

Tables for Weights and Measurements

Crops

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These tables give weights per bushel, weights of grain by volume, moisture conversion and planting rates.

Table 1. Weights per Bushel.

Crop	Weight per Bushel (lbs.)
Alfalfa	60
Barley	48
Clover, Alsike	60
Clover, Crimson	60
Clover, Ladino	60
Clover, White	60
Clover, Red	60
Clover, Sweet	60
Corn, shelled	56
Corn, ear	70
Cotton	32
Cowpeas	60
Flax	60
Grass, Brome (smooth)	14
Grass, Blue	14
Grass, Fescue (tall)	14
Grass, Orchard	14
Grass, Redtop	14
Grass, Timothy	45
Lespedeza	40-50
Millet	50
Oats	32
Rape	60
Rye	56
Sorghum, forage	50
Sorghum, grain	56
Soybeans	60
Sudan Grass	28
Sunflower (oil type)	24-32
Trefoil, Birdsfoot	60
Vetch	60
Wheat	60

Table 2. Calculating Approximate Weight of Grain by Volume

Standard Bushel Weight (lbs.)	Pounds/Cubic Feet
60	48.18
56	44.97
50	40.15
48	38.54
45	36.14
28	22.48
14	11.24
70 (ear corn)	28.00*

*Varies greatly with ear size and moisture content.

Measuring Cubic Feet

Width in feet x length in feet x depth of grain in feet = cubic feet in square or rectangular enclosures.

Example. 10 ft. width x 14 ft. length x 9 ft. grain depth = 1,260 cu. ft.

In circular bins, the formula is: $\pi r^2 \times \text{depth of grain} = \text{cu. ft.}$

Example. $\pi (3.1416) \times r^2$ (Radius = 10 ft. in 20 ft. diameter bin) x 12 ft. depth = $3.1416 \times (10 \times 10) \times 12 = 3769.92 \text{ cu. ft.}$

Obtaining Total Grain Weight

Multiply cu. ft. of volume by the appropriate figure from Table 2 under Pounds/Cubic Feet.

If actual bushel weight (test weight) is available, multiply actual bushel weight by 0.803. This calculation will give a more accurate figure for lbs./cu. ft. than you can get from the table.

Table 3. Moisture Conversion for Ear and Shelled Corn.

Percent Moisture in Grain	Harvest Weight (lbs.) of Ear Corn to Yield 56 Shelled Corn at 15.5% Moisture*	Shelled Corn (lbs.) Equivalent to 56 lbs. Shelled Corn at 15.5% Moisture
10	63.49	52.56
10.5	63.86	52.87
11	64.25	53.16
11.5	64.65	53.46
12	65.06	53.77
12.5	65.60	54.08
13	65.95	54.39
13.5	66.42	54.70
14	66.89	55.02
14.5	67.39	55.34
15	67.89	55.67
15.5	68.40	56.00
16	68.94	56.33
16.5	69.51	56.67
17	70.09	57.01
17.5	70.69	57.35
18	71.31	57.70
18.5	71.95	58.06
19	72.60	58.41
19.5	73.27	58.78
20	73.96	59.15
20.5	74.60	59.52
21	75.36	59.89
21.5	76.07	60.28
22	76.79	60.66
22.5	77.53	61.05
23	78.25	61.45
23.5	79.01	61.85
24	79.76	62.26
24.5	80.50	62.67
25	81.25	63.09
25.5	82.03	63.51
26	82.82	63.94
26.5	83.50	64.38
27	84.19	64.82
27.5	84.90	65.26
28	85.62	65.72
28.5	86.32	66.18
29	87.04	66.64
29.5	87.76	67.12
30	88.50	67.60
30.5	89.22	68.08
31	89.94	68.57
31.5	90.67	69.08
32	91.43	69.58
32.5	92.13	70.10
33	92.85	70.62
33.5	93.55	71.15
34	94.28	71.69
34.5	94.98	72.24
35	95.71	72.80

*Ear corn values supplied by Dr. Marcus Zuber, University of Missouri Agronomy Department. Ear corn values apply with greatest accuracy at harvest because differences in cob and grain moisture will change in storage. Shelled corn figures apply at any time.

Obtaining Bushels of Grain

Divide total grain weight by appropriate standard bushel weight.

Obtaining Number of Hundredweights (cwt.) of Grain

Divide total grain weight by 100.

Table 4. Moisture Conversion for Soybeans.

Percent Moisture in Grain	Soybeans (lbs.) Equivalent to 60 lbs. of Soybeans at 13.0% Moisture
10	58.00
11	58.65
12	59.32
13	60.00
14	60.70
15	61.41
16	62.14
17	62.89
18	63.66
19	64.64
20	65.25
21	66.08
22	66.92
23	67.79
24	68.68
25	69.60
26	70.54
27	71.51
28	72.50
29	73.52
30	74.57

Table 5. Moisture Conversion for Wheat.

Percent Moisture in Grain	Wheat (lbs.) Equivalent to 60 lbs. of Wheat at 13.5% Moisture
10	57.67
11	58.65
12	59.32
13	59.66
13.5	60.00
14	60.35
15	61.06
16	61.79
17	62.53
18	63.29
19	64.07
20	64.88
21	65.70
22	66.54
23	67.40
24	68.29
25	69.20
26	70.14
27	71.10
28	72.08
29	73.10
30	74.14

Table 6. Moisture Conversion for Grain Sorghum.

