**NATURAL RESOURCES CONSERVATION SERVICE**

**CONSERVATION PRACTICE STANDARD**

# COMPOSTING FACILITY

**(Number)**

**CODE 317**

## DEFINITION

A facility for the biological stabilization of waste organic material.

## PURPOSE

To treat waste organic material biologically by producing a humus-like material that can be recycled as a soil amendment and fertilizer substitute or otherwise utilized in compliance with all laws, rules, and regulations.

Waste organic material for composting may include livestock and poultry manure, dead animal carcasses, and food processing wastes where food is processed as part of the normal farming operation. Municipal sludge, solid waste, and other non-farm type wastes are not included in this standard.

## CONDITIONS WHERE PRACTICE APPLIES

This practice applies where:

- Waste organic material is generated by agricultural production or processing.
- Composting is needed to manage the waste organic material properly.
- An overall waste management system has been planned that accounts for the end use of the composted material.

## GENERAL DESIGN CRITERIA

**Soils.** Locate composting facilities on soils having slow to moderate permeability to minimize seepage of dissolved substances into the soil profile and movement toward groundwater. Evaluate site paving needs in terms of effects of equipment operation on trafficability, soil compaction, and potential for contamination from compost and petrol products.

**Runoff.** Divert surface runoff from outside drainage areas around the compost facility. Collect runoff from the compost facility and utilize or dispose of it properly. Evaluate the effects of changed infiltration conditions on groundwater recharge, and evaluate changes in volumes and rates of runoff caused by the location of the operation. Properly manage movement of organic material, soluble substances, and substances attached to solids carried by runoff.

**Carbon-Nitrogen Ratio.** Calculate the amounts of the various ingredients to establish the desired carbon-nitrogen ratio (C:N) of the mix to be composed. The C:N should be between 25:1 and 40:1. Use the higher range of C:N for organic materials that decompose at a high rate (or are highly unstable) with associated high odor production.

Where more than two ingredients are to be blended, the two main ingredients are to be used in the analysis for the desired C:N and mixed accordingly. Adding up to 50 percent by weight of other ingredients to improve workability and air movement is permissible as long as the C:N of the added ingredient does not exceed the target C:N of the compost.

**Odor.** Select carbonaceous material that, when blended with the nitrogenous material, will result in the desired pH. The blended material should have a pH at or slightly below neutral for best odor control. Where odors do not present a problem, a pH of 8 to 9 is acceptable, but strong ammonia and amine related odors will be present for up to the first 2 weeks.

Locate composting operations where movement of any odors toward neighbors will be minimized. Buffer areas, vegetative

screens, and natural landscape features can help minimize the effects of odors.

**Facility Size.** Where dead poultry and other farm animals are composted, establish the size of the composter units on the basis of locally determined animal loss rates. Composting facilities for the purpose of processing animal carcasses are to include a primary composting unit into which alternate layers of low moisture content manure (unusual poultry manure), carbon source material (straw is common), and dead animal carcasses are placed. A secondary composting unit is necessary to complete the composing process. Refer to Additional Criteria for specific recommendations for mortality composting.

**Moisture.** The moisture content of the blended material at start-up of the composting process should be approximately 60 percent (wet weight basis) and maintained between 40 and 60 percent during the composting process. The composting process may become inhibited when moisture falls below approximately 40 percent. Water used for moisture control must be free of deleterious substances.

**Pile Configuration.** Compost piles for windrowed and static piles should be triangular to parabolic in cross-sectional form with a base width to height ratio of about 2 to 1. Increased surface area favorably affects evaporation and natural aeration and increases the area exposed to infiltration from precipitation in uncovered stacks. Aligning piles north to south and maintaining moderate side slopes maximizes solar warming. Windrows should be aligned to avoid accumulation of precipitation.

**Composting Period.** The time needed for completion of the process varies with the material and must continue until the material reaches a stability level at which it can be safely stored without creating undesirable odors and poor handling features. Acceptable stability occurs when microbial activity diminishes to a low level. Stability can be obtained in about 21-28 days but can require up to 60 days to produce the desired quality. Visual inspection and temperature measurements will provide needed evaluation of compost status.

