MINNESOTA TREE LINE
Agricultural Extension Service
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Basic Specifications for Elm Sawlogs

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The high incidence of Dutch elm disease in Minnesota has led to the removal and harvest of thousands of board feet of elm sawlogs. Unfortunately, much of this material has been burned, buried, or otherwise wasted. Part of the solution to this problem is a basic understanding of what sawmills and veneer mills require in the way of log quality and length. This fact sheet discusses the use of elm logs for railroad ties and grade lumber.

What Is A Sawlog?

Standing hardwood trees (stumpage) must have a diameter at breast height (d.b.h.) of 11 inches. This diameter is measured inside the bark. After trees are cut, sawlogs of various lengths may be cut; log diameters are then based on inside-the-bark measurements on the small end of the log. Normal sawlog lengths are 8, 10, 12, 14, and 16 feet. However, it is **extremely important** to leave at least 6 to 8 inches of trim allowance on each sawlog. Failure to do this can result in loss of grade and log scale and, ultimately, a substantial loss of revenue in marketing the logs.

HARDWOOD LOG-USE CLASSES

The U.S. Forest Service has developed a grading system that places logs in four log-use classes. They are as follows:

1. Veneer class — This class includes the very high value logs.
2. Factory class — This type of log is adapted to the production of boards that later can be remanufactured to remove all defects and obtain the best yields of clear face and sound cuttings.
3. Construction class — This class includes logs suitable for sawing into ties, timbers, and other items used in one piece for structural purposes.
4. Local-Use class — In general, local-use logs are those that are suitable for products not usually covered by standard specifications.

Although the Forest Service Hardwood Log-Use Class and Grading System is nationally recognized, a recent survey indicated that few Minnesota mills are using these rules. Also, it would appear that very few of our mills have developed specification sheets for their loggers. For some people, it may be desirable to sell logs on a "woodsrun" basis; meaning that no effort is made to grade them. On the other hand, a prospective seller of logs should have a basic knowledge of at least the factory class. If only general sorting of logs occurs, into the F1, F2, and F3 classes, a seller will realize much higher returns than if the logs were sold on a "woodsrun" basis.

Table 1. Forest Service standard grades for hardwood factory lumber logs.[a]

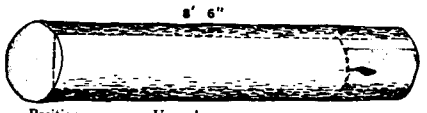
Grading Factors		Log grades							
		F1			F2				F3
Position in tree		Butts only	Butts & uppers		Butts & uppers				Butts & uppers
Scaling diameter, inches		13-15[b]	16-19	20+	11+[c]	12+			8+
Length without trim, feet		10+			10+	8-9	10-11	12+	8+
Required clear cuttings[d] of each of 3 best faces[e]	Min. length, feet	7	5	3	3	3	3	3	2
	Max. number	2	2	2	2	2	2	3	No limit
	Min. proportion of log length required in clear cutting	5/6	5/6	5/6	2/3	3/4	2/3	2/3	1/2
Maximum sweep & crook allowance	For logs with less than 1/4 of end in sound defects	15%			30%				50%
	For logs with more than 1/4 of end in sound defects	10%			20%				35%
Maximum scaling deduction		40%[f]			50%[g]				50%
End defect:		See special instructions							

[a] From USDA Forest Service Research Paper FPL-63
[b] Ash and basswood butts can be 12 inches if they otherwise meet requirements for small #1's.
[c] Ten-inch logs of all species can be #2 if they otherwise meet requirements for small #1's.
[d] A clear cutting is a portion of a face, extending the width of the face, that is free of defects.
[e] A face is 1/4 of the surface of the log as divided lengthwise.
[f] Otherwise #1 logs with 41-60% deductions can be #2.
[g] Otherwise #2 logs with 51-60% deductions can be #3.

Only the basics of grading hardwood factory lumber logs are covered in Table 1. For additional information on this subject and other log grades, single copies of "A Guide to Hardwood Log Grading" may be obtained by writing:

Northeastern Forest Experiment Station
U.S.D.A. — Forest Service
Upper Darby, Pennsylvania

Figure 1 is an example of a hardwood factory grade 1 log.



