ADMINISTRATIVE CODE

CHAPTER 420-3-16-A
APPENDICES

420-3-16-AC Appendix C - Dairy Farm Construction Standards and Milk Production.

(I) **TOILET AND SEWAGE DISPOSAL FACILITIES FLUSH TOILETS**

(a) Flush toilets are preferable to pit privies, earth closets, or chemical toilets at both dairy farms and milk plants. Their installation shall conform to the applicable state plumbing regulations. Toilets shall be located in a well-lighted and well-ventilated room. Fixtures shall be protected against freezing. The following shall be considered defects in flush-toilet installations:

1. Insufficient water pressure or volume.

2. Leaky plumbing.

3. Clogged sewers, as evidenced by overflowing toilet bowl.

4. Broken tile lines or clogged disposal field.

5. Access of dairy lactating animals to the effluent below the sewer or disposal-field discharge.

6. Effluent coming to the surface of the ground in the absorption field.

7. Toilet room floor soaked with urine or other discharges.

8. Offensive odors or other evidence of lack of cleanliness.

9. Location of soil lines, septic tank, absorption field, or leaching pit closer to the source of water supply than the limits indicated in Appendix D.

(II) **SEPTIC TANKS**

(a) Disposal of the wastes from toilets should preferably be into a sanitary-sewer system. Where such systems are not available to a dairy farm or milk plant, the minimum satisfactory method should include treatment in a septic tank, with the effluent discharged into the soil. Where soil of

satisfactory permeability is not available, the effluent shall be disposed of in accordance with the rules of the applicable government authority. It is preferable to treat floor drainage, wastes from washing of utensils, etc., in separate systems. When such wastes are combined with toilet wastes in the septic tank system, careful consideration shall be given to the expected flow in the design of both the septic tank and the leaching system.

(b) The septic tank shall be located a safe distance from water sources as determined by consideration of the criteria indicated in Appendix D and must meet all of the requirements of 420-3-1 Alabama Department of Public Health Onsite Sewage Treatment and Disposal.

(III) **GUIDELINE #45 - GRAVITY FLOW GUTTERS FOR MANURE REMOVAL IN MILKING BARNS - Published by the Dairy Practices Council**

(a) The gravity flow gutter concept for manure removal comes from Europe. Manure falls into a deep gutter in the barn floor and then flows by gravity to a cross channel or outlet pipe to storage. A low 8-20 centimeters (3)"- (8)" dam retains a lubricating liquid layer over which the manure flows (Fig. 1). After one (1) to three (3) weeks in a newly started gutter, the manure surface forms an incline of 1 percent to 3 percent above the dam. Then the manure moves continuously over the lip. The gutter shall be deep enough to contain manure sloped at this shallow angle.