**Storage.** Provide properly designed storage facilities sized for the appropriate storage period. Protect composted material from the weather by roofs or other suitable covers. Structures must meet the requirements of conservation practice standard, “Waste Storage Facility” (Code 313).

## GENERAL OPERATION CRITERIA

**Temperature.** For best results, operating temperature of the composting material should be 130 °F to 170 °F once the process has begun. It should reach operating temperature within about 7 days and remain elevated for up to 14 days to facilitate efficient composting. The material should remain at or above 110 °F for the remainder of the designated composting period.

If temperature falls significantly during the composting period and odors develop, or if material does not reach operating temperature, investigate piles for moisture content, porosity, and thoroughness of mixing. Compost managed at the required temperatures will favor destruction of any pathogens and weed seeds.

**Aeration.** Heat generated by the process causes piles to dehydrate. As the process proceeds, material consolidates, and the volume of voids through which air flows decreases. Materials selected for the composting mix should provide for adequate air movement throughout the composting process. Periodically turning the pile and maintaining proper moisture levels for windrows and static piles will normally provide adequate aeration.

**Nutrients.** Keep compost well aerated to minimize nitrogen loss by denitrification. Keep pH at neutral or slightly lower to avoid nitrogen loss by ammonification. High amounts of available carbon will aid nitrogen immobilization. Phosphorus losses will be minimized when the composting process is managed according to the requirements of this standard. Include compost nutrients in nutrient management plans. Determine the effects of use and management of nutrients on the

quality of surface water and ground water as related to human and livestock consumption.

**Testing Needs.** Test compost material for carbon, nitrogen, moisture, and pH if compost fails to reach desired temperature or if odor problems develop. The finished compost material should be periodically tested for constituents that could cause plant phytotoxicity as the result of application to crops. Composted materials that are prepared for the retail market will require testing for labeling purposes.

## GENERAL PLANNING CONSIDERATIONS

**Types.** Three types of composting operations are covered in this standard: aerated windrows, static piles, and in-vessel. Aerated windrows are more suited to large volumes of organic material that are managed by power equipment used to turn the composting material periodically. Periodic turning re-aerates the windrows, promoting the composting process.

Organic material in static piles is initially mixed to a homogeneous condition and not turned again throughout the composting process. Static pile material must have the proper moisture content and bulk density to facilitate air movement throughout the pile. Forced air might be necessary to facilitate the composting process.

In-vessel composting in a totally enclosed structure is carried out on a blended organic material under conditions where temperature and airflow are strictly controlled. In-vessel composting also includes naturally aerated processes where organic materials are layered in the vessel in a specified sequence. Layered, in-vessel materials are usually turned once to facilitate the process. Vessel dimensions must be consistent with equipment to be used for management of compost.

**Process.** Composting is accomplished by mixing an energy source (carbonaceous material) with a nutrient source (nitrogenous material) in a prescribed manner to meet aerobic microbial metabolic requirements. The process is carried out under specific moisture and temperature conditions for a specified period of time. Correct proportions of the various compost ingredients are essential to minimize odors and to avoid attracting flies, rodents, and other small animals.

**Carbon Source.** A dependable source of carbonaceous material must be available. The material should have a high carbon content and high carbon to nitrogen ratio (C:N). Wood chips, sawdust, peanut hulls, straw, corncobs, bark peat moss, and well-bedded horse manure are good sources of carbon.

**Moisture Control.** Large amounts of water evaporate during the composting process because operating temperatures drive off water. A source of water must be available for compost pile moisture control from start-up through completion. Proper moisture facilitates the composting process and helps control odors. Refer to mortality supplements for specific recommendations on moisture control in mortality composting.

**Equipment Needs.** Appropriate equipment must be available for initial mixing, turning, and hauling composted material and carbonaceous material. Appropriate long stem thermometers should be available for managing the composting material.

**Bulking Materials.** Bulking materials may be added to enhance airflow within the composting material. Piles that are too compact will inhibit the composting process. The carbonaceous material can be considered as a bulking agent. Where it is desirable to salvage carbonaceous material, provisions for removing the material, such as screening, must be made.

**Management.** Composting operations require close management. Management capabilities of the operator and availability of labor should be assessed as part of the planning and implementing process.

