

Quality Milk Production

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In cooperation with

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QUALITY MILK PRODUCTION

This booklet can serve as a guide for meeting the quality milk requirements for manufacturing grade (grade B) milk as required by the Minnesota Manufacturing Milk Standards Act of 1983. These standards now apply to both bulk and can milk shippers. Please note that certain of the details discussed in this booklet are recommendations for providing quality milk, not requirements per se of the Act. Requirements necessary for initial and continued certification are identified by *this style of type*.

GENERAL REQUIREMENTS OF THE 1983 ACT

Specifically, the 1983 Manufacturing Milk Standards Act adopts certain provisions of the U.S. Department of Agriculture's 1972 recommendations for production and processing of manufacturing milk. In general, the production standards set forth requirements for herd health, cooling of milk, milk quality, milkhouse or milkroom construction, water supplies, sewage disposal, and certification and inspection of farms. Each of these aspects will be treated separately.

Herd Health

All animals in the herd must be maintained in a healthy condition and be properly fed and kept. The herd must meet requirements of tuberculin, brucellosis and abnormal milk tests, as follows:

Tuberculin Test: *Tuberculin test requirements are those of a Modified Accredited Area. This means that no more than 0.5% of the cows in a herd may be found positive for tuberculosis.*

Brucellosis Test: *Brucellosis status of the herd must comply with the requirements of Certified Brucellosis - Free Herds of Cattle, Modified Certified Brucellosis Areas, or Certified Brucellosis - Free Areas. In essence, this demands that the herd be located in an area within the state in which the percentage of cattle affected with brucellosis does not exceed 1% and the number*

of herds infected with brucellosis does not exceed 5%.

Abnormal Milk

"Abnormal" is the term used to indicate presence of severe mastitis infections, and also milk containing antibiotics or other drugs, pesticides or other chemical residues, all of the latter at levels in excess of specified standards. Abnormal milk is also defined as bloody milk or colostrum. *No abnormal milk may be offered for sale as human food.*

Cooling of Milk

Can Milk: *Effective July 1, 1986 milk in cans must be cooled immediately to 50°F or lower unless delivered to the plant within two hours after milking. Prior to that date, cooling requirements are 60°F. Keep can coolers clean.*

Bulk Milk: *Milk stored in bulk tanks must be cooled to 40°F or lower within two hours after milking, and then maintained at 45°F or lower until transferred to the bulk pick-up truck. This latter requirement fixes the upper temperature of bulk milk when warm fresh milk is added to cold milk already present in the tank. This is a necessary requirement in order to minimize microbial growth and also to prevent rancidity, one form of which occurs when milk is cooled to refrigeration temperatures, then re-warmed and re-cooled (see Food Science and Nutrition Fact Sheet No. 16).*

MILK QUALITY STANDARDS

The USDA's recommendations for milk quality standards for manufacturing grade milk have previously been adopted by the State of Minnesota (MCAR 1.1188 - 1.1191). In brief, the standards call for evaluation of milk by sight and odor, by sediment content, number of bacteria, number of somatic cells (or severity of mastitis), antibiotics, radioactive elements, and pesticides.

Sight and Odor Requirements: *By visual observation, milk should not show presence of blood or mastitis clots, and should appear free of curdling, ropiness, or visible foreign matter. Odor should give evidence of a milk that is*

fresh and sweet to the taste. Each delivery or pick-up of milk must be examined for acceptability as related to sight and odor.

Sediment Standards: Sediment is visible evidence of contamination of milk with extraneous material -- dirt, hair, insect or insect parts, etc. Keep in mind that only insoluble matter is exposed on a sediment pad. Research indicates that about 25% of all extraneous material that finds its way into milk is actually detected by a sediment test; 75% dissolves in the milk and simply goes unobserved.