Position ..... Upper log
Size ..... Length 10', diameter 16" at small end
Straightness ..... Straight
Soundness ..... Sound
Cuttings ..... More than 5/6 of its grading-face length is clear in one section 8 feet 6 inches long

Practices In Minnesota

The Scribner Decimal C Log Rule (table 2) is the accepted grading standard in Minnesota, although some veneer class logs may be graded under the International 1/4-Inch Rule. Table 3 gives the board footage of wood found in logs of varying diameter and length. These figures are based on the Scribner Rule.

Special studies[1] of the elm situation in the Twin Cities area have yielded information which indicates many sawmills are willing to pay $40 per thousand board feet (MBF) at the sorting yard for "woodsrun" logs, provided they are well prepared and metal free. However, slightly higher prices may be realized for better quality logs (table 3). Metal in logs has become a real problem in many of the trees being removed from populated areas. Some loggers have resorted to jump-cutting the butt log on city elm trees at a height of 6 to 8 feet above the ground in hopes of eliminating the metal problem. Special metal detection equipment may be used on sawlogs.

[1] "Dutch Elm and Oak Wilt Diseases in the Twin City Metropolitan Area" September, 1976. Prepared for the Metropolitan Inter-County Council, St. Paul, Minnesota by National Biocentric, Inc., St. Paul, Minnesota.

Table 2. Scribner Decimal C Log Rule

Diameter (Inches)	Volume (board feet) according to length of log, in feet					
	6	8	10	12	14	16
7	5	10	10	20	20	30
8	10	10	20	20	20	30
9	10	20	30	30	30	40
10	20	30	30	30	40	60
11	20	30	40	40	50	70
12	30	40	50	60	70	80
13	40	50	60	70	80	100
14	40	60	70	90	100	110
15	50	70	90	110	120	140
16	60	80	100	120	140	160
17	70	90	120	140	160	180
18	80	110	130	160	190	210
19	90	120	150	180	210	240
20	110	140	170	210	240	280
21	120	150	190	230	270	300
22	130	170	210	250	290	330
23	140	190	230	280	330	380
24	150	210	250	300	350	400
25	170	230	290	340	400	460
26	190	250	310	370	440	500
27	210	270	340	410	480	550
28	220	290	360	440	510	580
29	230	310	380	460	530	610
30	250	330	410	490	570	660
31	270	360	440	530	620	710
32	280	370	460	550	640	740
33	290	390	490	590	690	780
34	300	400	500	600	700	800
35	330	440	550	660	770	880
36	350	460	580	690	810	920

Table 3. Sorting classifications for saw logs and associated prices (logs delivered to landings or sorting yards)

Product	Specifications	Price per MBF	
		Oak	Elm
Saw bolts	8"-11" in diameter	$ 45	$ 40
Saw logs	13"-15" and up		
	Factory #1	$ 80	$ 65
	#2	$ 60	$ 45
	#3	$ 45	$ 40
Veneer logs	14" and up prime grade	$215	$135

A brief check of buying practices for elm logs in Minnesota yielded the following information:

1. Some mills can take logs down to 7 feet 4 inches for pallet stock.
2. Most mills wanted logs at least 11 or 12 inches in diameter with 6 to 8 inches of trim allowance. (No shake and sound center required.)
3. Log lengths of 8, 10, 12, 14, and 16 feet were commonly requested (plus trim allowances). Logs of good quality in the 12-, 14-, and 16-foot lengths may bring higher prices.
4. In the case of elm, the presence of ring shake in many logs makes overlength even more desirable.
5. There is a demand for 13- and 14-foot logs for switch ties.
6. Landscape ties 6 inches by 8 inches by 8 feet 6 inches can be manufactured from some logs that cannot be used for railroad ties.
7. A prospective seller of sawlogs should contact local mills for log specifications prior to cutting the trees.

A Final Note — Sanitation

Dead and dying elm trees must be handled effectively so they do not become breeding sites for elm bark beetles or lead to further spread of Dutch elm disease. Trees cut between September 15 and March 15 may be stored with the bark on, but material held after March 15 must either be debarked or disposed of in an approved manner. This is true whether the tree from which the log was cut has had Dutch elm disease or not. For the period March 15 to September 15, diseased elm logs must be utilized or properly disposed of within 5-30 days (depending on state law and local ordinance). If the bark is removed, these logs then may be stored indefinitely.

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