

**TREE VOLUME TABLES
FOR MOLUCCANA
(PARASERIANTHES FALCATARIA
SYN. ALBIZIA FALCATARIA
SYN. A. MOLUCCANA)
IN BANGLADESH**

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tables.

LIST OF ABBREVIATIONS

BFRI	- Bangladesh Forest Research Institute
cm	- centimetre (also CM)
dbh	- tree diameter measured at breast height (1.3m above ground)
D	- tree diameter at breast height in centimetres = dbh
DF	- Degrees of Freedom
e	- base for natural logarithms = 2.7183
F	- conversion factor to be applied to total volume to arrive at merchantable volume
H	- total height in metres = HT
ha	- hectare
HT	- total tree height in metres = H
ln	- logarithm to the base e
MS	- Mean Square
m	- metres
m^3	- cubic metres
OB	- over bark (also ob)
SS	- Sums of Squares
UB	- under bark (also ub)
VF	- Variance Ratio
V	- total tree volume in cubic metres (over bark)

TABLE OF CONTENTS

	<u>Page</u>
SPECIAL ACKNOWLEDGEMENTS	ii
LIST OF ABBREVIATIONS	iii
1. INTRODUCTION	1
2. COLLECTION OF DATA	2
3. COMPILATION OF DATA	4
4. COMPUTATION OF VOLUME FUNCTION	4
5. STAND TABLE	5
6. CONFIDENCE LIMITS	7
7. THE VOLUME FUNCTION	7
8. CONVERSION FACTORS	8
9. JUSTIFICATION OF THE TABLES	9
10. ACKNOWLEDGEMENTS	9
11. REFERENCES	9

LIST OF TABLES

1. <u>Paraserianthes falcataria</u> - List of Trees for Volume Compilation	3
2. Parameters of the Regression Models Tested	5
3. Falcataria - Stand Table	6
4. Falcataria - Conversion Factors	11
5. Falcataria - Total Volume Overbark (CU M) Based on Diameter (CM) and Height (M)	12
6. Falcataria - Total Volume Overbark (CU M) Based on Girth (CM) and Height (M)	13
7. Falcataria - Total Volume Overbark (CU FT) Based on Diameter (IN) and Height (FT)	14
8. Falcataria - Total Volume Overbark (CU FT) Based on Girth (IN) and Height (FT)	15

INTRODUCTION

LIST OF FIGURES

	<u>Page</u>
1. Known Natural Distribution of <u>Paraserianthes falcataria</u>	2

1. INTRODUCTION

For the past decade the fast-growing exotic tree Paraserianthes falcataria (Moluccana) has been grown extensively in the Sylhet Forest Division of Bangladesh mainly for pulpwood. The species is also good for veneer manufacture. The wood is of very low density and is a very poor fuelwood.

The taxonomy of the species has been complicated by use of a number of names and by name changes (Clypearia alba 1743; Adenanthera falcataria 1762; Albizia moluccana 1855; Albizia falcata 1908; Albizia fulva 1925; Albizia eymae 1965; Albizia falcataria 1965 and Paraserianthes falcataria 1983). Synonomy is as follows:

Paraserianthes falcataria (L.) Nielsen -

Bull. Mus. natn. Hist. nat., Paris, 4th ser., sect. B. Adansonia 5 (3): 327 (1983).

- Adenanthera falcataria L., Sp. Pl., ed. 2 : 550 (1762).
- Albizia falcataria (L.) Fosberg. Reinwardtia 7 : 88 (1965); VERDC., Man. N.G. Legum : 182 (1979); KOSTERM., Ceyl. J. Sci. (Biol. Sci.) 13 (1-2) : 256 (1979); Rev. Handb. Fl. Ceylon 1 : 503 (1980).
- A. moluccana MIQ., Fl. Ind. Bot. 1 : 26 (1855) : KOORD., Meded. Lands Plantentuin 19 : 419 (1998); Exk. Fl. Java 2 : 358 (1912); Atlas Baumart. 1 : fig. 8 (1913) : GIBBS. Arfak : 211 (1917); type : "Poon Sikat der inlanders" Banda (holo-, L.).
- A. fulva LANE-POOLE, Rep. For. Res. Terr. Papua N. Guinea : 91 (1925): WHITE & FRANCIS. Proc. Roy. Soc. Queensl. 36 : 250 (1927) : FOSBERG Reinwardtia 7 : 86 (1965): VERDC., Man. N.G. Legum. : 184 (1979); type: Lane-Poole 263, New. Guinea, trail from Kokoda to the Gap (holo-, BRI: iso-, K), syn. nov.
- A. eymae FOSBERG, Reinwardtia 7 : 87 (1965); type: Eymae 5438, New Guinea, W. Irian. Wissel Lake region (holo-, BO; iso-, K, L.).
- Albizia falcata sensu BACKER, Voorl. Schoolfl. Java : 109 (1908): Schoolfl. Java : 437 (1911): Bekn. Fl. Java. ed. 5 : 10 (1940) : BACK & BAKU. f., Fl. Java 1 : 553 (1963); MERR. Int. Rumph. : 249 (1917): MERR. & PERRY. Journ. Arn. Arb. 23 : 395 (1942) : WHITMORE. Guide For. Brit. Solom. Isl. For. Rec. 2 : 81 (1966) : Tréefl. Mal. 1 : 277, figs. 2.13 (1972); BURK Dict. (ed. 2) : 85 (1966).

Type : Clypearia alba Rumphius, Herb. Amb. 3 : 176, tab. III (1743).

The common name in Bangladesh is the 1855 species name - Moluccana. Elsewhere the common name used is Falcataria.

There are recognized now three sub-species (Nielsen et al 1983) - subsp. falcatoria (Nielsen) from the Moluccas and New Guinea, from sea-level to 1 600 m; the taxon planted in Bangladesh.

subsp. solomonensis (Nielsen) from some small offshore islands north of Papua New Guinea, Admiralty Is, Solomon Islands and Bismarck Archipelago, from sea-level to 600 m.

and subsp. fulva (Lane-Poole) Nielsen from the central mountains of New Guinea from about 1 250 to 2 300 m altitude.

Natural distribution of these taxa is shown on the map (Fig. 1). Further information on the nomenclature of this species is available in Kostermans (1979) and Nielsen et al (1983 a, b).



FIGURE 1 : Known natural distribution of Parasarianthes falcatoria (L.) Nielsen. ● subsp. falcatoria, ▲ subsp. fulva, ■ subsp. solomonensis. Black arrows indicate transitional forms between subsp. falcatoria and fulva. White arrows indicate transitional forms between subsp. falcatoria and solomonensis. These volume tables are for subsp. falcatoria of undetermined origin, grown in Bangladesh.