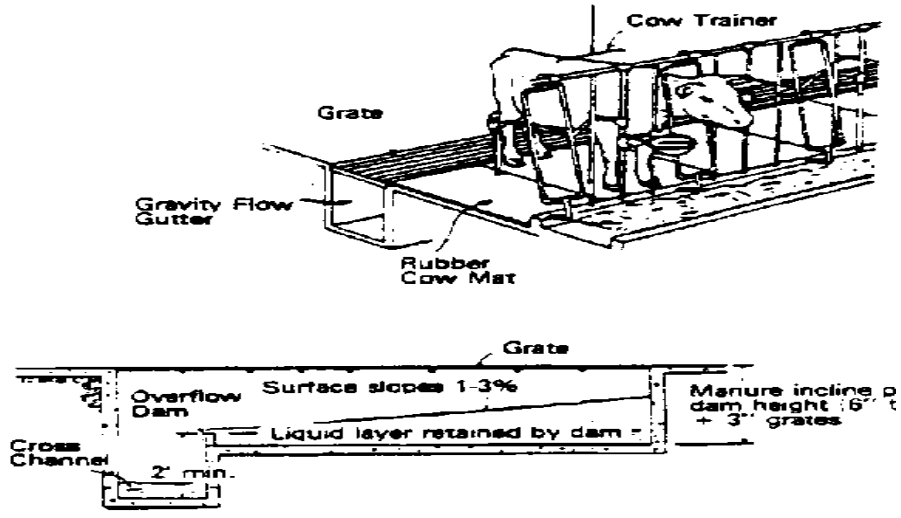

Figure 1. Side Cross Section of a Gravity Flow Gutter

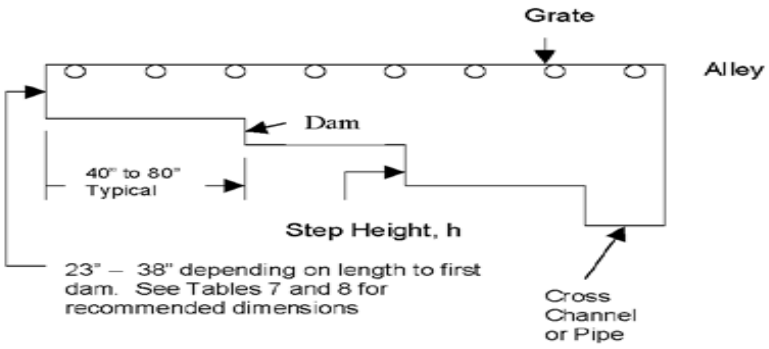

Figure 2. Stepped Gravity Flow Gutter

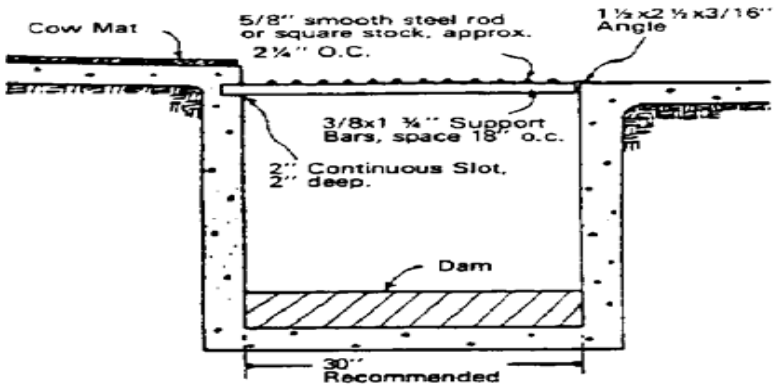

Figure 3. Cross Section of a Typical Gutter and Grate

(b) Because manure moves by its own weight, no mechanical equipment is required to remove it from the barn. Generally the cost of the gutter and cover grates is less than the cost of installing, operating, and maintaining a mechanical cleaner.

(c) This system is neither a flush gutter, where 115-225 liters (30-60 gallons) of water per cow is needed to remove manure from the gutter, nor is it an under-barn storage that is open to the barn. Rather, it is a conveying channel that carries the manure from behind the cow to the outside storage. The top surface of the slurry has been recorded to move 3 meters (10 feet) per hour.

(IV) **CONSTRUCTION**

(a) Gutter Depth - Gutter depth depends on the length of the gutter and the angle of incline of the manure surface. Design in this guideline assumes the manure surface forms a 3 percent

slope. Most diets form wetter manure, and with no bedding the slope may be 1 percent less. The bottom should be level so the dam will hold a uniform liquid layer. The maximum depth of the gutter at the end opposite the discharge shall not exceed 138 centimeters (54 inches). In addition, the outlet shall be clear of obstructions.

(b) The depth includes an allowance for a 15 centimeters (6 inches) dam and 8 centimeters (3 inches) deep grates.

(c) Adding steps may decrease the maximum manure depth. The depth from the bottom of each dam to the bottom of the next level varies depending on the distance between steps (refer to Figure 2).

TABLE 6

Slot Size vs. Cattle Age

Age (Months)	1-6	6-12	12-24	Over 24
Slot Size (Inches)	1-1 1/8	1 1/8 - 1 3/8	1 3/8 - 1 5/8	1 1/2 - 1 5/8

(d) Width of Gutters - The bottom of the gutter shall not exceed ninety-one 91 centimeters (thirty-six [36] inches) in width. A seventy-six (76) centimeters (thirty [30] inches) wide gutter is recommended. The gutter opening may be narrowed to fifty (50)- sixty (60) centimeters (twenty [20] to twenty-four [24] inches) in order to reduce the size and costs of grates.

Overflow Dam - The dam retains a lubricating liquid layer over the channel, which is essential to maintain flow. Typical heights range between eight (8) and twenty (20) centimeters (three [3] and eight [8] inches). Dams, if removable, would facilitate total cleanout, when and if necessary. Concrete, a steel plate, or a plank may be used to construct the dam. Caulking may be needed to seal the dam.

TABLE 7

GRAVITY FLOW GUTTER DEPTH VS. LENGTH FOR MANURE FROM LACTATING ANIMALS

Length		**Depth**	
Meters	Feet	Cm.	Inches
12	40	58	12
18	60	78	18
24	80	96	24
30	100	114	30
36	120	132	36

1. **Length** - A 70 meter (226 feet) long gutter has worked, but typical distances between dams range from 12 to 24 meters (40 to 80 feet). Longer channels must be deeper; hence, they may cost more because they require more concrete and stronger forms.

TABLE 8

GRAVITY FLOW GUTTER DEPTH VS. LENGTH FOR MANURE FROM LACTATING ANIMALS		
	Step Height	
Length Between Dams	For 1.5% Manure Incline	For 3% Manure Incline
40'	7"	14"
50'	9"	18"
60'	11"	22"
70'	13"	25"
80'	15"	20"

2. **Grates** - Commercial steel grates for stall barns and concrete slats for freestall barns are generally available. Table 7 suggests slot widths. Grates for stall barns are made from round or flat steel stock.