Tests for sediment require that a given amount of milk be forced through a given circular area of a lintine disc. Amount of milk and size of the area used on the disc depend on the method being employed. Minnesota regulations recognize several different methods:

For can milk: The "off-the-bottom" method described in Standard Methods for the Examination of Dairy Products must be used for testing sediment in can milk. In this procedure, a pint of milk is taken by drawing the testing device once across the bottom diameter of the original can of milk. Milk is drawn into the tester all the while this single pass is being made. The pint sample thus taken is then discharged through a lintine disc over a circular area measuring 1 1/8 inch in diameter.

For bulk milk: Sediment in bulk milk is measured by testing a sample of thoroughly agitated milk taken from the tank and then filtered through a lintine disc. Perhaps the most common method utilizes one pint of such milk filtered through an aperture 0.40 inch in diameter. However, Minnesota regulations provide for sample sizes of 1 pint, 4 oz., 2 oz., or 1 oz., with lintine disc coverage of circular areas of, respectively, 0.40, 0.20, 0.14, and 0.10 inch in diameter.

Although the total amount of sediment remaining on the disc varies by the

specific method used, all methods provide roughly comparable results, i.e., indicate equivalent amounts of sediment in the original milk.

The sediment grades and standards for can milk and for bulk milk (as measured by a pint sample of mixed milk) are as follows:

Rating	Can Milk Off-the-Bottom 1 1/8" disc (amount of sediment)	Bulk Milk Mixed Sample .40" disc (amount of sediment)
Pad No. 1	Not to exceed 0.50 mgms	Not to exceed 0.0625 mgms
Pad No. 2	Not to exceed 1.50 mgms	Not to exceed 0.1875 mgms
Pad No. 3	Not to exceed 2.50 mgms	Not to exceed 0.3125 mgms
Pad No. 4	Over 2.50 mgms	over 0.3125 mgms

Sediment tests are to be made no less frequently than once each month on each producer's milk delivery. Milk in cans is evaluated by doing a test on one or more randomly selected cans of milk from any one shipment.

Milk rating Pad Numbers 1 and 2 is considered acceptable. A probational grade is given to milk rating a Pad No. 3. Such milk can be accepted but cannot continue to rate a Pad No. 3 for more than 10 calendar days. After that length of time, probational milk is classed as illegal. Any milk testing as Pad No. 4 is also considered illegal, as is milk showing presence of any visible foreign material or other abnormality. Any time a randomly selected can of milk yields a sediment test in excess of 2.5 mgms (Pad No. 4), the remaining cans of the delivery must be tested. All cans of milk found to rate in excess of Pad No. 3 are to be declared illegal. Such milk must be rejected, denatured, tagged, and returned to the producer.

When a randomly selected can of milk from any one delivery does yield a Pad No. 4 sediment test, it is required that all cans of milk of subsequent deliveries be tested. Such testing continues until each can of milk from a

given delivery rates a sediment value of 2.5 mgms or less (Pad No. 3). However, such testing goes on for no more than 10 calendar days in total. At that point, the producer becomes a rejected patron if any can of milk exceeds a Pad No. 3. A rejected patron cannot offer milk for sale for human consumption, nor can a dairy plant accept such milk until authorization is given by the Commissioner of Agriculture.

Bacterial Estimates: Bacterial estimates must be made at least once each month. Acceptable test methods include (1) Direct Microscopic Count, (2) Standard Plate Count, (3) Plate loop Count, and (4) Resazurin reduction test, all as given in Standard Methods for the Examination of Dairy Products (published by the American Public Health Association) and kept on file in the office of the Commissioner of Agriculture.

Milk classification by bacterial estimate is shown in the following table:

<u>Grade Classification</u>	<u>Direct Microscopic Count, Standard Plate Count, or Plate Loop Count</u>	<u>Resazurin reduction time to Munsell color standard 5 P 7/4</u>
Grade One		
Can	not over 500,000/ml	not less than 2 1/4 hrs
Bulk	not over 500,000/ml	not less than 3 1/4 hrs
Grade Two		
Can	not over 3,000,000/ml	not less than 1 1/2 hrs
Bulk	not over 3,000,000/ml	not less than 2 1/2 hrs
Undergrade		
Can	over 3,000,000/ml	less than 1 1/2 hrs
Bulk	over 3,000,000/ml	less than 2 1/2 hrs

Milk found to rate Grade One or Two may be accepted by the plant.