2. COLLECTION OF DATA

Data were collected in 1983 from 343 standing trees located mainly at Satgaon and Lawachara and of age 4 to 11 years (Table 1).

Diameter measurements overbark and underbark (with bark gauge) were made at breast height and at one metre intervals from ground level up the trunk and main branches as far as could be reached by climbing standing trees.

These data were sent to the Unit of Tropical Silviculture, Oxford Forestry Institute, Oxford, England, for computer compilation and fitting of regressions.

TABLE 1 PARASERIANTHES FALCATARIA
LIST OF TREES FOR VOLUME TABLE COMPILATION

<u>Place</u>	<u>Year Planted</u>	<u>Plot No.</u>	<u>No. of Trees</u>
Lawachara	1980	1	30
Lawachara	1979	2	24
Lawachara	1978	3	17
Lawachara	1978	4	18
Lawachara	1977	5	16
Lawachara	1976	6	18
Lawachara	1975	7	19
Lawachara	1974	8	15
BFRI HQ	1972	9	18
Satgaon	1976	10	11
Satgaon	1977	11	16
Satgaon	1978	12	16
Satgaon	1978	13	16
Satgaon	1979	14	30*
Satgaon	1979	15	11
Satgaon	1979	16	18
Satgaon	1979	17	28
Satgaon	1980	18	22
TOTAL			343

All were at 8 x 8' (2.4 x 2.4m) spacing initially, except the plot indicated by an asterisk which was at 6 x 6' (1.6 x 1.6m). All plots were in the same area in the Sylhet District at two sites, except the BFRI plot which was at Chittagong.

3. COMPIRATION OF DATA

Total stem volumes were computed by sectional method, summing the volume for each one-metre long billet.

In addition to the primary variables of Volume (V), Diameter at breast height (D) and total Height (H), various functions and ratios of these variables (D^2 , $1/D$, $1/D^2$, Log (V), Log (D), DH, D^2H , V/D^2H , $1/DH$, $1/D^2H$, H/D^2 , H/D , and Log (H) were derived to provide additional variables for testing in regression analyses.

4. COMPUTATION OF VOLUME FUNCTION

Fifteen regression models were tried for best fit using the different variables as follows:

1. $V = a + bD$
2. $V = a + bD + cD^2$
3. $V = a + bD^2$
4. $V = a + bD^2H$
5. $V = a + bD^2 + cH + bD^2H$
6. $V = a + bD^2 + cDH + bD^2H$
7. $\ln(V) = a + b \ln(D)$
8. $V/D^2 = a + b/D^2 + c/D$
10. $V/D^2 = a + b/D$
11. $V/D^2H = a + b/D^2H$
12. $V/D^2H = a + b/D^2 + cH/D^2 + dH$
13. $V/D^2H = a + b/D^2H = c/H + d/D^2$
14. $V/D^2 = b/D^2 + cH/D + dH$
15. $V/D^2H = a + b/D^2H + c/H + d/D$

Where V, D and H are as described above, a is the regression constant and b, c and d are regression coefficients. The logarithmic functions are to the base e (natural logarithms).

The regression model of best fit was chosen by reference to various parameters describing the regressions (Table 2) including lowest furnival index, high multiple correlation coefficient, and low standard deviation. Model No. 8 was best.

5. STAND TABLE

All 343 trees were used in developing the volume over bark function, with diameter and height class distribution as shown in Table 3. Since all the computer generated volume tables have the same format, in some tables few to many values shown will be well outside the range of the original data boundaries.

Extrapolation in the volume tables much outside the range of height and diameter shown in the stand table should only be done with caution.

TABLE 2. PARAMETERS OF THE REGRESSION MODELS TESTED

Model Number	Multiple Correlation Coefficient R	R ²	Standard Deviation %	Variance Ratio VF	Furnival Index
1	0.918	0.843	63.5	1 836.3	0.0606
2	0.982	0.964	30.3	4 613.3	0.0289
3	0.980	0.961	31.7	8 387.5	0.0303
4	0.984	0.968	28.8	10 236.7	0.0275
5	0.987	0.973	26.2	4 146.2	0.0250
6	0.987	0.973	26.2	4 149.1	0.0250
7	0.944	0.892	12.8	2 804.7	0.0177
8	0.965	0.932	10.2	2 321.5	0.0141*
9	0.948	0.898	74.5	1 497.7	0.0398
10	0.836	0.698	128.1	788.3	0.0683
11	0.474	0.224	169.6	98.6	0.0871
12	0.991	0.982	31.3	6 198.1	0.0167
13	0.983	0.966	35.7	3 188.8	0.0183
14	0.936	0.875	82.5	793.9	0.0440
15	0.837	0.701	105.6	264.8	0.0542

* Regression model of best fit (lowest standard deviation % and lowest furnival index).

TABLE 3. FALCATARIA STAND TABLE - HEIGHT AND DIAMETER CLASS DISTRIBUTION OF SAMPLE TREES

DIAMETER	HEIGHT CLASSES										TOTAL	
	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0		
6.0	5	57	46	5	1	0	0	0	0	0	0	115
12.0	1	0	5	54	42	23	6	2	0	0	0	132
18.0	0	0	1	1	4	32	11	4	0	0	0	53
24.0	0	0	0	0	0	1	8	16	1	0	0	26
30.0	0	0	0	0	0	1	4	3	1	0	0	9
36.0	0	0	0	0	0	1	1	1	1	0	0	4
42.0	0	0	0	0	0	0	1	1	1	0	0	0
48.0	0	0	0	0	0	0	0	0	0	0	0	0
GT 51.0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	6	63	101	51	59	31	27	4	1	0	0	343

6. CONFIDENCE LIMITS

Confidence limits at the 95% level have been derived for the total volume over bark tables only; these limits do not apply to individual trees but to all trees of the particular diameter and height. These volume tables should not be used to determine volumes of individual trees in a stand. The mean height and diameter of the stand should be calculated first, then the means found in the table in order to derive the mean tree volume, which would be multiplied by the number of stems/ha to arrive at volume/ha.

7. THE VOLUME FUNCTION

Total volume overbark

The best function was the logarithmic one -

$$\checkmark \ln V = -8.9942 + 1.4963 \ln D + 1.1461 \ln H$$

where D is dbh in cm

H is total height in m

V is total volume over bark in m^3

using logarithms to the base e.

An analysis of variance for this volume function is given below:

ANALYSIS OF VARIANCE

DUE TO	DF	SS	MS	VF
REGRESSION	2	4.67860E+02	2.33930E+02	2321.51
RESIDUAL	340	3.42606E+01	1.00766E-01	
TOTAL	342	5.02121E+02		

8. CONVERSION FACTORS

Conversion factors (F) were computed to be applied to total volume overbark for deriving total volume underbark and merchantable volume to various top end diameter limits. A table of conversion factors has been included (Table 4). All factors are predicted from diameter (D).