3. **Cross Channel** - The cross channel may be constructed like the gutter. At least a 60 centimeters (2 feet) drop from the top of the dam to the bottom of the cross channel is suggested to prevent backup of manure into it. The channel may be extended directly to storage. The slurry should enter the bottom; to prevent storage gases and cold air from returning up the channel. Channel depth, below grade, should be sufficient to prevent freezing.

Gravity flow via a concrete, steel, or plastic pipe may also be used to transfer manure to the bottom of the outside storage. Pipe as small as 38 centimeters (15 inches) diameter has been used successfully; however, 60 centimeters (24 inches) diameter pipe is recommended.

Do not empty channels into large sumps or pits within, or having direct openings into the barn. These storages will produce gas and odors that will be drawn into the barn through the ventilation systems.

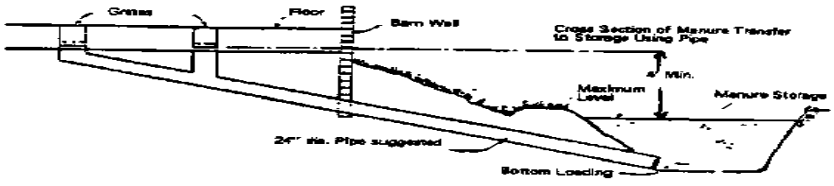

Figure 4. Manure Transfer to Storage

MANAGEMENT

1. **Flooding of Gutters** - Prior to stocking the building, fill the gutters with 8 to 15 centimeters (3 to 6 inches) of water to start the lubrication layer.

2. **Bedding Usage** - The type and amount of bedding used is important to successful operation. Up to .5 kilograms (1 pound) per lactating animal per day of sawdust, fine cut shavings or peanut hulls still allows the system to work. Some have worked with long straw bedding, but it is not recommended. More bedding or long straw increases manure stiffness and may clog the gutter. Lactating animal mats allow minimum bedding use. Sometimes water may need to be added, depending upon the feed ration and amount of bedding used.

3. **Wastage and Deposits** - Keep feed and hay out of the gutter. Barn lime and soil brought in from outside may settle to the bottom. For this reason, the overflow dam on some gutters is removable for clean out. Buildup of solids has not been a problem under normal management, although the gutter will need cleaning if it has not been used for some time. Watch for islands of solids, especially where excess bedding or feed builds up. Cut these islands free of the walls to keep them flowing.

4. **Cleaning Grates** - Grates need cleaning at least weekly and, preferably, daily. A broom connected to a hose makes the job easy.

5. **Flies and Odors** - Flies have caused little or no problems. Biodegradable oil such as mineral oil may be sprayed on the manure surface to control them. Little or no odors have been observed in barns with good ventilation. There is no need to install fans to ventilate the gutters.

IV. CONVALESCENT (MATERNITY) PENS IN MILKING BARNS AND STABLES

While the requirement for concrete floors in milking barns and stables is necessary for good sanitation, climatic conditions in some areas of the country has created a need for convalescent (maternity) pens to be located in milking barns and stables. Therefore, convalescent pens may be allowed in the milk barn or stable; provided that the following requirements are met:

1. All floors in the production milking facility, with the exception of the convalescent pens, shall be of an impervious surface, with slopes for drainage as currently listed in the regulations.

2. Milk from animals milked in convalescent pens with non-impervious floors shall not enter the distribution system or be sold.

3. Routine milking in pens shall not be allowed.

4. Pens shall be located in a location so as not to contaminate milk holding transfer facilities or water supplies. Convalescent pens cannot be within 15 meters (50 feet) of a well.

5. A minimum of a 15 centimeters (6 inches) curb shall be provided on all exposed sides of the pen(s).

6. Convalescent pens shall be well bedded, clean, and dry at all times.

7. No water faucet or drinking fountain shall be located within the curbed area.

8. State sanitarians, at their discretion, may require cleaning and/or reconstruction of such pens, based at intervals as necessary when the pens present a sanitation problem.

9. It is recommended that the number of pens be limited to 1 per 50 lactating animals.

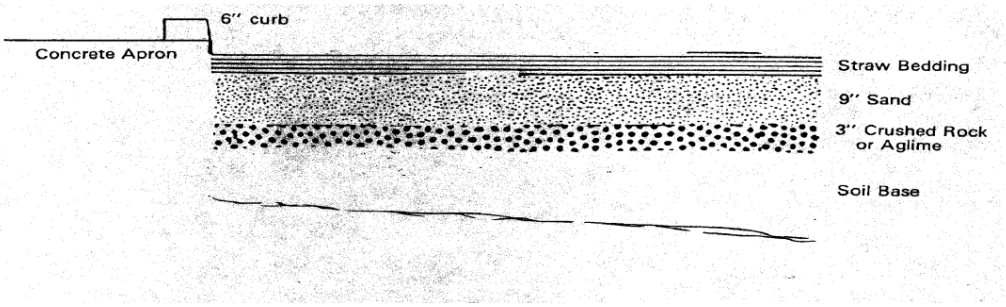

Figure 5. Side Cross Section of a Convalescent Pen

VI. GUIDELINES FOR CONVENTIONAL STALL BARN WITH GUTTER GRATES OVER LIQUID MANURE STORAGE

INTRODUCTION

The use of liquid manure storage under milking barns can be a cost, labor, and energy efficient method for handling dairy animal wastes. This type of system can aid in pollution control and will provide a safe and healthy environment for cattle and humans under the following guidelines:

1. Plans for the construction of a conventional stall barn, with gutter grates over liquid manure storage, shall be submitted to the Health Officer for approval before work is begun. Upon completion of the work, the builder shall furnish the purchaser with a signed written statement certifying that

the system is constructed so as to be in full compliance with these guidelines.