Undergrade milk is considered probational. The producer and the Minnesota Department of Agriculture, Dairy Industries Division must be notified immediately of any milk that classifies as undergrade. Milk from that producer can be accepted for a period not to exceed four weeks. During the four-week probationary period, the milk must be sampled and tested at least on a weekly

basis. The producer and the Minnesota Department of Agriculture, Dairy Industries Division are notified immediately of these test results. If at the end of this four-week time period the milk does not satisfy the bacterial requirements, it must be rejected from sale. No milk from a rejected producer can be offered for sale for human consumption nor can a dairy plant accept it until such time as authorization is given by the Commissioner of Agriculture.

For the dairy plant, test results of commingled (storage tank) milk must not exceed a bacteria count of 3,000,000/ml.

Abnormal Milk: Milk from each producer must be tested at least four times during any six-month period for the presence of unwholesome abnormal secretions. Such secretions may derive from mastitic conditions or be of physiological or environmental origin.

Milk is considered acceptable as long as it does not exceed the following screening test results:

- * California Mastitis Test -- Weak Positive (CMT 1+)
- * Modified Whiteside Test -- Positive (1+)
- * Wisconsin Mastitis Test -- WMT value of 21 mm

Milk samples that exceed the above test results must undergo confirmation analysis. That is, they must be tested by somewhat more sensitive methods. Approved methods include the Direct Microscopic Somatic Cell Count (DMSCC) (or equivalent method) or the Electronic Cell Count Method (ESCC). The DMSCC or ESCC test may be run on all producer milk in lieu on any screening tests.

Acceptance or Rejection of Milk: Whenever a sample of milk, tested by a confirmatory method, indicates presence of more than 1,500,000 somatic cells per ml, the dairy plant must inform in writing both the producer and the Minnesota Department of Agriculture Dairy, Industries Division of this fact. If the next test result (obtained no less than three days and no more than

21 days after the previous sample was taken) is also found to exceed 1,500,000/ml, the producer's milk must be rejected until further tests indicate to the Minnesota Department of Agriculture that the milk satisfies the requirements of this standard. The notice provision remains in effect as long as two of the last four consecutive samples exceed 1,500,000 cells/ml.

Antibiotics and/or Bacterial Growth Inhibitors

A test for presence of antibiotic residues or bacterial growth inhibitors must be made on a separate or commingled sample of each producer's milk at least four times during each six month period. The test to be used must be approved by the Commissioner of Agriculture. Any producer's milk found to yield a positive test must not be accepted until a subsequent test indicates negative results.

Radionuclides

A test (performed by the regulatory authority) for level of radio-active elements in composite samples of milk is required at regular intervals as deemed necessary to protect the consumer.

Pesticides

A test (performed by the regulatory authority) for pesticides in composite samples of milk from selected areas within the state must be made as deemed necessary to adequately protect the consumer.

Summary of Bases for Rejecting Milk

The dairy plant must reject milk that does not meet acceptable quality standards. In summary, the reasons for rejection include a milk supply that (1) fails to meet requirements for sight and odor, (2) classifies as a number 4 in sediment test, (3) fails to meet the bacterial standards over four consecutive weeks following a count in the probationary (undergrade) range, (4) fails the

standards for somatic cell count, (5) is found positive for antibiotics, (6) exceeds standards for either radionuclides or pesticides (as determined by the Minnesota Department of Agriculture, Dairy Industries Division), and (7) contains added water.

Required Dairy Plant Responsibilities

The dairy plant or its specified laboratory is responsible for testing the milk in the appropriate manner, for reporting results or, in certain cases, notifying producers of unacceptable test results.