Underbark/overbark

This factor is derived from an exponential function

$$F = 0.9130 - 0.6636e^{-0.3401D}$$

5 cm top diameter limit

~~Dia.~~ $F = 1.0049 - 28.503D^{-2.256}$ to a maximum D of 46 cm after which a constant ratio of 1.000 should be used.

10 cm top diameter limit

$$F = 0.9781 (1 - e^{-0.2838D})^{84.591}$$

15 cm top diameter limit

$$F = 0.9352 (1 - e^{-0.2742D})^{244.88}$$

20 cm top diameter limit

$$F = 0.9329 (1 - e^{-0.2313D})^{502.64}$$

Branchwood volume

$$F = 0.2803 (1 - e^{-0.02435D})^{1.831}$$

The functions for 15 cm and 20 cm were based on 54 and 21 trees respectively. Of the 343 trees 81 had branchwood volume.

9. JUSTIFICATION OF THE TABLES

It will be noted from the stand table that the volume regression was based mainly on small trees, because of the young age of the stands when sampled in 1983 (Das 1984). Because of this, an additional sample of 47 larger trees was felled in the Lawachara Silvicultural Research Station in November, 1985 to improve the precision of the regression for larger diameters.

Since girth and imperial measurements are still used, additional regressions and tables have been generated to allow their use until metric conversion is complete.

A guide for using tables such as these was presented by Choudhury and Davidson (1984). The additional regressions are:

Metric Units (Girth):

$$\ln(V) = 1.4963 \ln(G) + 1.1461 \ln(H) - 10.707106$$

Imperial Units (Diameter):

$$\ln(V) = 1.4963 \ln D + 1.1461 \ln(H) - 5.396746$$

Imperial Units (Girth):

$$\ln(V) = 1.4963 \ln(G) + 1.1461 \ln(H) - 7.1096$$

10. ACKNOWLEDGEMENTS

The DFO Silviculture Research Division, BFRI and the DFO Sylhet Forest Division are thanked for allowing the sample trees to be felled at Lawachara.

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5 (4) : 335 - 360.

TABLE 4. FALCATARIA CONVERSION FACTORS (Note: These factors can also be applied to the direct equivalents in imperial measure)

DBH (CM)	JB:OB	5 CM	10 CM	15 CM	20 CM	BRANCH
5.000	0.792	0.250				0.005
6.000	0.827	0.504				0.007
7.000	0.852	0.651				0.009
8.000	0.869	0.743				0.012
9.000	0.882	0.804				0.014
10.000	0.891	0.847	0.006			0.017
11.000	0.897	0.877	0.022			0.020
12.000	0.902	0.900	0.056			0.023
13.000	0.905	0.917	0.115			0.026
14.000	0.907	0.931	0.196			0.029
15.000	0.909	0.942	0.293	0.016		0.032
16.000	0.910	0.950	0.395	0.044		0.035
17.000	0.911	0.957	0.495	0.091		0.039
18.000	0.912	0.963	0.586	0.160		0.042
19.000	0.912	0.968	0.665	0.245		0.045
20.000	0.912	0.972	0.732	0.338	0.007	0.049
21.000	0.912	0.975	0.786	0.431	0.018	0.052
22.000	0.913	0.978	0.830	0.519	0.042	0.056
23.000	0.913	0.981	0.864	0.598	0.079	0.059
24.000	0.913	0.983	0.891	0.666	0.132	0.063
25.000	0.913	0.985	0.912	0.722	0.198	0.067
26.000	0.913	0.987	0.928	0.769	0.273	0.070
27.000	0.913	0.988	0.940	0.806	0.352	0.074
28.000	0.913	0.989	0.949	0.835	0.430	0.077
29.000	0.913	0.991	0.956	0.858	0.505	0.081
30.000	0.913	0.992	0.962	0.876	0.573	0.084
31.000	0.913	0.993	0.966	0.890	0.634	0.088
32.000	0.913	0.993	0.969	0.900	0.686	0.091
33.000	0.913	0.994	0.971	0.909	0.731	0.095
34.000	0.913	0.995	0.973	0.915	0.769	0.098
35.000	0.913	0.996	0.974	0.920	0.800	0.101
36.000	0.913	0.996	0.975	0.923	0.826	0.105
37.000	0.913	0.997	0.976	0.926	0.847	0.108
38.000	0.913	0.997	0.976	0.928	0.864	0.111
39.000	0.913	0.998	0.977	0.930	0.878	0.114
40.000	0.913	0.998	0.977	0.931	0.889	0.118
41.000	0.913	0.998	0.977	0.932	0.898	0.121
42.000	0.913	0.999	0.978	0.933	0.905	0.124
43.000	0.913	0.999	0.978	0.933	0.911	0.127
44.000	0.913	0.999	0.978	0.934	0.915	0.130
45.000	0.913	1.000	0.978	0.934	0.919	0.133
46.000	0.913	1.000	0.978	0.934	0.922	0.136
47.000	0.913		0.978	0.935	0.924	0.139
48.000	0.913		0.978	0.935	0.926	0.142
49.000	0.913		0.978	0.935	0.927	0.145
50.000	0.913		0.978	0.935	0.928	0.147

TABLE 5. FALCATORIA - TOTAL VOLUME OVERTBARK (CU M) BASED ON DIAMETER (CM)
AND HEIGHT (M)