**Economics.** Benefits associated with the ultimate use of the composted material should be compared to the capital expenditure and operating costs of the composting operations. In addition to cost return, benefits can include environmental protection, improved handling, disposal of dead poultry and other farm animal

carcasses, odor control, and reduced need for storage volume.

**Plans, Specifications, and Operation and Maintenance.**

Plans and specifications for organic composting facility shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. A written operation and maintenance plan shall be developed with full knowledge and input of the owner-operator and included with the documents provided to the owner-operator.

**CRITERIA FOR POULTRY COMPOSTING FACILITY**

1. Composting facility shall be located as near to the source of poultry mortality as practical.
2. Reliable source of carbon and nitrogen material (poultry litter, straw, peanut hulls, etc.).
3. All runoff should be diverted from the facility.
4. The mortality composter will **not** be designed to process poultry from other farms.

**Permit Requirements**

**Federal, State and Local laws**:
All methods for the disposal of dead animal carcasses require permits from the North Carolina Department of Agriculture. The design of the poultry mortality composting facility will adhere to all state and local laws, rules, and regulations. The producer/landowner will be responsible for securing necessary permits to install the composting facility and for maintaining, operating and managing the composter.

A permit is required from the State Veterinarian's Office before construction of the composting facility. The following information must be submitted to obtain individual permits for the composter.

1. Owner's name and address
2. QBSP number (exact farm location)
3. Size and type of poultry operation
4. Construction plans (drawings) for the composter
5. Topographical location

Submit information to:

Director of Laboratories
Rollins Animal Disease Diagnostic Laboratory
Veterinary Division
P. O. Box 12223
Raleigh, North Carolina 27605
(919) 733-3986

**Carbon-Nitrogen Ratio**

For mortality composting to work, the two agents, a nitrogen source (poultry carcasses and poultry litter) and a carbon source (straw, wood shavings, or peanut hulls), must be present in the correct ratio. In addition, an aerobic environment must be maintained for optimum microorganism growth. When all agents are combined, the temperature increases (greater than 140 degrees F.) and the poultry carcasses are decomposed to produce water vapor, carbon dioxide, nitrogen and carbon. The 140 degree F. plus temperatures of the composting system will destroy disease-causing organisms, thus making it a sanitary method of mortality disposal.

As a part of the two-stage mortality composting process, the recipe should be followed carefully until it has been determined the process is working well.

The "Original" Recipe

| | By Weight | By Volume |
|---|---|---|
| Carcass | 1.0 lbs. | 1.0 |
| Poultry Litter | 1.2 lbs. | 1.5 |
| Straw | 0.1 lbs. | 1.0 |
| Water | Water is added as needed to maintain proper moisture content. A mixture that is too wet will not function properly. | |

Alternative Recipes and mixes for mortality composting are being developed with varying degrees of success. It is recommended that

the mortality composter be operated for one year using the orginal recipe and layering procedure.

**Moisture Control**

The moisture content of the compost mixture is extremely important. Too wet and the mixture will become anaerobic and produce undesirable odors. Being too dry will cause the carcasses to dehydrate and not decompose. The amount of water will need to be carefully monitored. The producer will have to adjust the water based on the wetness or dryness of the litter. The general procedure is to add a very small quantity of water initially for dry litter or none at all for "cake" or crusting litter. Then if the temperatures don't rise to the 140-160 degree range, water is added to the top layer in small quantities. As the mixture is turned into secondary treatment, the moisture content will need to be carefully evaluated. Again, add water in small quantities, if needed.

The conversion from weight to volume is 0.5 lbs. of water equals one cup or 1/2 pint.

**Structural Design**

Material and structural design of the mortality composting facility shall conform to the requirements of state and local building codes. Details of material requirements must be determined by the designer on a case by case basis.

Composters can vary considerably and perform well; however, all good composters have certain common features:

**Roof:** While composting of some materials may be done in the open, it does not work with mortality composts. A roof insures year round operation and controls rainwater and percolation, which can be major problems. A roof overhang of two feet with guttering is recommended if compost bins are located on the sides of the building.

**Concrete Floor and Apron**: This is critical to all-weather operation, secures the composter against rodents, dogs, etc., and prevents contamination of the surrounding area. Apron length should correspond to the equipment used to handle the compost.

