Reference information is printed on both side of this sheet.

Reference Page A

2014 National Agricultural Technology & Mechanical Systems Examination

Common American Wire Gauge (AWG) Sizes (proportional differences)

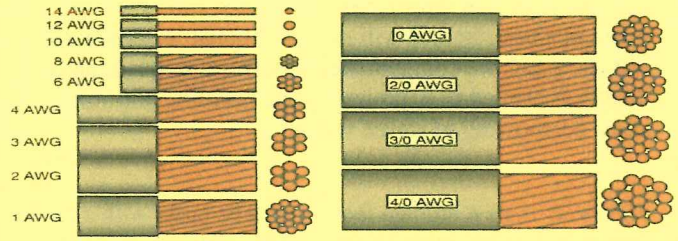

Table 1: Voltage Drop Table* (Alternating Current): 3% Allowable Voltage Drop

Appropriate Electrical Conductor Sizes for Aluminum Wiring Installations All conductor sizes are in American Wire Gauge (AWG). Use this table for Single Phase, 115 Volts, Maximum of 3% Voltage Drop										
Electrical Load In Amps	Length of Circuit In Feet									
	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft	175 ft	200 ft	225 ft	250 ft
15 Amps	12	10	8	6	4	4	4	4	4	4
20 Amps	12	10	8	6	4	4	4	3	3	2
30 Amps	10	8	6	4	4	3	2	1	1	1
45 Amps	8	4	4	3	2	1	1/0	1/0	2/0	2/0
60 Amps	8	4	2	1	1	1/0	2/0	3/0	3/0	3/0

* When length and/or amperage values are between the values listed on this table, use to the next larger length and/or amps to determine conductor size and keep voltage drop within acceptable limits. Examples: If 35 amps use 45 amps and if 85 feet use 100 feet.

Table 2: Voltage Drop Table* (Alternating Current): 3% Allowable Voltage Drop

Appropriate Electrical Conductor Sizes for Aluminum Wiring Installations All Conductor Sizes Are In American Wire Gauge (AWG). Use this table for Single Phase, 230 Volts, Maximum of 3% Voltage Drop										
Electrical Load In Amps	Length of Circuit In Feet									
	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft	175 ft	200 ft	225 ft	250 ft
15 Amps	12	12	12	10	8	8	8	6	6	6
20 Amps	12	12	10	8	8	6	6	6	6	4
30 Amps	12	10	8	6	6	6	4	4	4	4
45 Amps	10	8	6	6	4	4	3	3	2	2
60 Amps	8	6	6	4	4	3	2	1	1	1

* When length and/or amperage values are between the values listed on this table, use to the next larger length and/or amps to determine conductor size and keep voltage drop within acceptable limits. Examples: If 35 amps use 45 amps and if 85 feet use 100 feet.

Table 3: Single Phase Motor Full Load Amperage (FLA)* Table (Alternating Current)

Amperages to Size Conductors for Single Phase Electrical Motors				
Motor Horsepower	115 Volt Motors		230 Volt Motors	
	Full Load Amperage	125% of Full Load Amperage	Full Load Amperage	125% of Full Load Amperage
1/4	5.8 amps	7.2 amps	2.9 amps	3.6 amps
1/2	9.3 amps	12.2 amps	4.9 amps	6.1 amps
3/4	13.8 amps	17.2 amps	6.9 amps	8.6 amps
1	16 amps	20 amps	8 amps	10 amps
2	24 amps	30 amps	12 amps	15 amps
3	34 amps	42 amps	17 amps	21 amps
5	56 amps	70 amps	28 amps	35 amps

* Amperage use by single phase AC electrical motors when they are fully loaded.
When sizing electrical conductors for single phase motors, 125% of FLA is used as the circuit amperage to allow for the high starting amperage that occurs when a motor is starting.