DBH(cm)	HEIGHT IN METRE															
	5.00	7.00	9.00	11.00	13.00	15.00	17.00	19.00	21.00	23.00	25.00	27.00	29.00	31.00	33.00	35.00
5.00	0.01	0.01	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.06	0.06	0.07	0.07	0.08	0.08
6.00	0.01	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.07	0.08	0.09	0.09	0.10	0.11
7.00	0.01	0.02	0.03	0.04	0.04	0.05	0.06	0.07	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.13
8.00	0.02	0.03	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16
9.00	0.02	0.03	0.04	0.05	0.06	0.07	0.09	0.10	0.11	0.12	0.13	0.15	0.16	0.17	0.18	0.20
10.00	0.02	0.04	0.05	0.06	0.07	0.09	0.10	0.11	0.13	0.14	0.16	0.17	0.18	0.20	0.21	0.23
11.00	0.03	0.04	0.06	0.07	0.08	0.10	0.12	0.13	0.15	0.16	0.18	0.20	0.21	0.23	0.25	0.26
12.00	0.03	0.05	0.06	0.08	0.10	0.11	0.13	0.15	0.17	0.19	0.20	0.22	0.24	0.26	0.28	0.30
13.00	0.04	0.05	0.07	0.09	0.11	0.13	0.15	0.17	0.19	0.21	0.23	0.25	0.27	0.30	0.32	0.34
14.00	0.04	0.06	0.08	0.10	0.12	0.14	0.17	0.19	0.21	0.23	0.26	0.28	0.31	0.33	0.35	0.38
15.00	0.05	0.07	0.09	0.11	0.13	0.16	0.18	0.21	0.23	0.26	0.29	0.31	0.34	0.37	0.39	0.42
16.00	0.05	0.07	0.10	0.12	0.15	0.18	0.20	0.23	0.26	0.29	0.31	0.34	0.37	0.40	0.43	0.46
17.00	0.05	0.08	0.11	0.13	0.16	0.19	0.22	0.25	0.28	0.31	0.34	0.38	0.41	0.44	0.47	0.51
18.00	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.31	0.34	0.38	0.41	0.44	0.48	0.52	0.55
19.00	0.06	0.09	0.13	0.16	0.19	0.23	0.26	0.30	0.33	0.37	0.41	0.44	0.48	0.52	0.56	0.60
20.00	0.07	0.10	0.14	0.17	0.21	0.24	0.28	0.32	0.36	0.40	0.44	0.48	0.52	0.56	0.60	0.65
21.00	0.07	0.11	0.15	0.18	0.22	0.26	0.30	0.35	0.39	0.43	0.47	0.52	0.56	0.60	0.65	0.69
22.00	0.08	0.12	0.16	0.20	0.24	0.28	0.33	0.37	0.41	0.46	0.51	0.55	0.60	0.65	0.70	0.75
23.00	0.09	0.13	0.17	0.21	0.26	0.30	0.35	0.40	0.44	0.49	0.54	0.59	0.64	0.69	0.74	0.80
24.00	0.09	0.13	0.18	0.23	0.27	0.32	0.37	0.42	0.47	0.52	0.58	0.63	0.68	0.74	0.79	0.85
25.00	0.10	0.14	0.19	0.24	0.29	0.34	0.39	0.45	0.50	0.56	0.61	0.67	0.73	0.78	0.84	0.90
26.00	0.10	0.15	0.20	0.25	0.31	0.36	0.42	0.47	0.53	0.59	0.65	0.71	0.77	0.83	0.89	0.96
27.00	0.11	0.16	0.21	0.27	0.33	0.38	0.44	0.50	0.56	0.63	0.69	0.75	0.82	0.88	0.95	1.01
28.00	0.11	0.17	0.23	0.28	0.34	0.40	0.47	0.53	0.60	0.66	0.73	0.79	0.86	0.93	1.00	1.07
29.00	0.12	0.18	0.24	0.30	0.36	0.43	0.49	0.56	0.63	0.70	0.77	0.84	0.91	0.98	1.05	1.13
30.00	0.13	0.19	0.25	0.31	0.38	0.45	0.52	0.59	0.66	0.73	0.81	0.88	0.96	1.03	1.11	1.18
31.00	0.13	0.20	0.26	0.33	0.40	0.47	0.54	0.62	0.69	0.77	0.85	0.92	1.00	1.08	1.16	1.24
32.00	0.14	0.21	0.28	0.35	0.42	0.49	0.57	0.65	0.73	0.81	0.89	0.97	1.05	1.14	1.22	1.31
33.00	0.15	0.22	0.29	0.36	0.44	0.52	0.60	0.68	0.76	0.84	0.93	1.02	1.10	1.19	1.28	1.37
34.00	0.15	0.23	0.30	0.38	0.46	0.54	0.62	0.71	0.80	0.88	0.97	1.06	1.15	1.24	1.34	1.43
35.00	0.16	0.24	0.31	0.40	0.48	0.57	0.65	0.74	0.83	0.92	1.01	1.11	1.20	1.30	1.40	1.49
36.00	0.17	0.25	0.33	0.41	0.50	0.59	0.68	0.77	0.87	0.96	1.06	1.16	1.25	1.35	1.46	1.56
37.00	0.17	0.26	0.34	0.43	0.52	0.61	0.71	0.81	0.90	1.00	1.10	1.20	1.31	1.41	1.52	1.62
38.00	0.18	0.27	0.36	0.45	0.54	0.64	0.74	0.84	0.94	1.04	1.15	1.25	1.36	1.47	1.58	1.69
39.00	0.19	0.28	0.37	0.47	0.56	0.66	0.77	0.87	0.98	1.08	1.19	1.30	1.41	1.53	1.64	1.75
40.00	0.20	0.29	0.38	0.48	0.59	0.69	0.80	0.90	1.01	1.13	1.24	1.35	1.47	1.59	1.70	1.82
41.00	0.20	0.30	0.40	0.50	0.61	0.72	0.83	0.94	1.05	1.17	1.29	1.40	1.52	1.65	1.77	1.89
42.00	0.21	0.31	0.41	0.52	0.63	0.74	0.86	0.97	1.09	1.21	1.33	1.46	1.58	1.71	1.83	1.96
43.00	0.22	0.32	0.43	0.54	0.65	0.77	0.89	1.01	1.13	1.26	1.38	1.51	1.64	1.77	1.90	2.03
44.00	0.23	0.33	0.44	0.56	0.68	0.80	0.92	1.04	1.17	1.30	1.43	1.56	1.69	1.83	1.96	2.10
45.00	0.24	0.34	0.46	0.58	0.70	0.82	0.95	1.08	1.21	1.34	1.48	1.61	1.75	1.89	2.03	2.17
46.00	0.24	0.36	0.47	0.60	0.72	0.83	0.98	1.12	1.25	1.39	1.53	1.67	1.81	1.95	2.10	2.25
47.00	0.25	0.37	0.47	0.62	0.75	0.88	1.01	1.15	1.29	1.43	1.58	1.72	1.87	2.02	2.17	2.32
48.00	0.26	0.38	0.50	0.64	0.77	0.91	1.05	1.19	1.33	1.48	1.63	1.78	1.93	2.08	2.24	2.39
49.00	0.27	0.39	0.57	0.66	0.79	0.93	1.08	1.23	1.37	1.53	1.68	1.83	1.99	2.15	2.31	2.47
50.00	0.27	0.40	0.54	0.68	0.82	0.96	1.11	1.26	1.42	1.57	1.73	1.89	2.05	2.21	2.38	2.54

TABLE 5. FALCATARIA - TOTAL VOLUME OVERBARK (CU M) BASED ON DIAMETER (CM)
AND HEIGHT (M)