**Rot-Resistant Building Materials:** Pressure-treated lumber resists the biological activity of composting. Pressure treated lumber, or a similar material, shall be specified.

**Size Determination**

Primary and secondary composting, as well as storage for the poultry litter, straw and finished composted material, require a roof cover and concrete floor. The area provided shall be adequate for all stages of composting as well as storage areas for straw and litter material used in the composting layers and the composted materials.

The size of the composter is dependent on the quantity of mortality to be composted. Farm mortality records can be used as a basis for mortality calculations. In lieu of actual mortality records, Table 1 can be used to size the composter.

Total primary bin volume is determined by using the following formula:

$$\textbf{Vol.} = B \times (M/T) \times W_B \times f$$

where

| | | |
|---|---|---|
| Vol. | = | Total primary bin volume (cu. ft.) |
| B | = | Number of bird per flock |
| M | = | Loss rate (as a decimal) |
| T | = | Flock life (days) |
| $W_B$ | = | Average market weight of bird (lb.) |
| *f | = | Volume factor = 1.5 to 2.5 |

**volume factor is based on local conditions, experiences, and management skills of operator.*

The total primary bin volume is divided by the volume of each bin to determine the number of bins (rounded to the nearest whole number).

In all cases, poultry mortality composting facilities shall have a minimum of two (2) primary bins regardless of the size of the operation.

Secondary bin volume will be 80 to 100% of the primary bin volume. The secondary volume may be one large bin or several smaller ones.

Storage capacity for compost that has gone through the secondary process, as well as storage for poultry litter, straw and other supplies, shall be designed into the poultry mortality composting facility. Required storage will vary greatly depending on how the compost will be utilized and removed from storage. It is recommended that the storage volume for the

compost be equal to the volume generated by the mortality composter for a three to six month period. The volume for poultry litter storage should be equal to the volume needed to operate the mortality composter for 1) one year for an annual clean out cycle or; 2) the length of time between clean outs of the poultry house such that the stored litter is replenished 4 to 6 times per year.

**Loading the primary composter**

For the primary (first stage) composting, the material is placed in the bins in layers according to the following sequence (See *figures* 10-37 and 10-38 in Chapter 10 of the Agricultural Waste Management Field Handbook).

1. One foot of dry litter will be placed on the floor of the bin. This litter layer is not a part of the recipe. An extra thick (approximately 6 inches) layer of loose straw is placed on top of the litter to aid aeration under the carcass.
2. Place carcasses in a single layer on the litter mat and completely cover the carcasses with the correct amount of litter. (Do not leave any part of a carcass exposed even if extra litter must be added). Do not place carcasses or carcass parts within 6 inches of the bin sidewalls.
3. Water may not be needed in the primary bin. If water is needed, sprinkle lightly onto the carcasses at a rate of about 0.25 pounds (1/2 cup) per pound of carcass.

This completes the first batch.

4. The next batch starts with a layer of straw, then a single layer of carcasses, then a layer of poultry litter. Each layer is proportioned in accordance with the recipe.
5. Continue the layering until the bin is filled. Monitor the temperature in the bin as it is filling. Temperatures should continually exceed 125 to 130 degrees F. They may be as high as 160 degrees.
6. Partial layers shall be covered with litter that day. The remaining portion of the layer can be filled and covered the next day.
7. Cap off bin with a 4-inch thick layer of litter.

**Monitoring Temperatures**

After a primary bin is capped off, temperatures should be monitored daily. A 30-36 inch probe-type thermometer is used for this purpose.

Temperatures will reach 140-160 degrees in 7 to 10 days after capping. If temperatures do not reach 140 degrees, small adjustments must be made in the process to achieve proper composting in the next batch. Adjusting the moisture content, more water or less water, or adjusting the carbon-nitrogen ratio are two of the more easily made adjustments that radically affect the process.

Temperatures should reach at least 140 degrees to kill fly larvae and kill most pathogens. If the temperature does not reach 140 degrees, the mixture needs to be recomposted. If the temperature exceeds 190 degrees and is rising, remove the material from the compost bin and cool it.

The material should be moved to the second stage after the appropriate time (10-14 days) and temperatures (140-160) have been achieved and begin dropping. Moving the material aerates the mixture and revives the bacteria, allowing them to begin another cycle of heating. Temperature should rise again and peak in 7 days.