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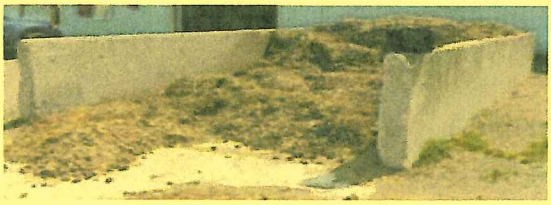


Figure 1: Picture at left is an example of an animal waste storage bay with the floor and three sides constructed from concrete. Stored waste in a bay like this will have additional moisture added by rain and snow and the contaminated runoff is a frequent problem. A new facility is needed to optimized waste handling and storage, and to allow composting of stored waste.

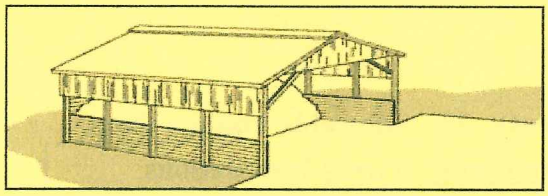


Figure 2: A new storage facility is to be build with a trussed-roof as shown in the picture to the left and the concrete slab (floor) will allow the bucket of a front-end loader to load, unload, and mix the manure as needed.

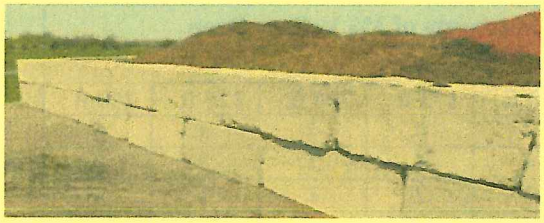


Figure 3: Concrete blocks as shown in the picture to the left (measuring 2 feet tall, 2 feet thick, and 4 feet long) will be used in the proposed new storage facility rather than permanent concrete walls as shown in **Figure 1**.

Proposed Animal Waste Storage Facility:
The proposed new waste storage facility will have covered storage with a concrete slab (floor) that is 34 feet wide and 42 feet long. The concrete blocks (2' x 2' x 4') will be used to construct eight bays as shown in **Figure 4** below. The center block wall (push wall) will be three blocks tall (6 feet tall) and it is the wall that the bucket of a front-end loader pushes against when loading/moving the animal waste. The side walls of each bay will be two blocks tall (4 feet tall). Each of the eight bays will have internal dimensions that are 8 feet wide and 16 feet long and allow manure to be piled as shown in **Figure 5** below.

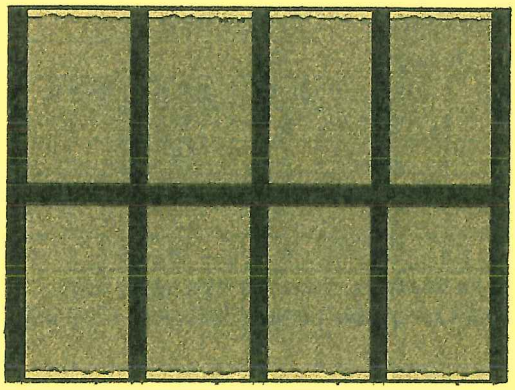
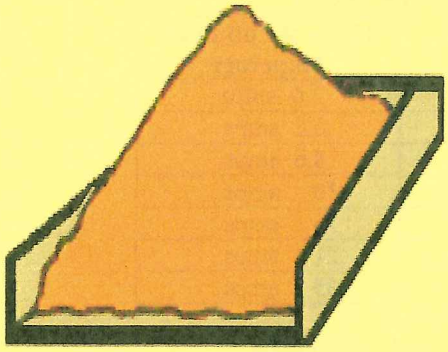


Figure 4: Top view of eight storage bays with concrete blocks on three sides of each bay. The black color represents the tops of the concrete walls and other than the end walls, the concrete block walls are common (shared) between bays. The long center wall is three blocks tall (6 feet) and the side walls are two blocks tall (4 feet). The grey color represents manure filling each bay (8 feet wide and 16 feet long) and piled as shown in **Figure 5** below.

Figure 5: Example showing manure piled in a single storage bay.



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