DBH(cm)	HEIGHT IN METRE															
	5.00	7.00	9.00	11.00	13.00	15.00	17.00	19.00	21.00	23.00	25.00	27.00	29.00	31.00	33.00	35.00
5.00	0.01	0.01	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.06	0.06	0.07	0.07	0.08	0.08
6.00	0.01	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.07	0.08	0.09	0.09	0.10	0.11
7.00	0.01	0.02	0.03	0.04	0.04	0.05	0.06	0.07	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14
8.00	0.02	0.03	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16
9.00	0.02	0.03	0.04	0.05	0.06	0.07	0.09	0.10	0.11	0.12	0.13	0.15	0.16	0.17	0.18	0.20
10.00	0.02	0.04	0.05	0.06	0.07	0.09	0.10	0.11	0.13	0.14	0.16	0.17	0.18	0.20	0.21	0.23
11.00	0.03	0.04	0.06	0.07	0.08	0.10	0.12	0.13	0.15	0.16	0.18	0.20	0.21	0.23	0.25	0.26
12.00	0.03	0.05	0.06	0.08	0.10	0.11	0.13	0.15	0.17	0.19	0.20	0.22	0.24	0.26	0.28	0.30
13.00	0.04	0.05	0.07	0.09	0.11	0.13	0.15	0.17	0.19	0.21	0.23	0.25	0.27	0.30	0.32	0.34
14.00	0.04	0.06	0.08	0.10	0.12	0.14	0.17	0.19	0.21	0.23	0.26	0.28	0.31	0.33	0.35	0.38
15.00	0.05	0.07	0.09	0.11	0.13	0.16	0.18	0.21	0.23	0.26	0.29	0.31	0.34	0.37	0.39	0.42
16.00	0.05	0.07	0.10	0.12	0.15	0.18	0.20	0.23	0.26	0.29	0.31	0.34	0.37	0.40	0.43	0.46
17.00	0.05	0.08	0.11	0.13	0.16	0.19	0.22	0.25	0.28	0.31	0.34	0.38	0.41	0.44	0.47	0.51
18.00	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.31	0.34	0.38	0.41	0.44	0.48	0.52	0.55
19.00	0.06	0.09	0.13	0.16	0.19	0.23	0.26	0.30	0.33	0.37	0.41	0.44	0.48	0.52	0.56	0.60
20.00	0.07	0.10	0.14	0.17	0.21	0.24	0.28	0.32	0.36	0.40	0.44	0.48	0.52	0.56	0.60	0.65
21.00	0.07	0.11	0.15	0.18	0.22	0.26	0.30	0.35	0.39	0.43	0.47	0.52	0.56	0.60	0.65	0.75
22.00	0.08	0.12	0.16	0.20	0.24	0.28	0.33	0.37	0.41	0.46	0.51	0.55	0.60	0.65	0.70	0.80
23.00	0.09	0.13	0.17	0.21	0.26	0.30	0.35	0.40	0.44	0.49	0.54	0.59	0.64	0.69	0.74	0.85
24.00	0.09	0.13	0.18	0.23	0.27	0.32	0.37	0.42	0.47	0.52	0.58	0.63	0.68	0.74	0.79	0.80
25.00	0.10	0.14	0.19	0.24	0.29	0.34	0.39	0.45	0.50	0.56	0.61	0.67	0.73	0.78	0.84	0.90
26.00	0.10	0.15	0.20	0.25	0.31	0.36	0.42	0.47	0.53	0.59	0.65	0.71	0.77	0.83	0.89	0.96
27.00	0.11	0.16	0.21	0.27	0.33	0.38	0.44	0.50	0.56	0.63	0.69	0.75	0.82	0.88	0.95	1.01
28.00	0.11	0.17	0.23	0.28	0.34	0.40	0.47	0.53	0.60	0.66	0.73	0.79	0.86	0.93	1.00	1.07
29.00	0.12	0.18	0.24	0.30	0.36	0.43	0.49	0.56	0.63	0.70	0.77	0.84	0.91	0.98	1.05	1.13
30.00	0.13	0.19	0.25	0.31	0.38	0.45	0.52	0.59	0.66	0.73	0.81	0.88	0.96	1.03	1.11	1.18
31.00	0.13	0.20	0.26	0.33	0.40	0.47	0.54	0.62	0.69	0.77	0.85	0.92	1.00	1.08	1.16	1.24
32.00	0.14	0.21	0.28	0.35	0.42	0.49	0.57	0.65	0.73	0.81	0.89	0.97	1.05	1.14	1.22	1.31
33.00	0.15	0.22	0.29	0.36	0.44	0.52	0.60	0.68	0.76	0.84	0.93	1.02	1.10	1.19	1.28	1.37
34.00	0.15	0.23	0.30	0.38	0.46	0.54	0.62	0.71	0.80	0.88	0.97	1.06	1.15	1.24	1.34	1.43
35.00	0.16	0.24	0.31	0.40	0.48	0.57	0.65	0.74	0.83	0.92	1.01	1.11	1.20	1.30	1.40	1.49
36.00	0.17	0.25	0.33	0.41	0.50	0.59	0.68	0.77	0.87	0.96	1.06	1.16	1.25	1.35	1.46	1.56
37.00	0.17	0.26	0.34	0.43	0.52	0.61	0.71	0.81	0.90	1.00	1.10	1.20	1.31	1.41	1.52	1.62
38.00	0.18	0.27	0.36	0.45	0.54	0.64	0.74	0.84	0.94	1.04	1.15	1.25	1.36	1.47	1.58	1.69
39.00	0.19	0.28	0.37	0.47	0.56	0.66	0.77	0.87	0.98	1.08	1.19	1.30	1.41	1.53	1.64	1.75
40.00	0.20	0.29	0.38	0.48	0.59	0.69	0.80	0.90	1.01	1.13	1.24	1.35	1.47	1.59	1.70	1.82
41.00	0.20	0.30	0.40	0.50	0.61	0.72	0.83	0.94	1.05	1.17	1.29	1.40	1.52	1.65	1.77	1.89
42.00	0.21	0.31	0.41	0.52	0.63	0.74	0.86	0.97	1.09	1.21	1.33	1.46	1.58	1.71	1.83	1.96
43.00	0.22	0.32	0.43	0.54	0.65	0.77	0.89	1.01	1.13	1.26	1.38	1.51	1.64	1.77	1.90	2.03
44.00	0.23	0.33	0.44	0.56	0.68	0.80	0.92	1.04	1.17	1.30	1.43	1.56	1.69	1.83	1.96	2.10
45.00	0.2	0.34	0.46	0.58	0.70	0.82	0.95	1.08	1.21	1.34	1.48	1.61	1.75	1.89	2.03	2.17
46.00	0.24	0.36	0.47	0.60	0.72	0.81	0.98	1.12	1.25	1.39	1.53	1.67	1.81	1.95	2.10	2.25
47.00	0.25	0.37	0.47	0.62	0.75	0.88	1.01	1.15	1.29	1.43	1.58	1.72	1.87	2.02	2.17	2.32
48.00	0.26	0.38	0.50	0.64	0.77	0.91	1.05	1.19	1.33	1.48	1.63	1.78	1.93	2.08	2.24	2.39
49.00	0.27	0.39	0.57	0.66	0.79	0.93	1.08	1.23	1.37	1.53	1.68	1.83	1.99	2.15	2.31	2.47