**Aeration and Moving Compost Mixture to Secondary Treatment**

The purpose of moving the product from primary treatment to secondary is to mix and aerate the compost so that a more complete breakdown of the carcasses occurs. The compost mixture should “cascade” from the loader bucket to provide good turning and aeration as it is deposited in the secondary treatment area. Delayed movement, poor aeration, poor mixing or improper moisture will cause the compost not to re-heat properly.

When turning the mixture into the secondary bin, any large bones or other carcass parts found in the mix shall be removed and placed in a primary bin for recomposting.

Carefully analyze the need for water as the compost mixture is moved into secondary bin(s) for another heating cycle. After the temperature, determined by daily monitoring,

drops about 20 degrees F. (10-14 days) the compost should be moved to a storage area to await its use as a fertilizer. Although the compost material can be land applied after secondary treatment, it should be stored under roof and allowed to "rest" and dry for at least 30 days. Drying of the compost in storage will facilitate handling and spreading. In moving from secondary treatment, any large bones shall be removed and placed in a primary bin for recomposing. Large bones may damage or clog the spreading equipment and result in complaints by the citizenry.

**Recomposting of the mixture**

When a bin fails to achieve proper temperatures, the entire mixture needs to be recomposted. Recomposting of an entire bin is best accomplished by correcting the cause of the low temperatures (drying the mixture, moistening the mixture, adding or changing carbon source, adjusting nitrogen source). The mixture should be placed in a primary bin for ease of monitoring temperatures. The temperature of recomposting should be monitored just as initial composting. When the 140 degrees or higher temperature is reached and drops, the mixture should be turned into a secondary bin for further treatment.

If carcass parts or bones are observed after primary or secondary treatment, they should be placed in a layered (first stage) primary bin with new carcasses for recomposting and decomposition.

**Land Application of Mortality Compost**

Land application of mortality compost shall be at recommended agronomic rates in a timely manner in accordance with the NRCS Nutrient Management Practice Standard (Code 590) and the Waste Utilization Practice Standard (Code 633). The nutrient requirements for any particular crop should be based on a current soil test and realistic yield expectations.

Since approximately 70 percent of the total nitrogen in poultry mortality compost is in organic form, the compost will act as a slow release fertilizer. This characteristic of compost allows better utilization of the nitrogen by the crop and also reduces the potential for movement to surface or ground waters.

Poultry mortality compost is relatively moist. The selection of application equipment will need to account for this condition of mortality compost. The application equipment will need to be calibrated frequently to insure the proper application rate.

Application of the mortality compost will consider prevailing winds, neighboring dwellings, proximity to watercourses and visual effects.

**Maintaining the Structure**

The compost structure should be inspected at least twice each year when the bins are empty. Wooden parts or hardware that has deteriorated should be replaced. Patch concrete floors, aprons, and curbs as necessary to assure water tightness. Roof structures should be examined for structural integrity and repair. Access to the composting facility should be maintained as an all-weather road for use during adverse weather periods. Roads should be free of potholes, crowned in the middle, and have drainage on each edge.

**Trouble Shooting**

The following is a list of possible problems and solutions.

**Indications of composting improperly**:

1. Temperature not rising to or above 135 degrees F.
   - Moisture levels wrong
   - Dead litter (low initial bacteria count)
   - Lack of oxygen
2. Temperature rising above 160 degrees F.
   - Everything correct **BUT** too much oxygen in the compost. Be careful: spontaneous combustion can occur at a temperature slightly above 160 degrees F.
   - If temperature is excessive, you may have to move the mass out of the composting house to prevent a fire that will destroy your building.
3. Fly problems and, possibly, maggots.
   - Composting too slow to start; (temperature too low) 95-100 degrees F. for fly production.
   - Refer to number 1.

4. Weeping - moisture loss out the sides of the composter.
   - Too much moisture
   - Poor procedure for adding moisture (wet and dry spots)

5) Poor breakdown of carcasses.
   - Refer to number 1.
   - Carcasses closer to the cool walls or too many dead birds placed in a layer.