The dairy plant is prohibited from accepting milk that fails to meet the standards summarized above. Beyond those standards of acceptability, the dairy plant carries the responsibility for determining the acceptability of milk supplied by all of its producers.

New Producers: No dairy plant can pick up or accept milk from any new producer until the farm is inspected and certified. Bacteria and other quality test results must be within the established standards and all of those tests must be performed on a sample or samples obtained from the first pick-up.

Transfer Producers: Prior to acceptance of milk from any producer who, for whatever reason, has discontinued selling milk to one plant and now wishes to sell to another, the new buyer (plant) must request and receive from the Minnesota Department of Agriculture, Dairy Industries Division, a copy of the milk quality records covering at least the preceding 90 days.

Record of Tests: Accurate records of quality tests performed on producer supplies of milk must be kept on file by the person taking the tests for at least one year thereafter, and a copy of all test results must be sent to the Minnesota Department of Agriculture, Dairy Industries Division.

Field Service: A representative of the dairy plant will be available to provide information and assistance in readying any farm for the initial certification. A dairy plant field representative should also be available to provide on-site assistance to upgrade milk quality as test results demand, and to encourage production of high quality milk.

MILK PRODUCTION FACILITIES

General Considerations

Separation of Dairy Area: *Swine and fowl carry diseases potentially dangerous to man; they must not enter a dairy barn, stable, milking parlor, or milkhouse. Exclude swine from the holding or bedded area in loose-housing systems. Confine horses, dry cows, calves, and bulls in stalls or pens that are kept clean and in good repair. Tight partitions between the dairy area and all other areas are essential.*

Feed Storage: *Restrict feed storage, grinding, and mixing to a section separated from the milking area and milkhouse by dusttight partitions and doors. Close off this section at all times except during feed transfer. Good venting to the outside reduces dust problems and explosion hazards. Equip hay chutes with hinged or sliding doors and keep them closed except when in use. Also place a door between the silo and cow milking area.*

Approaches and Holding Area: You can produce low bacteria-count, sediment-free milk consistently only if your cows and milking area are clean. A concrete approach or ramp is recommended for all doorways and walks leading from the barn. This approach or ramp helps prevent injury to cows and reduces the amount of mud and manure tracked into a barn. Make it at least 8 feet long and as wide as the door.

For loose-housing systems, you should consider several other factors.

- * Provide a concrete holding area where cows may assemble prior to milking. Slope it to drain away from the milking area. Allow 20 square feet per cow or 400 square feet for a herd of up to 20 cows. For each cow over the 20 add 10 square feet.
- * Separate the holding area from the bedded area with a fence, plank, skirt, concrete wall, or other similar structure. This separation prevents manure and straw from collecting in the holding area, which must be kept clean and free from accumulated manure or liquids.
- * Slope the holding area floor to form a ramp to the milking stall level. Or, if you prefer steps, make treads 16 to 24 inches deep with a rise of no more than 8 inches. For outlet ramps, a slope no steeper than 1:4 (3 inches per foot of run) is recommended.
- * Grade and drain the cowyard and feeding area and keep them free of standing pools and manure accumulations. A paved area of 100 square feet per cow is recommended. If you don't pave the entire lot, minimal paving should cover: (1) a 10-foot-wide strip in front of the loafing barn, running the entire length, and (2) at least 7 feet around the hay feeder.
- * Whenever possible, slope the lot 2-4 feet per 100 feet (one-fourth to one-half inch per foot) away from loafing, holding, milking, and milk-handling areas.
- * Install a watering tank or automatic waterer with heating device for winter months. Place it on a concrete platform in a protected area. Heated automatic

waterers are satisfactory. Do not install the waterer in the bedded area because wet and muddy conditions usually develop. Instead, locate the waterer in a protected place where it may be opened to the inside of the barn during severe weather and to the outside during good weather.

Milking Facility and Housing

Provide a milking barn or parlor of sufficient size and arrangement to permit sanitary milking operations. Regulations require that this area be well lighted and ventilated. The floor must be constructed of concrete or other impervious material. Keep this facility clean, remove manure daily and store it so as to prevent cows from gaining access to it and also to avoid major accumulations.

