface area of required parts.

Rough-part lengths up to 9 feet long are needed, but over 80 per-cent of the parts are equal to or less than 3 feet long (Table 9).

A wide range of rough-part widths is needed for kitchen cabi-nets (Table 10). The 1- to 3-inch-wide parts, which make up almost 60 per-cent of all the clear part require-ments, are usually ripped from lum-ber for use as stile and rail parts. The 3- to 6-inch-wide parts are either ripped from lumber or are ripped from wide edge-glued panels for use primarily as drawer fronts. The 6- to

30-inch edge-glued panels are gen-erally used to make solid doors or inserts for doors.

Uses of the Data

There are many potential uses of the data presented in this report. Using the rough-part data distribu-tions, researchers, development en-gineers, systems analysts, con-sultants, and material suppliers could:

- Answer questions such as “Can short lumber be used to produce

required furniture parts for solid and veneered furniture?” and “Can 4-foot-long lumber be used for recliner requirements?”

- Conduct input-output analysis for different grades of lumber and parts requirements.
- Simulate a rough-mill operation for one or several of the five product-type requirements.
- Determine the percentage of parts that are made from edge-glued material.

Table 7. Distribution of rough-part lengths needed for recliners, by required input lumber thickness and required part quality

Lumber thickness (inches)	Quality of parts	Length grouping (feet)			Percent of total
		0-1	1.01-2	2.01-3	
----- <i>Percent</i> ^a -----					
4/4	Sound	—	37.1	15.9	53
5/4	Clear	—	1.8	2.2	4
	Sound	—	18.8	9.2	28
8/4	Sound	0.2	7.5	.3	8
Percent of total		0.2	65.2	27.6	93

^aPercentage of total surface area of required parts.

Table 8. Distribution of rough-part widths needed for recliners, by required input lumber thickness and required part quality

Lumber thickness (inches)	Quality of parts	Width grouping (inches)							Percent of total
		0-1	1.01-2	2.01-3	3.01-4	4.01-5	5.01-6	6.01-30	
----- <i>Percent^a</i> -----									
4/4	Sound	1.6	10.1	10.1	5.3	1.0	3.2	21.7	53
5/4	Clear	—	.6	.4	—	—	—	3.0	4
	Sound	1.4	5.3	6.2	2.5	.3	—	12.3	28
8/4	Sound	—	5.0	1.3	.3	.3	—	1.1	8
Percent of total		3.0	21.0	18.0	8.1	1.6	3.2	38.1	93

^aPercentage of total surface area of required parts.

Table 9. Distribution of rough-part lengths needed for kitchen cabinets, by required input lumber thickness and required part quality

Lumber thickness (inches)	Quality of parts	Length grouping (feet)									Percent of total
		0-1	1.01-2	2.01-3	3.01-4	4.01-5	5.01-6	6.01-7	7.01-8	8.01-9	
----- <i>Percent^a</i> -----											
3/4	Clear	1.3	9.7	6.8	0.8	0.1	—	0.2	0.1	—	19
4/4	Clear	1.4	31.5	25.2	5.6	2.8	0.4	1.4	.3	1.4	70
	Sound	.2	2.1	1.9	.8	—	—	—	—	—	5
5/4	Clear	.1	1.3	2.0	.4	.2	—	.3	.3	.4	5
Percent of total		3.0	44.6	35.9	7.6	3.1	0.4	1.9	0.7	1.8	99

^aPercentage of total surface area of required parts.

Table 10. Distribution of rough-part widths needed for kitchen cabinets, by required input lumber thickness and required part quality

Lumber thickness (inches)	Quality of parts	Width grouping (inches)						Percent of total	
		0-1	1.01-2	2.01-3	3.01-4	4.01-5	5.01-6		6.01-30
----- Percent ^a -----									
3/4 4/4 5/4	Clear	0.4	5.5	5.7	2.3	1.1	0.6	3.4	19
	Clear	—	16.8	18.2	11.2	4.2	2.8	16.8	70
	Sound	.3	2.1	2.4	.1	.1	—	—	5
	Clear	—	2.6	.3	.2	.6	—	1.3	5
Percent of total		0.7	27.0	26.6	13.8	6.0	3.4	21.5	99

^a Percentage of total surface area of required parts.

Appendix

Part Quality Definitions³

Clear. C1F and C2F.

C1F (clear-one-face). This grade shall be clear on one face, both edges, and both ends, and shall otherwise comply with the clear-two-faces grade, except that the reverse face may contain defects of a sound grade.

C2F (clear-two-faces). This grade shall be clear on both faces, the edges, and the ends, except that sapwood, slight streaks, and small burls or swirls, and light stain shall be permitted.

Core. This material shall be sound on both faces, admitting tight sound knots, small worm holes, slight surface checks, or their equivalent.

Sound. This material may contain any defects that will not materially impair the strength of the individual piece for the use intended.

Exposed, upholstered. Same as clear.

Frame, upholstered. Same as sound.

³Hardwood Dimension Manufacturers Association. Rules for measurement and inspection of hardwood dimension parts, hardwood interior trim and moldings, hardwood stair treads and risers. 5th ed. Nashville, TN: Hardwood Dimension Manufacturers Association; 1961.

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