TABLE 6. TOTAL VOLUME OVERBARK (CU M) BASED ON GIRTH (CM) AND
HEIGHT (M)

GBH(cm)	HEIGHT IN METRE															
	5.00	7.00	9.00	11.00	13.00	15.00	17.00	19.00	21.00	23.00	25.00	27.00	29.00	31.00	33.00	35.00
6.00	.00	.00	.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02
8.00	.00	.00	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03
10.00	.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.04
12.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.05
14.00	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.06	0.06	0.06	0.07
16.00	0.01	0.01	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.06	0.06	0.07	0.07	0.08	0.08
18.00	0.01	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.06	0.06	0.07	0.07	0.08	0.09	0.09	0.10
20.00	0.01	0.02	0.02	0.03	0.04	0.04	0.05	0.06	0.06	0.07	0.08	0.09	0.09	0.10	0.11	0.12
22.00	0.01	0.02	0.03	0.04	0.04	0.05	0.06	0.07	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.13
24.00	0.02	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.09	0.10	0.11	0.12	0.13	0.14	0.15
26.00	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17
28.00	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.16	0.17	0.19
30.00	0.02	0.03	0.05	0.06	0.07	0.08	0.09	0.11	0.12	0.13	0.15	0.16	0.17	0.19	0.20	0.21
32.00	0.03	0.04	0.05	0.06	0.08	0.09	0.10	0.12	0.13	0.15	0.16	0.17	0.19	0.20	0.22	0.24
34.00	0.03	0.04	0.05	0.07	0.08	0.10	0.11	0.13	0.14	0.16	0.18	0.19	0.21	0.22	0.24	0.26
36.00	0.03	0.04	0.06	0.07	0.09	0.11	0.12	0.14	0.16	0.17	0.19	0.21	0.23	0.24	0.26	0.28
38.00	0.03	0.05	0.06	0.08	0.10	0.12	0.13	0.15	0.17	0.19	0.21	0.23	0.25	0.26	0.28	0.30
40.00	0.04	0.05	0.07	0.09	0.11	0.12	0.14	0.16	0.18	0.20	0.22	0.24	0.26	0.29	0.31	0.33
42.00	0.04	0.06	0.07	0.09	0.11	0.13	0.15	0.18	0.20	0.22	0.24	0.26	0.29	0.31	0.33	0.35
44.00	0.04	0.06	0.08	0.10	0.12	0.14	0.17	0.19	0.21	0.23	0.26	0.28	0.31	0.33	0.35	0.38
46.00	0.04	0.06	0.09	0.11	0.13	0.15	0.18	0.20	0.23	0.25	0.28	0.30	0.33	0.35	0.38	0.41
48.00	0.05	0.07	0.09	0.11	0.14	0.16	0.19	0.21	0.24	0.27	0.29	0.32	0.35	0.38	0.40	0.43
50.00	0.05	0.07	0.10	0.12	0.15	0.17	0.20	0.23	0.26	0.28	0.31	0.34	0.37	0.40	0.43	0.46
52.00	0.05	0.08	0.10	0.13	0.16	0.18	0.21	0.24	0.27	0.30	0.33	0.36	0.39	0.42	0.45	0.49
54.00	0.06	0.08	0.11	0.14	0.17	0.20	0.23	0.26	0.29	0.32	0.35	0.38	0.42	0.45	0.48	0.51
56.00	0.06	0.09	0.11	0.14	0.17	0.21	0.24	0.27	0.30	0.34	0.37	0.40	0.44	0.47	0.51	0.54
58.00	0.06	0.09	0.12	0.15	0.18	0.22	0.25	0.28	0.32	0.35	0.39	0.43	0.46	0.50	0.54	0.57
60.00	0.06	0.10	0.13	0.16	0.19	0.23	0.26	0.30	0.34	0.37	0.41	0.45	0.49	0.52	0.56	0.60
62.00	0.07	0.10	0.13	0.17	0.20	0.24	0.28	0.31	0.35	0.39	0.43	0.47	0.51	0.55	0.59	0.63
64.00	0.07	0.10	0.14	0.18	0.21	0.25	0.29	0.33	0.37	0.41	0.45	0.49	0.54	0.58	0.62	0.66
66.00	0.07	0.11	0.15	0.18	0.22	0.26	0.30	0.35	0.39	0.43	0.47	0.52	0.56	0.61	0.65	0.70
68.00	0.08	0.11	0.15	0.19	0.23	0.28	0.32	0.36	0.40	0.45	0.49	0.54	0.59	0.63	0.68	0.73
70.00	0.08	0.12	0.16	0.20	0.24	0.29	0.33	0.38	0.42	0.47	0.52	0.56	0.61	0.66	0.71	0.76
72.00	0.09	0.13	0.17	0.21	0.25	0.30	0.35	0.39	0.44	0.49	0.54	0.59	0.64	0.69	0.74	0.79
74.00	0.09	0.13	0.17	0.22	0.27	0.31	0.36	0.41	0.46	0.51	0.56	0.61	0.67	0.72	0.77	0.83
76.00	0.09	0.14	0.18	0.23	0.28	0.33	0.38	0.43	0.48	0.53	0.58	0.64	0.69	0.75	0.80	0.86
78.00	0.10	0.14	0.19	0.24	0.29	0.34	0.39	0.44	0.50	0.55	0.61	0.66	0.72	0.78	0.83	0.89
80.00	0.10	0.15	0.20	0.25	0.30	0.35	0.41	0.46	0.52	0.57	0.63	0.69	0.75	0.81	0.87	0.93
82.00	0.10	0.15	0.20	0.26	0.31	0.36	0.42	0.48	0.54	0.59	0.65	0.71	0.78	0.84	0.90	0.96
84.00	0.11	0.16	0.21	0.26	0.32	0.38	0.44	0.50	0.56	0.62	0.68	0.74	0.80	0.87	0.93	1.00
86.00	0.11	0.16	0.22	0.27	0.33	0.39	0.45	0.51	0.58	0.64	0.70	0.77	0.83	0.90	0.97	1.03
88.00	0.11	0.17	0.23	0.28	0.34	0.40	0.47	0.53	0.60	0.66	0.73	0.79	0.86	0.93	1.00	1.07
90.00	0.12	0.17	0.23	0.29	0.36	0.42	0.48	0.55	0.62	0.68	0.75	0.82	0.89	0.96	1.03	1.11