**Table 1: Poultry data for calculating primary bin volume if producer or local data is unavailable**

| Poultry Type | Loss Rate (M) | Flock Life (Days) (T) | Cycles / Year | Avg. Market Weight (Lbs.) ($W_B$) |
|---|---|---|---|---|
| **Broiler** | .045-.055 | 42-49 | 5.5-6 | 4.2 |
| **Roasters:** Females | .05 | 42 | 4 | 4.0 |
| Males | .08 | 70 | 4 | 7.5 |
| **Hens:** Laying | .14 | 420-455 | 0.9 | 4.5 |
| Breeding | .2 | 280-315 | .09 | 10 |
| **Breeders**: Male | .2-.25 | 280-315 | 1.1 | 15 |
| **Turkey:** Female | .05-.06 | 91-98 | 3 | 14 |
| Light Tom | .09 | 112 | 3 | 24 |
| Feather Production | .12 | 126 | 2.5 | 28-32 |

Primary Bin Volume (cubic feet) = Number of Birds x ($^{\text{Loss Rate}}/_{\text{Flock Life}}$) x Average Market Weight of Bird x Volume Factor

| Table A | | Table B | | Table C | |
|---|---|---|---|---|---|
| Pigs/Hog Parts <=50 lbs. | | Pigs/Hog Parts >50 <100 lbs. | | Hogs >100 lbs. | |
| Carcass | 1.0 lb. | Carcass | 1.0 lb. | Carcass | 1.0 lb. |
| Poultry Litter | 1.5 lbs. | Poultry Litter | 2.0 lbs. | Poultry Litter | 2.5 lb. |
| Straw | 0.1 lb. | Straw | 0.1 lb. | Straw | 0.15 lb. |
| Water | 0.25 - 0.5 lb. | Water | 0.34-0.65 lb. | Water | 0.4-0.65 lb. |

**CRITERIA FOR SWINE AND OTHER SMALL ANIMAL MORTALITY COMPOSTING FACILITY**

The criteria for composing swine and other small animals is basically the same as for composting poultry mortality with some exceptions.

**Permit Requirements**

Federal, State and Local laws:
The design of swine mortality composting facility will adhere to all state and local laws, rules, and regulations. The producer or landowner will be responsible for securing necessary permits to install the composting facility and for maintaining, operating and managing the composter.

A permit is required from the State Veterinarian before construction of the composting facility. To obtain a permit for the construction of any composter other than poultry the address is:

State Veterinarian ‘s Office
Post Office Box 26026
Raleigh, N. C. 27611
919-733-7601

**Composting Components**. As a part of the two-stage mortality composting process, three “recipes” are suggested until it can be

determined the process is working well. (See Tables A, B, and C on page 8.)

Add a very small quantity of water initially for dry litter or none at all for “cake” or crusting litter. Then if the temperatures don’t rise to the 140-160 degree range, water is added to the top layer in small quantities. As the mixture is turned into secondary treatment, the moisture content will need to be carefully evaluated. Again, add water in small quantities, if needed.

The conversion from weight to volume is 0.5 lbs. of water equals one cup or 1/2 pint.

**Size Determination**

Primary and secondary composting, as well as storage for the poultry litter, straw, and finished composted material, require a roof cover and concrete floor. The area provided shall be adequate for all stages of composting as well as storage areas for straw and litter materials used in the composting layers and the composted material.

The size of the composter is dependent on the quantity of mortality to be composted. Farm mortality records can be used as a basis for mortality calculations. Heavy feeders, sows and boars should be loaded into the primary bins at a rate of five pounds per cubic foot. Nursery pigs and small feeder pigs can be loaded into primary bins at a rate of eight pounds per cubic foot.

Secondary bin volume will be 80 to 100% of the primary bin volume. The secondary volume may be one large bin or several smaller ones.

Storage capacity for compost that has gone through the secondary process, as well as storage for poultry litter, straw and other supplies, shall be designed into the swine mortality composting facility. Required storage will vary greatly depending on how the compost will be utilized and removed from storage. It is recommended that the storage volume for the compost be equal to the volume generated by the mortality composter for a three to six month period. The volume for poultry litter storage should be equal to the volume needed to operate the mortality composter for 1) one year or 2) the length of time between poultry house cleanouts such that the litter is replenished throughout the year.

**Operation of Swine Mortality Compost System**

Because of the difference in size of carcasses and the longer time needed to compost the big carcasses, the primary bins should be designated for large hogs or for pigs.