MILKHOUSE OR MILKROOM DESIGN

(for stanchion and loose-housing installations)

Location: If your milkhouse is to be attached to the barn, locate it on the clean side or end readily accessible to the roadway. *Either a milkhouse outside the barn or a milkroom inside the barn will satisfy requirements of the Milk Standards Act of 1983.*

Size: The milkroom or milkhouse is the area set aside for filtering, cooling, and storing milk and for cleaning and storing dairy utensils. Table 1 shows the suggested floor area based on volume of milk production. A minimum width of 12 x 14 feet is necessary. The minimum recommended milkhouse size is 12 x 14 feet. Important: In choosing milkroom dimensions, plan for herd expansion and/or conversion to bulk.

Table 1. Suggested milkroom floor area based on volume of milk production.

Milk production, gallons per day	Floor area in square feet		
	Can milk	ED bulk*	EOD bulk†
50 or less	168	168	168
51-100	168	192	216
101-160††	192	208	240

* ED is everyday pickup.

† EOD is every-other-day pickup.

†† Add 0.4 square foot of floor area for each gallon over 160 to the amount given in the proper column.

Bulk Tank Clearances: Recommendations for bulk tank clearances from walls or other equipment are as follows:

- * Working side -- not less than 24 inches
- * Outlet valve end -- 36 inches
- * Rear side -- not less than 24 inches
- * Side opposite outlet valve -- not less than 24 inches

Provide six inches clearance between the bottom of the bulk tank and the floor. A minimum of 4-inch clearance is considered adequate, however, if the bottom of the tank slopes upward to at least 6 inches in a horizontal distance of 12 inches.

Tanks designed for installation on concrete islands are acceptable as long as (1) the island itself is not less than 6 inches high, (2) the island is sealed to or is an integral part of the floor, and (3) the bulk tank is sealed to the island.

Hose Port: Provide a fixed, flytight, self-closing opening in an exterior wall for the milk conductor tube of bulk systems. The base of this hose port must be at least 6 inches off the milkhouse or milkroom floor. A small platform or slab constructed of concrete or other impervious material shall be provided under the hose port.

Truck Approach: Prevent pooling of water and make it possible to prevent

the milk hose of transport trucks from contacting the ground. To do so, a properly graded and surfaced truck approach is recommended. In addition, bulk systems shall be designed to make it possible to activate the milk-pump motor of the truck without opening a milkroom door or window. An outside, all-weather outlet is recommended.

Floor Drainage: House, milkhouse or milkroom and toilet wastes must be disposed of in a manner that prevents pollution of the soil surface, contamination of any water supply, or exposure to insects. Regulations require that:

- * liquid wastes be disposed of in a sanitary manner, with all floor drains accessible and trapped if connected to a sanitary sewer; no drain openings may pass through the milkhouse or milkroom wall.

- * floors be sloped to drain so that no pools of standing liquid waste occur; a slope of not less than 1/4 inch per foot to the drain is recommended; joints between the floor and walls must be watertight.

To lessen danger of freezing, and to permit ready draining of bulk tanks without flooding the floor, it is recommended that floor drains be placed at least 1 1/2 feet from an outside wall but near wash vats. Do not place floor drains under a bulk tank.

MILKHOUSE OR MILKROOM CONSTRUCTION

Floor: Construct the floor of smooth, dense concrete or other impervious material. Floors must be stable to ensure year-round accuracy of milk measurements in bulk tanks. In addition, permanent scribe marks shall be made on the milkhouse floor indicating the position on which the bulk tank must be located; painted marks are not considered adequate. Maintain floors in good repair.

To provide proper flooring, it is recommended that topsoil be removed, then the area backfilled with at least 8 inches of sand, gravel, or crushed rock. A 5-inch-thick floor should ensure proper strength and rigidity. To protect wall

sheathing from excessive wetting, the concrete footing can be extended about 6 inches above the floor.