2. The storage capacity of the liquid manure tank shall be for a minimum of nine (9) months.

3. A negative pressure mechanical ventilation system shall be installed to meet the following requirements (refer to Figures 6 and 7):

a. Provide a maximum exhaust capacity of 40 air changes per hour from the occupied area. Of this total, about one-half, 20 air changes per hour shall be considered the cold weather part of the system and shall be exhausted through the manure storage area. The remaining 20 air changes per hour shall be considered the warm weather part of the system and shall be exhausted through the barn walls.

b. Of the 20 air changes exhausted through the manure storage area there shall be a minimum continuous exhaust of 4 air changes per hour. The additional cold weather capacity of about 16 air changes per hour shall be thermostatically controlled. All fans exhausting from the manure storage area shall be installed in permanent fan houses built on the exterior wall of the barn and connected directly to the manure storage area. These fans shall be single-speed with a certified delivery rating against 6 millimeters (0.25 of an inch) water gauge static pressure. One (1) pit fan shall operate continuously. Airflow shall be from the occupied area through the gutters. The use of variable-speed fans is prohibited.

c. Fans supplying the additional summer capacity shall be mounted to discharge directly through the barn walls. They may be mounted on the outside of the building and the openings closed with insulated panels in cold weather, or when mounted in the walls be protected with an inside insulated cover to eliminate condensation and frost formation on the shutters and mountings. Warm weather fans are to be located on the same side of the barn as the pit fans. They must have a certified delivery rating against 3 millimeters (0.125 of an inch) water gauge static pressure and should be single speed.

d. All fans, except those providing the minimum continuous exhaust rate are to be controlled by thermostats located away from the barn walls. All pit fans are to be in operation before any of the wall fans are started. An electrical thermal overload device of the proper size shall protect each fan.

e. Calculation Method: To calculate the fan capacity in cubic feet per minute (cfm) for a particular barn, multiply the length times the width times the average ceiling height, all in feet, to obtain the volume. Divide the volume by 15 to obtain the minimum continuous capacity of 4 air changes per hour in cfm.

$$\frac{W \times L \times H}{15} = cfm$$

For Example: Barn width 36 feet, length 160 feet and average ceiling height eight (8) feet-(6) inches. This would be a reasonable size for 60 stalls and 2 pens. The calculation of the minimum continuous exhaust for this example would be:

$$\frac{36 \times 160 \times 8.5}{15} = 3,264\ cfm$$

Total cold weather capacity of 20 air changes per hour equals 5 times the minimum capacity: 3,264 x 5 = 16,320 cfm.

Use 2 fans of 3,264 each and 2 fans of 4,896 cfm each to make up the total. Build (2) fan houses. Mount one 3,264 cfm and one 4,896 cfm fan in each. Operate one 3,264 cfm fan continuously. Thermostatically control the second 3,264 cfm fan at 4.5°C (40°F). Control the two (2) larger fans with thermostats set at 6°C (43°F) and 8°C (46°F). Divide the summer capacity of an additional 20 air changes per hour among three (3) fans of 5,440 cfm each. Locate these fans in the walls. Control them with thermostats set to 10°C-13°C (50°F-56°F (refer to Figure 6 for the approximate locations for all fans). Fans of the exact calculated capacity are usually unavailable. Always select those having a slightly higher rather than lower capacity.

f. Adequate incoming fresh air, to enable the fan exhaust system to function as designed, shall be provided. A continuous slot inlet with manual adjustment on 1 side is recommended to provide uniform fresh air distribution throughout the barn (refer to Figure 7). Adjustment of the slot opening opposite the fans is to be done manually for cold and warm weather conditions. Careful construction of the fresh air intake system is essential to the satisfactory performance of the ventilation system.

4. A stand-by generator to supply electric current to the ventilation system, in the event of a power failure, shall be provided.

