Determining Silage Bag Capacity

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Are you interested in knowing how much you have in those silo bags behind the barn? According to UW-Extension Engineer, Brian Holmes, one way to estimate this value is to calculate as:

$$\mathbf{V = 3.14 \times (D^2 / 4) \times L}$$

where:
V = Volume (ft3)
D = Diameter (ft)
L = Length of silage (ft)

When full length bags are used, the actual length of silage is the bag length minus the unused portion needed to seal each end of the bag. The quantity of dry matter in the bag is the volume multiplied times the dry matter density. The dry matter density can vary from bag to bag and is based on machine type and adjustment as well as forage type. Typical densities range between 11-15 lbs DM/ft3. Table 1 has been developed to show silo bag capacity based on the following assumptions: Round Bags, Silage Length = Bag Length - (2 x Diameter) and Density = 13 lbs DM/ft3.

Use the multiplier in Table 2 to adjust the values in Table 1 for a different density. For example, the quantity of silage in a 200' x 9' bag packed to 15 lbs DM/ft3 is: 150,500 lbs DM x 1.15 = 173,100 lbs DM

Table 1 lists dry matter in one bag. If you need to know the capacity in lbs. of silage as fed, divide the table value by the dry matter content. For example, 65% moisture silage in a 200-foot long bag of 9 ft diameter weighs 430,000 lbs AF (150,500 lbs DM/0.35) when packed at 13 lbs DM/ft3 density. Divide this value by 2000 lbs. to obtain total tons.

For additional information or Excel spreadsheets on storing silage go to the UW Team Forage Website at: http://www.uwex.edu/ces/crops/uwforage/storage.htm . You might also want to consider trying the SiloCAP spreadsheet on the Virginia Tech Dairy website at: http://www.vtdairy.dasc.vt.edu/

Table 1. Capacities of Silage Bags at 13 lbs DM/ft^3 Density

Bag Diameter	**8 ft**	**8 ft**	**9 ft**	**9 ft**
Bag Length (ft)	Silage Length (ft)	Capacity (lbs DM)	Silage Length (ft)	Capacity (lbs DM)
100	84	54,900	82	67,800
150	134	88,600	132	109,200
200	184	120,200	182	150,500
250	234	152,900	232	191,900
300	284	185,600	282	233,200
Bag Diameter	**10 ft**	**10 ft**	**12 ft**	**12 ft**
100	80	81,700	76	111,700
150	130	132,700	126	185,300
200	180	183,800	176	258,800
250	230	234,800	226	332,300
300	280	285,900	276	405,800

Table 2. Multiplier to Adjust Table 1 Capacities to a Different Density.

Density (lbs DM/ft^3)	**Multiplier**
11	0.85
12	0.92
13	1.00
14	1.08
15	1.15