Percent Moisture in Grain	Grain Sorghum (lbs.) Equivalent to 56 lbs. of Grain Sorghum at 13% Moisture
10	54.13
11	54.74
12	55.36
13	56.00
14	56.65
15	57.32
16	58.00
17	58.70
18	59.41
19	60.15
20	60.90
21	61.67
22	62.46
23	63.27
24	64.11
25	64.96
26	65.83
27	66.74
28	67.67
29	68.62
30	69.60

Calculating Other Conversion Factors.

These conversion tables cover the most widely grown crops and the most common moisture contents. When you need other conversions, the calculations are relatively simple.

Use *percent dry matter* in making conversions because the problem is to obtain the same weight of dry matter as is found in a standard bushel. For example, a standard bushel of wheat contains 60 lbs. at 13.5% moisture. Thus, 86.5% dry matter $(100 - 13.5) \times 60$ lbs. = 51.9 lbs of dry matter.

Example. How many pounds of 20.5% moisture wheat is equivalent to a standard bushel?

- 13.5% Standard Moisture Content = $100 - 13.5 = 86.5\%$ Dry Matter
- 20.5% Moisture Content = $100 - 20.5 = 79.5\%$ Dry Matter
- $86.5 \div 79.5 = 108.8\%$
- $108.8 \times \text{Standard Bu. Wt. (60 for wheat)} = \frac{\quad}{100}$
- 65.28 lbs. equivalent to a standard bushel

To check your answer, $65.28 \times 79.5\%$ dry matter = 51.9 lbs. of dry matter.

Table 7. Common Measures and Approximate Metric Equivalents.

1 liquid teaspoon	= 5 milliliters (ml.)
3 liquid teaspoons	= 1 liquid Tablespoon = 15 ml.
2 liquid tablespoons	= 1 liquid ounce = 30 ml.
8 liquid ounces	= 1 liquid cup = 0.24 liter (l.)
2 liquid cups	= 1 liquid pint = 0.47 l.
2 liquid pints	= 1 liquid quart = 0.9463 l.
4 liquid quarts	= 1 liquid gallon (U.S.) = 3.7854 l.

Table 8. Conversion Factors for Metric and English Units.

To Convert Column 1 into Column 2, Multiply by	Column 1	Column 2	To Convert Column 2 into Column 1, Multiply by
Length			
0.621	Kilometer, km.	Mile, mi.	1.609
1.094	Meter, m.	Yard, yd.	0.914
0.394	Centimeter, cm.	inch, in.	2.540
Area			
0.386	Kilometer ² , km. ²	Mile ² , mi. ²	2.590
247.1	Kilometer ² , km. ²	Acre, Acre	0.00405
2.471	hectare, ha.	Acre, Acre	0.405
Volume			
0.00973	Meter ³ , m. ³	acre-inch	102.8
2.838	hectoliter, hl.	bushel, bu.	0.352
1.057	liter	quart (liquid), qt.	0.946
Weight			
1.102	ton (metric)	ton (English)	0.9072
220.5	quintal, q.	pound, lb.	0.00454
2.205	Kilogram, kg.	pound, lb.	0.454
Yield or Rate			
0.446	ton (metric) /hectare	ton (English) /Acre	2.242
0.892	kg./ha.	lb./acre	1.121
0.892	quintal/ hectare, q./ha.	bushel/acre, bu./acre	1.121
1.487	quintal/ hectare, q./ha.	bushel/acre, bu./acre (60#)	0.6726
1.597	quintal/ hectare, q./ha.	bushel/acre, bu./acre (56#)	0.6278
Temperature			
1.80 C + 32	Celsius, C	Fahrenheit, F	0.555 (F-32)

Table 9. Mixing Small Quantities of Liquid Spray.

Concentration of Active Ingredient per Gallon	Amount to Mix for 1000 sq. ft. to get 1 lb./acre of Active Ingredient
1 lb.	7 tablespoons or 103 ml.
2 lbs.	3.5 tablespoons or 51.5 ml.
3 lbs.	2.3 tablespoons or 34.3 ml.
4 lbs.	1.7 tablespoons or 25.8 ml.

Checking Planting Rate or Stand Per Acre

This table may be useful in checking actual planting rate when planting a crop. It can also be used in obtaining stand counts.

Determine average spacing in inches between seeds (or plants) in the row. Then *divide* the appropriate figure in the right hand column by this figure to determine planting rate (or stand).

Example. Grain sorghum planted in 30" rows is found to average 2.5 inches between seeds.

209,088 ÷ 2.5 = 83,635 seeds being planted per acre.

Or the grain sorghum stand averages 1 plant per 3.5" of row. Then 209,088 ÷ 3.5 = 59,379 plants per acre.

You can use this method without the table as long as you remember that there are 43,560 sq. ft. per acre and that 144 sq. in. = 1 sq. ft.

Example. 43,560 x 144 = 6,272, 640 sq. inches per acre. Divide 6,272, 640 by inches of row width to obtain inches of row per acre (6,272,640 ÷ 30 = 209,088).

Row Spacing (inches)	Inches of Row Per Acre
40	155,682
38	165,069
36	174,240
30	209,088
28	224,023
24	261,360
20	313,632
18	348,480
15	418,176
14	448,046
12	522,720
10	627,264
8	784,080
7	896,091

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