TABLE 7. TOTAL VOLUME OVERBARK (CU FT) BASED ON DIAMETER (IN) AND HEIGHT (FT)

DBH INCH	HEIGHT IN FEET															
	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00	55.00	60.00	65.00	70.00	75.00	80.00	85.00	90.00
2.00	0.28	0.40	0.51	0.63	0.75	0.88	1.00	1.13	1.26	1.40	1.53	1.66	1.80	1.94	2.08	2.22
3.00	0.52	0.73	0.94	1.16	1.38	1.61	1.84	2.08	2.32	2.56	2.80	3.05	3.30	3.56	3.81	4.07
4.00	0.80	1.12	1.44	1.78	2.12	2.47	2.83	3.19	3.56	3.94	4.31	4.70	5.08	5.47	5.87	6.26
5.00	1.12	1.56	2.01	2.48	2.96	3.45	3.95	4.46	4.97	5.50	6.02	6.56	7.10	7.64	8.19	8.75
6.00	1.47	2.05	2.65	3.26	3.89	4.54	5.19	5.86	6.53	7.22	7.91	8.61	9.32	10.04	10.76	11.49
7.00	1.86	2.58	3.33	4.11	4.90	5.71	6.54	7.38	8.23	9.09	9.97	10.85	11.74	12.64	13.55	14.47
8.00	2.27	3.15	4.07	5.02	5.99	6.98	7.98	9.01	10.05	11.10	12.17	13.25	14.34	15.44	16.55	17.67
9.00	2.70	3.76	4.86	5.98	7.14	8.32	9.52	10.75	11.99	13.24	14.52	15.80	17.10	18.42	19.74	21.08
10.00	3.17	4.40	5.68	7.01	8.36	9.74	11.15	12.58	14.03	15.50	16.99	18.50	20.02	21.56	23.11	24.68
11.00	3.65	5.08	6.56	8.08	9.64	11.24	12.96	14.51	16.18	17.88	19.60	21.34	23.09	24.87	26.65	28.46
12.00	4.16	5.78	7.47	9.20	10.98	12.80	14.65	16.53	18.43	20.37	22.32	24.30	26.30	28.32	30.36	32.42
13.00	4.69	6.52	8.42	10.37	12.38	14.43	16.51	18.63	20.78	22.96	25.17	27.40	29.65	31.93	34.22	36.54
14.00	5.24	7.28	9.40	11.59	13.83	16.12	18.45	20.81	23.22	25.65	28.12	30.61	33.13	35.67	38.24	40.83
15.00	5.81	8.07	10.43	12.85	15.33	17.87	20.45	23.08	25.74	29.44	31.17	33.94	36.73	39.55	42.40	45.27
16.00	6.40	8.89	11.48	14.15	16.89	19.68	22.53	25.42	28.35	31.32	34.33	37.38	40.45	43.56	46.69	49.85
17.00	7.00	9.74	12.58	15.50	18.49	21.55	24.67	27.83	31.04	34.30	37.59	40.93	44.29	47.70	51.13	54.59
18.00	7.63	10.61	13.70	16.88	20.14	23.48	26.87	30.32	33.82	37.36	40.95	44.58	48.25	51.95	55.69	59.46
19.00	8.27	11.50	14.85	18.30	21.84	25.45	29.13	32.87	36.67	40.51	44.40	48.34	52.32	56.33	60.39	64.47
20.00	8.93	12.42	16.04	19.76	23.58	27.48	31.46	35.49	39.59	43.74	47.94	52.19	56.49	60.83	65.20	69.62
21.00	9.61	13.36	17.25	21.26	25.37	29.57	33.84	38.18	42.59	47.05	51.58	56.15	60.77	65.43	70.14	74.89
22.00	10.30	14.32	18.50	22.79	27.20	31.70	36.28	40.93	45.66	50.45	55.29	60.19	65.15	70.15	75.20	80.29
23.00	11.01	15.31	19.77	24.36	29.07	33.88	38.77	43.75	48.80	53.92	59.10	64.33	69.63	74.97	80.37	85.81
24.00	11.73	16.31	21.07	25.96	30.98	36.10	41.32	46.63	52.01	57.46	62.98	68.56	74.21	79.90	85.65	91.45
25.00	12.47	17.34	22.39	27.60	32.93	38.38	43.92	49.56	55.28	61.08	66.95	72.88	78.88	84.94	91.05	97.21
27.00	13.99	19.46	25.13	30.97	36.95	43.06	49.29	55.61	62.03	68.54	75.12	81.78	88.51	95.30	102.16	109.08
28.00	14.77	20.55	26.53	32.70	39.02	45.47	52.04	58.72	65.50	72.37	79.32	86.35	93.46	100.63	107.87	115.18
29.00	15.57	21.65	27.96	34.46	41.12	47.92	54.85	61.09	69.03	76.27	83.60	91.01	98.50	106.06	113.69	121.39
30.00	16.38	22.78	29.42	36.26	43.26	50.42	57.70	65.11	72.62	80.24	87.95	95.74	103.62	111.58	119.60	127.70

TABLE 8. TOTAL VOLUME OVERBARK (CU FT) BASED ON GIRTH (IN) AND
HEIGHT (FT)

