Farm Structures FACTSHEET

Order No. 372.302-3
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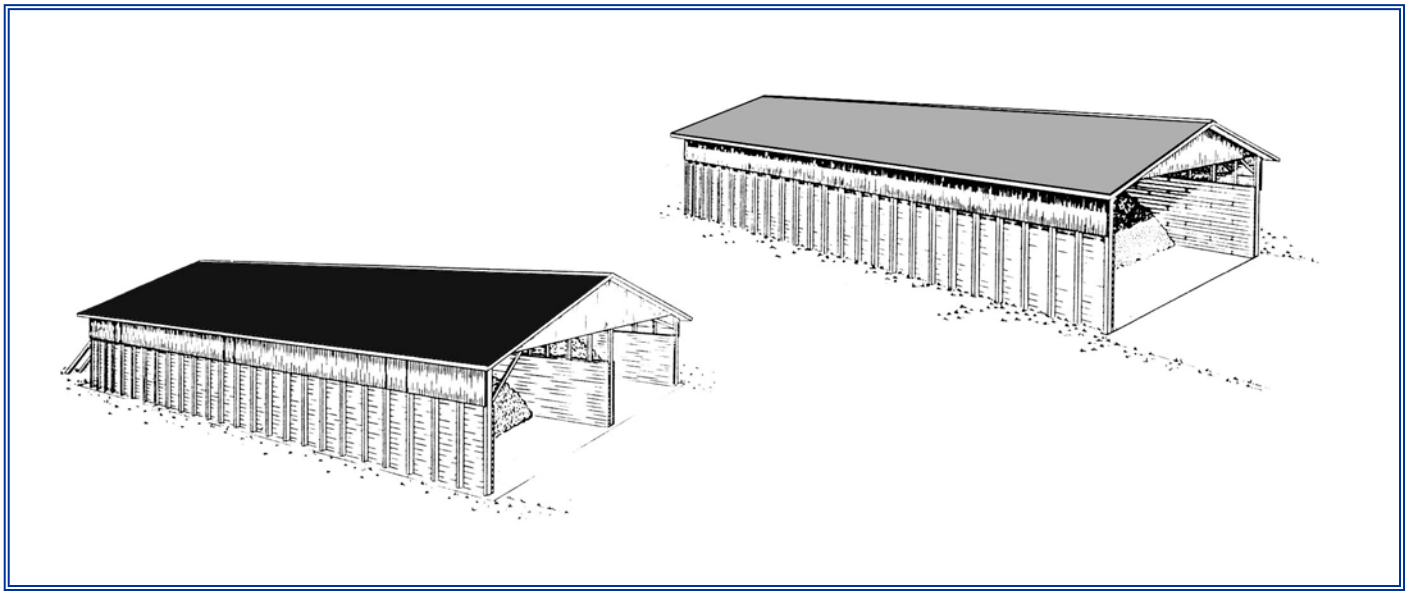
SIZING HORIZONTAL SILOS



Horizontal silos are a popular and low cost method for storing forage. However, it is important that horizontal silos be appropriately shaped and sized to prevent excessive spoilage both during storage and at the time of feeding. The following is a list of points to consider when sizing a horizontal silo. This is followed by a table of common silo sizes and an example for calculating horizontal silo dimensions.

- The minimum horizontal usage rate of silage in horizontal silos should be 3 inches per day in cool weather and 4 inches per day in warm weather. A lesser usage rate will cause spoilage, decreasing the nutritional value of the feed.

- Silo capacity required can be based on daily feed consumption multiplied by days of feed required.

- Silo capacity required can also be based on type of crop and expected average yield per acre, multiplied by total acreage to be harvested.

- When sizing a horizontal silo, consideration should be made for future expansion. One option can be to size the silo for less depth than full capacity, such as calculating for 10 feet depth. And then building for the full 12 feet depth. Another alternative is silo location. Locate the horizontal silo so that expansion can be achieved by adding to the front of the silo. Expanding to the back adds extra expense in removing the back wall and reconstructing it again. You can also consider planning to build a second compartment in the future if you build the first compartment today with a mono pitch roof.

– All horizontal silos require good ventilation, which is very important, to remove the gases produced from the tractor's exhaust. During silo packing, operators have experienced headaches and dizziness within minutes of operating the tractor. The necessary ventilation can be achieved by use of open eaves and a continuous ridge ventilator. Good ventilation is also required when the silo is housing cattle for self-feeding.

– For self-feeding, the vertical face dimension of the settled silo should be no more than 6 to 8 feet. A greater vertical dimension increases the danger of cattle eating into the face and creating an overhang which could collapse and injure cattle or farm workers.