Interior Walls and Ceilings: *Regulations require that walls and ceilings be sealed, be kept clean and in good repair, and be constructed so as to prevent entrance of dust, dirt, flies, or other pests or contaminating materials.*

To meet the above requirements, use smooth, tight construction. Suggested materials include: matched lumber (shiplap or flooring), exterior plywood, fiberglass or similar materials on lumber backing; concrete block, or other masonry.

It is recommended that the bottom 4 feet of the wall be waterproof or water resistant. Apply seal to this section to permit washing over an extended time.

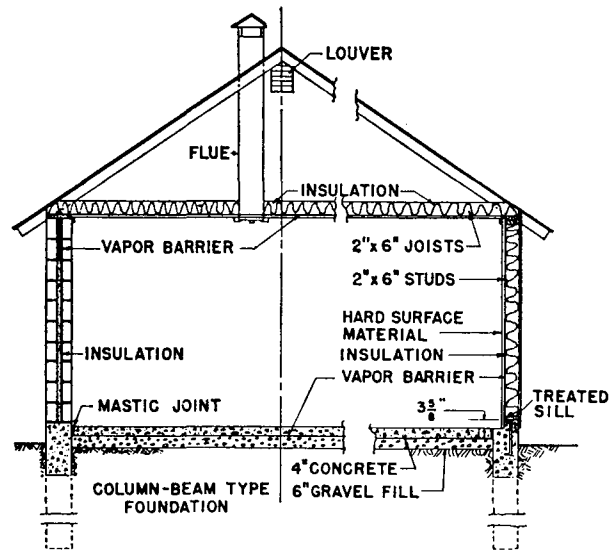
Upper sections of walls and the ceiling should also be sufficiently waterproof to permit cleaning as needed. Interior walls, regardless of construction material, should be of light color. Apply seal to all concrete blocks.

Insulation: Insulation reduces your heating cost and helps ensure proper ventilation; therefore it is recommended that you insulate all exposed outside walls. Frame construction should be double-walled with sheathing on the inside and outside of studs. Use at least 1½ inches of insulation in both sidewalls and ceilings; 3½ inches are recommended in sidewalls and 4-6 inches in ceiling. Install a vapor seal between inside sheathing and studs to prevent moisture transfer inside building (see right sidewall, figure 1).

If you use single concrete block walls, fill them with insulation. Furring strips 2 x 2 inches, attached to the inside of the concrete block, are recommended. Fill spaces between blocks and inside sheathing with insulation.

You may also use a double 4-inch block wall; place 2½ inches of insulation between rows of blocks (see left sidewall, figure 1).

Figure 1. Milkhouse cross section.



Ventilation: Adequate ventilation must be provided both in summer and winter to minimize odors and moisture condensation on floors, walls, ceilings and utensils. Fan ventilation with thermostatic control is recommended, and also outside fresh air inlets, with cross section area equal to 1 square foot per 750 cubic feet per minute (cfm) of fan capacity. Fan capacity expressed in cfm should equal one-sixth the cubic volume (length x height x width) of your milkhouse. For example, a 12 x 14 x 8 foot milkhouse requires a fan of 224 cfm capacity ($12 \times 14 \times 8 \times 1/6 = 224$).

Heating: You must provide sufficient heat to prevent freezing.

Lighting: Regulations call for "adequate" natural or artificial light, or both. It is recommended that there be, for bulk installations, one watt of light per square foot of floor area plus a 150-watt bulb located above and beyond each end of the tank. No lights are allowed directly over the bulk tank openings.

Equipment: Milking equipment, preferably stainless steel, must be durable and seamless. Milk cans also must be durable and seamless and free of rust

or milkstone, both of which effect quality of milk. Farm bulk tanks, milk pumps, pipelines, and fittings must meet 3A Sanitary Standards specifications as to design, finish material and construction.