5. Construction Requirements

a. The floor system over the pit shall be designed to safely support all animal weight, plus the possibility of a tractor that may be needed to remove a sick or dead animal. Agitating and pumping of the stored manure shall be done through annexes built outside the barn (refer to Figures 6 and 7). Service alley floor and lactating animal stall platforms shall be constructed to drain to the grated gutter tank opening, located between the lactating animal stall and the service alley.

b. Waste water from the milkhouse can be discharged into the pit. Sanitary (toilet) waste shall not be disposed of in the manure storage tank. When wastewater from the milkhouse is discharged into the pit, a drop pipe shall be connected to the discharge line so that the liquid waste will be deposited beneath the surface of the tank contents to prevent turbulence and possible odor production.

c. Grates over the gutters, tank slot openings, shall be of sufficient strength to support all applied loads. A suitable grate design is one using 16 millimeters (0.625 of an inch) smooth steel bars running the length of the open gutter. The distance between the center of the first bar and the vertical face of the stall platform should be 57 millimeters (2.25 inches). The remaining bars should be spaced 63 millimeters (2.5 inches) center-to-center. Support bars crossing the gutters should be 19 millimeters (0.75 of an inch) diameter and spaced 40 centimeters (16 inches) center-to-center.

6. Little or no bedding can be used with this system, rubber mats or equivalent, and lactating animal trainers shall be installed at the time the barn is constructed. Daily cleaning of grates with a stiff broom or scraper is recommended.

7. Other construction criteria and management practices recommended for stall dairy barns should be followed.

8. Requirements for emptying holding tanks:

a. Remove all animals and post signs on all doors that no one is to enter the milking barn during the time the tank is being agitated.

b. All pit fans shall be operating during agitation and emptying.

c. All milkhouse and feed storage area openings, doors, windows, etc., shall be closed.

The milking barn shall remain evacuated by animals. and people for at least one (1) hour, after agitation of the holding tank is completed.

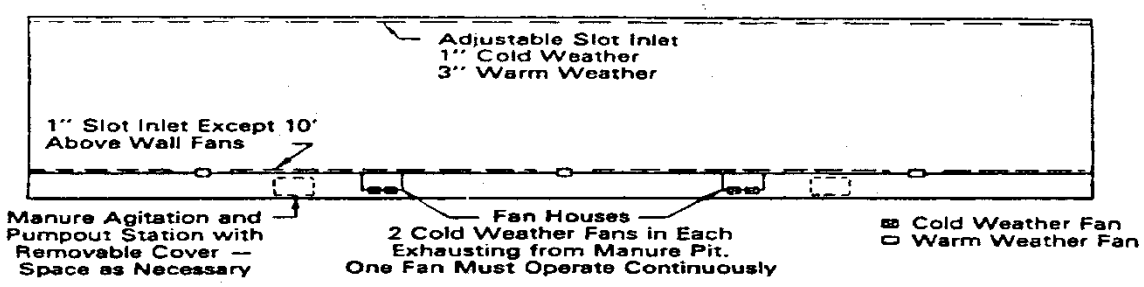

Figure 6. Schematic Diagram Showing Suggested Exhaust Fan Locations for a Typical Stall Dairy Barn with Gutter Grates Over Liquid Manure Storage

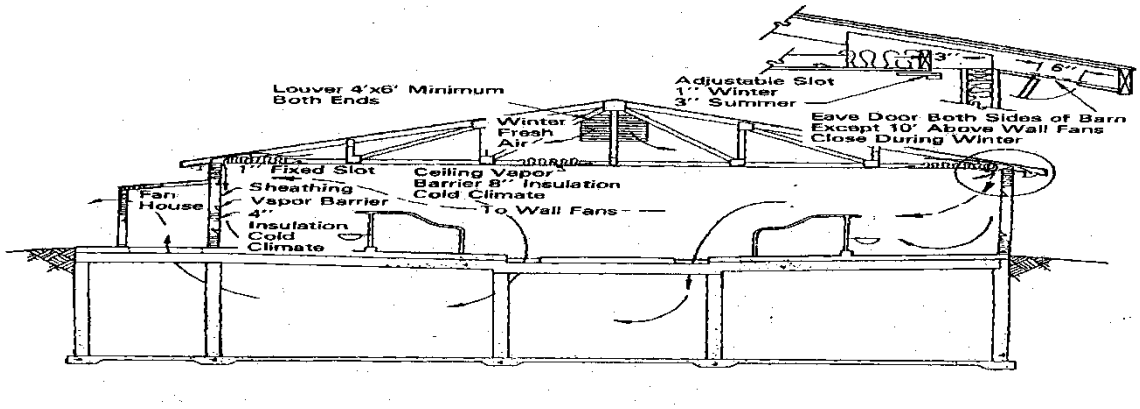

Figure 7. Schematic Diagram Showing General Pattern of Ventilation Air Movement, Slot Inlet Design and Fan House for Pit Fans

I. **DAIRY - CONSTRUCTION AND OPERATION - MILKING BARN, STABLE OR PARLOR**

Numerous factors, including the size and topography of the farm, the availability of utilities, the condition and disposition of existing buildings, the dairy operator's ultimate goals for the enterprise, and the operator's construction budget serve to make each milk producer's herd housing problems individual and unique.