GBH (IN)	HEIGHT IN FEET															
	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00	55.00	60.00	55.00	70.00	75.00	80.00	85.00	90.00
6.00	0.27	0.37	0.48	0.59	0.70	0.82	0.94	1.06	1.18	1.30	1.43	1.55	1.68	1.81	1.94	2.07
8.00	0.41	0.57	0.73	0.90	1.08	1.26	1.44	1.62	1.81	2.00	2.19	2.39	2.59	2.78	2.98	3.19
10.00	0.57	0.79	1.03	1.26	1.51	1.76	2.01	2.27	2.53	2.80	3.06	3.34	3.61	3.89	4.17	4.45
12.00	0.75	1.04	1.35	1.66	1.98	2.31	2.64	2.98	3.32	3.67	4.03	4.38	4.74	5.11	5.48	5.85
14.00	0.94	1.31	1.70	2.09	2.49	2.91	3.33	3.75	4.19	4.63	5.07	5.52	5.97	6.43	6.90	7.36
16.00	1.15	1.60	2.07	2.55	3.05	3.55	4.06	4.58	5.11	5.65	6.19	6.74	7.30	7.86	8.42	8.99
18.00	1.38	1.91	2.47	3.04	3.63	4.23	4.85	5.47	6.10	6.74	7.39	8.04	8.70	9.37	10.04	10.72
20.00	1.61	2.24	2.89	3.56	4.25	4.96	5.67	6.40	7.14	7.89	8.65	9.41	10.19	10.97	11.76	12.56
22.00	1.86	2.58	3.34	4.11	4.91	5.72	6.54	7.38	8.23	9.10	9.97	10.86	11.75	12.65	13.56	14.48
24.00	2.12	2.94	3.80	4.68	5.59	6.51	7.45	8.41	9.38	10.36	11.36	12.37	13.38	14.41	15.45	16.49
26.00	2.38	3.32	4.28	5.28	6.30	7.34	8.40	9.48	10.57	11.68	12.80	13.94	15.09	16.24	17.41	18.59
28.00	2.66	3.71	4.79	5.90	7.04	8.20	9.39	10.59	11.81	13.05	14.31	15.57	16.86	18.15	19.45	20.77
30.00	2.95	4.11	5.31	6.54	7.80	9.09	10.41	11.74	13.10	14.47	15.86	17.27	18.69	20.12	21.57	23.03
32.00	3.25	4.52	5.84	7.20	8.59	10.01	11.46	12.93	14.43	15.94	17.47	19.02	20.58	22.16	23.76	25.37
34.00	3.56	4.95	6.40	7.89	9.41	10.97	12.55	14.16	15.80	17.45	19.13	20.82	22.54	24.27	26.01	27.77
36.00	3.88	5.40	6.97	8.59	10.25	11.94	13.67	15.42	17.21	19.01	20.84	22.68	24.55	26.43	28.34	30.25
38.00	4.21	5.85	7.56	9.31	11.11	12.95	14.82	16.72	18.66	20.61	22.59	24.59	26.62	28.66	30.72	32.80
40.00	4.54	6.32	8.16	10.06	12.00	13.98	16.00	18.06	20.14	22.26	24.39	26.56	28.74	30.95	33.17	35.42
42.00	4.89	6.80	8.78	10.82	12.91	15.04	17.22	19.43	21.67	23.94	26.24	28.57	30.92	33.29	35.69	38.10
44.00	5.24	7.29	9.41	11.60	13.84	16.13	18.46	20.83	23.23	25.67	28.13	30.63	33.15	35.69	38.26	40.85
46.00	5.60	7.79	10.06	12.40	14.79	17.24	19.73	22.26	24.83	27.43	30.07	32.73	35.43	38.15	40.89	43.66
48.00	5.97	8.30	10.72	13.21	15.76	18.37	21.02	23.72	26.46	29.24	32.05	34.89	37.76	40.65	43.58	46.53
50.00	6.34	8.82	11.39	14.04	16.76	19.53	22.35	25.22	28.13	31.08	34.06	37.08	40.13	43.22	46.32	49.46
52.00	6.73	9.36	12.08	14.89	17.77	20.71	23.70	26.74	29.83	32.96	36.12	39.32	42.56	45.83	49.12	52.45
54.00	7.12	9.90	12.78	15.76	18.80	21.91	25.08	28.30	31.56	34.87	38.22	41.61	45.03	48.49	51.98	55.50
56.00	7.52	10.45	13.50	16.64	19.85	23.14	26.48	29.88	33.33	36.82	40.36	43.94	47.55	51.20	54.89	58.60
58.00	7.92	11.02	14.23	17.53	20.92	24.38	27.91	31.49	35.12	38.81	42.53	46.30	50.11	53.96	57.84	61.76
60.00	8.33	11.59	14.97	18.45	22.01	25.65	29.36	33.13	36.95	40.83	44.75	48.71	52.72	56.77	60.85	64.97
62.00	8.75	12.17	15.72	19.37	23.12	26.94	30.83	34.79	38.81	42.88	47.00	51.16	55.37	59.62	63.91	68.24
64.00	9.18	12.77	16.49	20.32	24.24	28.25	32.34	36.49	40.70	44.96	49.28	53.65	58.07	62.53	67.02	71.56
66.00	9.61	13.37	17.26	21.27	25.39	29.58	33.86	39.20	42.61	47.08	51.61	56.18	60.80	65.47	70.18	74.93
68.00	10.05	13.98	18.05	22.25	26.54	30.93	35.41	39.95	44.56	49.23	53.96	58.75	63.58	68.46	73.39	78.36
70.00	10.50	14.60	18.85	23.23	27.72	32.31	36.97	41.72	46.54	51.42	56.36	61.35	66.40	71.50	76.64	81.83
72.00	10.95	15.23	19.66	24.23	28.91	33.70	38.57	43.52	48.54	53.63	58.78	63.99	69.26	74.58	79.94	85.35
74.00	11.41	15.86	20.49	25.25	30.13	35.11	40.18	45.34	50.57	55.87	61.24	66.67	72.16	77.70	83.29	88.93
76.00	11.87	16.51	21.32	26.27	31.35	36.54	41.82	47.18	52.63	58.15	63.74	69.39	75.09	80.86	86.68	92.55
78.00	12.34	17.16	22.16	27.32	32.59	37.98	43.47	49.05	54.72	60.45	66.26	72.14	78.07	84.06	90.11	96.21
80.00	12.82	17.83	23.02	28.37	33.85	39.45	45.15	50.95	56.83	62.79	68.82	74.92	81.09	87.31	93.59	99.93
82.00	13.30	18.50	23.89	29.44	35.13	40.94	46.85	52.87	58.97	65.15	71.41	77.74	84.14	90.60	97.11	103.69
84.00	13.79	19.18	24.76	30.52	36.42	42.44	48.57	54.81	61.13	67.54	74.03	80.59	87.23	93.92	100.68	107.50
86.00	14.28	19.86	25.65	31.61	37.72	43.96	50.31	56.77	63.32	69.96	76.68	83.48	90.35	97.29	104.24	111.35
88.00	14.78	20.56	26.55	32.72	39.04	45.50	52.07	58.76	65.54	72.41	79.37	86.40	93.51	100.69	107.94	115.25
90.00	15.29	21.26	27.46	33.84	40.38	47.05	53.85	60.77	67.78	74.89	82.08	89.36	96.71	104.14	111.63	119.19
92.00	15.80	21.97	28.37	34.97	41.73	48.63	55.65	62.80	70.05	77.39	84.83	92.35	99.95	107.62	115.36	123.17
94.00	16.32	22.69	29.30	36.11	43.09	50.22	57.47	64.85	72.34	79.92	87.60	95.37	103.21	111.14	119.13	127.20
96.00	16.84	23.42	30.24	37.27	44.47	51.82	59.31	66.93	74.65	82.49	90.40	98.42	106.52	114.69	122.95	131.27