– For self-feeding, the feeding face at floor elevation should be 4 to 5 inches wide per beef cow and 6 to 8 inches wide per dairy cow. This is satisfactory provided the cattle have access to the feeding face 24 hours per day

TABLE 1 TABLE OF CAPACITIES FOR COMMON HORIZONTAL SILO SIZES

(CAPACITY IS IN TONS FOR A GRASS OR CORN SILAGE DENSITY OF 45 POUNDS PER CUBIC FOOT AT 70% MOISTURE)

The following table lists the **approximate wet ton capacity** for a number of common silo sizes. The table takes into account a 1:2 sloping front face. Widths given are inside to inside and do not include space taken up by posts and planking. When using this table, calculate the daily feed removal to ensure enough feed is removed to prevent spoilage. For capacity in **TONNES**, multiply figures shown by 0.91.

Silo Width	Silage Depth	Silage Face Area	OVERALL LENGTH OF SILO (FEET)										
(ft)	(ft)	(sq ft)	56	64	72	80	88	96	104	112	120	136	156
20	8	160	175	200	230	260	290	315	345	375	405	460	535
	10	200	210	245	280	315	350	390	425	460	495	565	655
	12	240	240	280	325	365	410	455	495	540	580	670	775
24	8	192	210	240	275	310	345	380	415	470	485	555	640
	10	240	250	290	335	380	420	465	510	550	595	680	790
	12	288	285	335	390	440	490	545	595	645	700	800	935
28	8	224	240	285	320	365	405	445	485	525	565	645	745
	10	280	290	340	390	440	490	540	590	640	695	795	920
	12	336	335	395	455	515	575	635	695	755	815	935	1085
32	8	256	275	325	365	415	460	505	550	600	645	735	850
	10	320	330	390	445	505	560	620	675	730	790	905	1050
	12	384	380	450	515	585	655	725	790	860	930	1065	1235
36	8	288	310	365	415	470	520	570	625	680	725	830	960
	10	360	375	440	500	570	635	700	765	825	890	1020	1185
	12	432	430	505	585	660	740	815	895	970	1050	1205	1400
40	8	320	345	405	460	520	575	635	695	750	805	920	1065
	10	400	415	485	555	630	705	775	880	920	990	1135	1315
	12	480	475	560	645	735	820	905	990	1080	1165	1340	1555

TABLE 2 MAXIMUM EXPOSED SURFACE OF HORIZONTAL SILOS
(Table based on removing 4 inches per day to reduce spoilage)

FEEDING RATE (lbs per cow)	SURFACE AREA (sq ft per cow)
30	2
40	2.66
50	3.33
60	4
70	4.66
80	5.33
90	5.33
100	6.66

Refer to the following Factsheets available online:

372.302-1 Safety Precautions for Filling Horizontal Silos

372.300-2 Silage – Make it Right!

Example for 75 cows and replacements.

A 75 cow milking dairy herd is on a feeding program of 1/3 hay and 2/3 silage per day. The silage of 2/3 per day represents an average cow consumption of 60 pounds per day. The replacement cattle consume the same rate of feed, which amounts to 50% of the milking herd consumption. Storage is for year round feeding of 365 days.

Step 1: Calculate total surface area.

From Table 2, 60 lbs per cow = 4 sq ft per cow

75 cows x 4 ft^2 = 300 square feet

Add 50% for replacements +150 square feet
TOTAL 450 square feet

From Table 1, see column #3 and choose 36 feet wide by 12 feet deep = 432 square feet. (Alternate: any silo width and silo depth with an area less than 450 square feet).

Step 2: Calculate total feed requirements for storage period required.

75 cows x 60 lbs/cow/day x 365 days
= 1,642,500 lbs = 821 tons
Add 50% for replacements = 410 tons
TOTAL FEED REQUIRED = 1231 tons

Choose from step 1 and Table 1:

36 ft wide x 12 ft deep x 136 ft long
= 1205 tons (use 140 ft long)

Alternate Size if a double bunker silo is desired.

See Table 1 for a capacity 1/2 of 1231. Therefore:

$\frac{1231}{2}$ = 615 tons

Note that the silage face area must be equal to or less than calculation of Step 1, which is 450 square feet. Choose:

32 ft wide x 10 ft deep x 96 ft long

Which has a capacity of 620 tons. Therefore, times 2 equals 1236 tons.

This choice allows for future expansion by increasing the silage depth to 12 feet.

FOR FURTHER INFORMATION CONTACT
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