While there has been a tendency for workers to develop strong convictions about the practicability of given housing or milking systems, there is little doubt that the success or failure of most dairy farm operations may be traced to good or poor planning. When the unique problems of each system in its individual applications are given proper consideration, the job of producing clean milk is made easier and compliance with regulations is

simplified. For example, operators of barns in which lactating animals are housed and milked will find that efficient ventilation not only reduces condensation but also relieves the problem of dust and mold on walls, ceilings, and windows. When window sills are sloped or windows set flush with interior walls in stanchion barns, the accumulation of dust and unwanted miscellaneous items is similarly lessened. Covered recessed light fixtures remain clean longer and are less subject to damage than those projecting from the ceiling.

Operators of milking parlor loose-housing systems, on the other hand, will value design features such as mechanically operated doors, which speed up animal traffic, and glazed wall finishes, which cut down the time required for proper post-milking wash-up of the parlor. Cleaner lactating animals result from proper planning and management of exercise yards and bedded areas. At least 9 square meters (100 square feet) of surfaced yard and not less than 5 square meters (50 square feet) of bedded space are recommended for each animal to be accommodated. Provisions shall also be made for the removal at least daily of manure from exercise yards and traffic lanes. Operators utilizing loose housing have shown considerable interest in free-stall housing. Many workers have concluded that it provides the solution to the problems of unclean lactating animals and excessive bedding demands that have plagued loose housing in past years. Milk producers planning new construction or large-scale changes in existing housing should carefully study its features.

Adequate light shall be available in all work areas in the milking barn, stable or parlor. Because many dairy functions are frequently performed after dark, it is important that the required minimum of 10 foot-candles (110 lux) of illumination be available from artificial sources. While absolute certainty of compliance with this requirement can only be confirmed by the use of a light meter, experience has shown that milking barns which otherwise meet the standards of these Rules will be properly lighted when equipped with one 100-watt bulb (or its fluorescent equal) for each 3 stanchions or per 3 meters (10 linear feet) of walkway behind each row of lactating animals in face-in barns or between rows of lactating animals in face-out barns. In addition, a smaller number of bulbs, equally spaced, are recommended for feed alleys in front of the lactating animals. When natural light is utilized, a minimum of .37 square meters (4 square feet) of window space for each 5.6 square meters (60 square feet) of floor space is recommended.

Construction plans and suggestions for the various systems of animal management are available to the sanitarian and the dairyman from numerous sources, including the USDA, the county extension agent, farm periodicals, and the trade associations serving the building supply industry.

MILKHOUSE

Milkhouses should be large enough to provide adequate space to meet present needs and should take into account the prospect of future expansion. Installed milkhouse equipment should be readily accessible to the operator. Aisles should be at least 76 centimeters (30 inches wide), with added allowance at the outlets of bulk milk tanks, adjacent to wash-and-rinse vats and where operational conditions warrant. It is especially important that the space available to bulk milk tanks and mechanical cleaning systems be adequate to permit their disassembly, inspection, and servicing.

Floor drains should not be located under bulk milk tanks unless there is sufficient room for servicing. Floor drains should not be located directly under the outlet of a bulk milk tank. Drains and waste disposal systems should be adequate to drain the volume of water used in rinsing and cleaning.

Milkhouses should be well ventilated. Proper ventilation not only avoids the obvious disadvantages of condensation on equipment and walls, it also lengthens the useful life of the building and its equipment. The constant need for renewal of painted surfaces, the repair of wooden fixtures and frames, and the removal of algae and mold from walls and ceilings of poorly ventilated milkhouses can represent a continuing expense to the operator.

Where possible, windows should be placed to provide cross ventilation. In addition, one (1) or more ceiling vents should be located to receive water vaporizing from wash-and-rinse vats and other sources of evaporative moisture.

Glass brick is sometimes substituted for windows in milkhouse construction. In these instances, mechanical ventilation shall be provided. A system affording filtered positive air pressure is recommended over exhaust ventilation, as the latter frequently draws dust, insects, and odors into the milkhouse.

The great demand for water under pressure in milkhouse operations has emphasized the importance of protecting plumbing from freezing. Devices that have proved effective include the insulation of water lines, the use of wrap-around heat tape, infrared lamps, and thermostatically controlled space heaters.

Insulated milkhouses make protection against freezing easier and more economical, and offer the additional advantage of greater comfort for the operator. The factor of personal convenience frequently results in better performance by the operator, with subsequent benefits to milk quality. Automated milking and mechanical cleaning systems of milking equipment has increased the use of hot water in the milkhouse. The following table indicates the volumes of water required to fill 30 meters 100 feet of pipeline of varying diameters:

TABLE 9

WORK WATER VOLUME OF VARIOUS SIZED PIPELINES	
Length Between Dams	For 1.5% Manure Incline
1	4.7
1.5	9.2
2	16.3

Since most cleaning installations employ a pre-rinse, followed by wash-and-rinse cycles, this table actually represents only one-third (⅓) the usual milking-time demand for heated water. Also, it does not include the "take up" of collecting jars, pumps, rubber parts, etc. Udder washing, bulk milk tank cleaning, and similar milkhouse tasks offer additional uses for hot water.