Properly managed primary bins loaded with small pigs and light weight (< 100 pounds) hog carcasses can be turned into the secondary bin in about 60 days after the primary bin is capped off.

Heavy feeders (>100 pounds), sows, gilts and boars should stay in the primary bins at least 90 days after the bin is capped off.

When turning the mixture into the secondary bin, any large bones or other carcass parts found in the mix shall be removed and placed in a primary bin for recomposting.

Carefully analyze the need for water as the compost mixture is moved into secondary bin(s) for another heating cycle. After 90 to 120 days in the secondary bin, the compost should be moved to the storage area for another 60 days. In moving from secondary treatment to storage any large bones shall be removed and placed in a primary bin for recomposting.

**REFERENCES**

*NRCS Agricultural Waste Management Field Handbook, Chapter 10*

*NRCS Conservation Practice Standards*
- *Waste Management System (Code 312)*
- *Waste Storage Facility (Code 313)*
- *Nutrient Management (Code 590)*
- *Waste Utilization (Code 633)*

**NATURAL RESOURCES CONSERVATION SERVICE**
**CONSERVATION PRACTICE STANDARD**

**SPECIFICATIONS**

# COMPOSTING FACILITY

**(Number)**

**Code 317**

## POULTRY OR SWINE MORTALITY COMPOSTER SPECIFICATIONS

### Grading

Grading and shaping of the site shall consist of removal and disposal of all grass, roots, and other vegetation and shaping of the ground surface to the dimensions, neat lines and grades as shown on the drawings. Any fill material shall be placed in 9" maximum layers and compacted by 3 passes of heavy grading equipment over the entire layer prior to placement of another layer. The entire foundation area shall be uniformly compacted, whether or not fill is required.

### Materials

All lumber shall be Southern Yellow Pine (SYP) No. 2 or better. Posts shall be SYP No. 2SR grade or better.

All posts shall be preservative pressure treated with 0.6 pounds (minimum) per cubic foot of chromated copper arsenate.

(CCA-Type A, B, or C). All planking and other preservative pressure treated lumber shall be treated with 0.25 pounds (minimum) per cubic foot of chromated copper arsenate (CCA-Type A, B, or C).

Pressure treated lumber is not required in the roof structure. Roof structure lumber may be spruce, pine, or fir.

### Hardware and Fasteners

Hardware, nails and other metal fasteners or components in contact with the compost or litter should be galvanized and conform to a high standard building quality.

### Concrete

Concrete shall be made with Type 1 or Type 1a cement and have at 28 days a strength of 3000 psi., minimum. Entrained air content at the time of placement shall be 5 to 8 percent and the slump 3 1/2" plus or minus 1". Concrete surfaces shall be float finished. Concrete shall not be placed when ambient temperatures are above 85$^{o}$ or below 40$^{o}$F unless severe weather precaution are used under the supervision of persons familiar with such procedures.

The concrete floor shall have a minimum thickness of 4 inches. Floors having a span greater than 30 feet shall be provided with expansion joints at a maximum of 30 feet.

Concrete floors and apron shall be reinforced with 6" x 6", 10 gauge welded wire fabric reinforcement or reinforcing bars. The reinforcing wire fabric shall be placed at the midpoint of concrete slab in such a manner as to maintain its position during concrete placement.

To **improve surface durability** the concrete floor and apron may be fiber reinforced by adding 1.5 pounds of polypropylene fibers (fibermesh micro-reinforcement or equal) per cubic yard. The fibers will be 100 percent virgin homopolymer polypropylene, multifilament fibers containing no reprocessed olefin materials and will be specifically manufactured for use as concrete secondary reinforcement. (This is not in lieu of steel reinforcement with wire fabric or steel reinforcing bars.)

### Workmanship

The structure shall be constructed to the dimensions, neat lines and grades as shown on the drawings. All framing shall be true and exact. Timber and lumber shall be accurately cut and assembled to a close fit and shall have even bearing over the entire contact surface. Nails and spikes shall be driven flush with the surface of the wood.

**Vegetation**

All disturbed areas shall be vegetated in accordance with fertilization and seeding rates in accordance with the Critical Area Planting Conservation Practice Standard (Code 342).