Sanitarians should compute the hot water demand of the individual milking systems under their supervision and require that not less than the minimum amount be available at all times. Milk producers should be made aware of the fact that effective cleaning of mechanically cleaned installations is impossible without adequate hot water and should be encouraged to provide a supply which exceeds their expected need. Such planning avoids emergency shortages and allows for normal expansion of the herd and facilities.

Detailed plans for milkhouses, as well as recommendations on hot water needs, insulation, lighting, and ventilation are available from power companies, building supply associations, county agricultural extension agents, and state universities.

Refrigeration, electrical, or mechanical systems powered by gasoline or diesel engines has no place in a milkhouse, milking barn, or in any communicating passageway between the milkhouse and milking barn. Such equipment is characteristically given to oil leakage and the discharge of fumes. The space occupied by it is difficult to keep clean and frequently becomes a gathering place for trash and flammable materials. With effective planning, these engines and their accessory equipment can be located, without detriment to their performance, in a separate room or building adjacent to the barn or milkhouse.

MILKING METHODS

Milking methods shall be geared to permit the efficient withdrawal of milk without introducing undue numbers of bacteria or causing injury to the udder.

The goal of a successful milking procedure is to ensure that most dairy animals will be milked quickly, gently, and completely under conditions that optimize udder health and result in the production of milk with a low bacteria count and somatic cell count.

3-A Accepted Practices for the Design, Fabrication, and Installation of Milking and Milk Handling Equipment, Number 606-##, provides guidance on performance and information requirements and certain dimensional requirements for satisfactory functioning of milking equipment for milking and cleaning. Methods for milking equipment testing to ensure compliance with this Accepted Practice are presented in the NMC guidelines *Procedures for Evaluating Vacuum Levels and Air Flow in Milking Systems*.

Suggested milking procedures to minimize the risk of mastitis and to enhance the quality of milk are presented in the NMC publication *Current Concepts of Bovine Mastitis* and the NMC factsheet *Recommended Milking Procedures*.

It has been known for many years that a relationship exists between mastitis and milking practices. While not all the facts are known about mastitis, it is abundantly clear that its control is enhanced by use of mechanically sound milking equipment and good milking practices. The NMC has described a satisfactory milking system as one which:

1. Maintains a stable vacuum in the teat cup and at a level adequate for completely milking most udders in three (3) to five (5) minutes.

2. Does not stress the tissues of the teat by excessive stretching and ballooning.

3. Produces massage without harsh action.

4. Is designed so that the entire system can be sanitized efficiently and satisfactorily. The NMC considers proper milking procedure to include the following:

(i) Before the milking unit is applied to the udder, the operator takes thirty (30) seconds to prepare the lactating animal in the recommended manner to obtain milk letdown, and the milking machine should be applied immediately thereafter.

(ii) The teat cups are attached in a manner to limit the volume of air drawn into the system.

(iii) The teat cups are positioned as low on the teats as practicable.

(iv) The operator stays near the machine and, at the end point of milk removal, the claw is briefly pulled down to open the teat cavity and remove the strippings. Stripping by machine should not extend over a period of more than fifteen to twenty (15-20) seconds. Prolonging stripping can be injurious to the udder.

(v) Before removing the machine, the vacuum to the teat cups is broken and the cups removed in a gentle manner.

REVERSE FLUSH SYSTEMS

Systems are acceptable if they are designed, installed, and operated in accordance with the following parameters for reverse flush systems:

1. All product-contact surfaces shall conform to the construction criteria of 420-3-16-.09(09).

2. An intervening break to the atmosphere shall be provided between the water and/or chemical solution and the milk and/or milk product-contact surfaces at all times.

3. If a pre-rinse cycle is used it shall be with safe water.

4. The system shall provide for:

(a) A chemical solution cycle with a chemical solution complying with the provisions of Appendix F of these rules.

(b) The chemical solution strength shall be limited to that strength necessary to accomplish its intended effect and shall not leave a significant residual in the milk.

(c) A post-rinse cycle with safe water. The use of treated water to prevent psychrophilic microorganism contamination should be considered.

(d) A drain cycle with sufficient time to drain or remove all moisture from the product-contact surfaces of the reverse flush system.

5. When air under pressure is used in contact with product or solution-contact surfaces, it shall comply with the requirements for air under pressure contained in 420-3-16-.09(16), provided that an exception to the piping requirement for the air piping downstream from the terminal filter may be granted when:

(a) The piping is used only for filtered air.

(b) At least one (1) access point is available to determine cleanliness of the air piping.

(c) The piping is of a smooth, non-absorbent, corrosion-resistant, non-toxic material, including any adhesives used in joints.

In some installations, a check-valve may be required to prevent water and/or chemical solution from entering these air lines.

DRUG RESIDUE AVOIDANCE CONTROL MEASURES

Animal identification and record keeping are critical for avoiding milk drug residues. Producers should establish systems to ensure that animal drugs are used properly and be able to provide evidence that adequate control over the administration of drugs to prevent residues in milk and/or meat has been implemented. These control systems should accomplish the following objectives:

1. Lactating animals treated with medicinal agents are:

   (a) Identified, i.e., leg bands, chalk marks, etc.; and/or

   (b) Segregated; or

   (c) Other means provided to preclude the adulteration of milk offered for sale.

2. Treatment Records include the following information:

   (a) Identity of the animal(s) treated.

   (b) Date(s) of treatment.

   (c) Drug(s) or other chemicals administered.

   (d) Dosage administered

   (e) Milk discard time.

   (f) Withdrawal time prior to slaughter, even if zero.

   Note: Records may consist of paper and file folders, card files, appointment book-type calendars, monthly paper calendars, chalk boards (temporary records), electronic computer records, etc.

3. Maintenance of Records - The proper use or misuse of some animal drugs may cause prolonged residues in milk 4 to 45 days and meat 18 to 24 months. Verification of drug treatment records may be necessary in the event of an investigation or trace back by the industry or Health Officer to identify specific treated animal(s) that may be related to a milk or dairy beef residue. Producers should maintain all treatment records for a minimum of two (2) years in the event of a need to trace back or follow up on a confirmed milk or meat residue.

4. Quarantine/segregation of treated animals or other means to preclude the sale of milk or offering of treated animals for sale for slaughter prior to the end of the prescribed withdrawal time.

5. Education of all farm personnel involved in treating animals on proper drug use and methods to avoid marketing adulterated milk or meat for human food.

INSECT AND RODENT CONTROL

The complete elimination of flies from the farm premises is practically unattainable. However, a major reduction of fly infestation is obtainable by the dairy farm operator who conscientiously follows a sustained program of sanitation, screening, and the proper use of insecticides.

The milk producer or milk plant operator must be continually aware of the potential hazard to people and animals which is inherent in most pesticides, including insecticides and rodenticides. It is important that they employ only those insecticides and rodenticides that are recommended by competent authority for the insect and rodent problems they seek to overcome, and that they follow implicitly the manufacturer's label directions for their use. Questions on the use of pesticides should be referred to the appropriate Health Officer and/or County Agricultural Extension Agent.

Intermittent, time release, high-pressure insect fogging or spraying systems shall be installed and operated in accordance with the following guidelines:

1. The insecticide shall be registered with the EPA.

2. The label on the insecticide container shall specify that the insecticide may be used on dairy farms and in milking areas.

3. The label shall contain adequate instructions for the safe use of the insecticide.

4. The insecticide shall be designated for use in an intermittent, time release, high-pressure insect fogging system and used in accordance with the labeling directions.

5. The container, tank, or barrel of concentrated insecticide or use solution and the pumping or pressurizing equipment shall not be located in the milkhouse.

6. Nozzles, which would emit, spray, or fog the insecticide shall not be located in the milkhouse.

7. Nozzles shall be located, positioned, and operated so that they will not spray, fog, drip, or drain any insecticide on milk pipeline and return solution line openings, milking machine appurtenances, including milk claws, inflations, flow sensors, and interconnecting flexible milk tubing, milk receivers, or releasers, milk pumps, weigh jars, milk measuring equipment, or over any area where milk is poured, strained, or transferred.

8. Nozzles shall be located, positioned, and operated so that they will not contaminate any feed or water.

9. The fogging or spraying systems, which have nozzles located in the milking barn or parlor, shall not be operated during milking. In addition, the system shall not operate during the washing and sanitizing of milking equipment in a milking barn or parlor. This may be accomplished by inter-wiring the system so that it will not operate when the vacuum pump is operating or by a master cut-off switch with a conspicuously posted sign warning the operator that the switch shall be turned off while milking, cleaning, and sanitizing.

10. The fogging or spraying system shall operate so that only the amount of insecticide necessary to accomplish the intended purpose of reducing fly and other insect populations is used. Excessive insecticide which leaves a film on exposed walls, floors, and equipment, should be considered a violation of Item 19r of these rules.

11. These systems should be considered an adjunct to and not a replacement for good sanitary practices of proper manure removal and disposal to adequately control fly and other insect breeding on dairy farms.

Effective rodent control, like insect control, is dependent on sanitation for much of its success. The careful elimination of trash and woodpiles; the rodent-proofing of feed bins, corn cribs, and similar structures; the prompt removal of spilled feed and manure to places of ultimate disposition; and the deliberate elimination of protected harborage areas in farm buildings, all tend to discourage rodents near the dairy farm. Such a program also pays excellent dividends in feed savings, lowered maintenance costs for farm buildings, reduced fire hazards, and lessened risk of disease outbreaks among farm animals.

Anticoagulant poisons, Warfarin, Fumarin, etc. have offered improved means of controlling rodents on the farm. Used according to directions, and with due precaution against their consumption by domestic animals, these chemicals should keep the rodent population in check while additional preventive programs are instituted.

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