All farm bulk tanks shall be equipped with an approved indicating thermometer having a minimum range of 32° to 100°F, with extensions on either side permitted and protected against damage at 0°F and 220°F.

Cleaning Facilities -- Wash Vat: You must provide a sound, clean wash and rinse vat for use in the milkhouse or milkroom. A double-compartment vat is recommended but a single compartment unit is considered satisfactory if it is equipped for easy drainage and is rinsed between washing and rinsing of equipment.

The vat may be constructed of sound porcelain enamel, well-tinned metal, or stainless steel. It must be large enough to wash and rinse the largest piece of equipment used. It cannot be used as a storage unit for supplies, equipment, etc., except that milking machines may be stored on the vat using proper racks. Waste water must be disposed of in a sanitary manner (see Floor Drainage, Disposal Systems).

Utensil rack: You will need a utensil rack, preferably constructed of metal, mounted or standing high enough off the floor to prevent contamination of cleaned equipment. A rack also allows drainage of wash and rinse solutions. Dry equipment prevents bacterial growth.

Milk Cooler: A milk cooler, whether can, bulk, or plate type, must be located in the milkroom or milkhouse. Regulations require that it be clean, free from offensive odors, and in good operating condition for year-round use.

The minimum cooling method allowable would be a tank with running water at a temperature capable of satisfactorily cooling milk in cans.

Any tank or can cooler must be large enough to hold the number of cans

required during peak production. Bulk tanks or plate coolers also need be of capacity that is adequate to properly cool both the lowest and highest volumes of milk produced throughout the year.

Water for Cleaning: *Hot water may be made available by (1) a hot water system under pressure, (2) a pot hot water heater, or (3) hand carrying hot water to the milkhouse or milkroom. The water system required depends upon the method of milking and/or handling of milk:*

* *Pipeline systems -- Hot water under pressure is required. It is recommended that the hot water heater be of not less than 30-gallon capacity, with thermostat and heating elements capable of maintaining water at 140°F.*

* *Bulk tank system without pipeline -- Water under pressure is required. The system may be cold water only, but only if a satisfactory method of heating water is provided in the milkhouse or milkroom. Hot water under pressure is recommended.*

* *Can system -- An adequate supply of water is required. Water under pressure is recommended but not required as long as a satisfactory method of heating water and providing hot water to the milkhouse or milkroom is used and is found to satisfy cleaning requirements.*

Screening: *All outside openings of the milkhouse or milkroom must be effectively screened during the fly season. Windows and doors are also required to be closed during dusty weather.*

Doors: *You must provide a door for any direct opening between the milkhouse or milkroom and the barn, stable, milking parlor, or any room used for domestic purposes. Doors must be solid, tight-fitting, and self-closing. If this door is hinged to swing inward, provide it with an outward opening screen door during the fly season.*

Doors of milkhouses or milkrooms may be hinged to be single or double

action in style.

Detailed Construction Plans

The preceding milkhouse or milkroom construction information will serve general needs. For a fee, however, detailed plans may be obtained from the Midwest Plan Service. These plans may be ordered from: Agricultural Engineering Extension, 201 Agricultural Engineering Bldg., University of Minnesota, St. Paul, MN 55108.

General Housekeeping

The milkhouse or milkroom is the area set aside for cooling and storage of milk and for washing, sanitizing, and storage of milking utensils. Keep this area uncluttered. Do not store equipment or materials here that are unrelated to general upkeep. Odor-causing compounds will impart off-odors and flavors to milk. Kerosene, various other petroleum-based products, and certain medicinals carry strong odors readily absorbed by milk. In addition, regulations specifically prohibit storage of pesticides (insecticides, rodenticides, herbicides, fungicides) and medicinals in the milkhouse or milkroom. Not only do these compounds often carry strong odors, many are white, milk-like fluids at use strength. Accidental contamination of milk has occurred in the past; it could readily happen again. Store insecticides -- except those specifically approved for the use in the milkhouse -- out of the milkhouse or milkroom.

Provide a cabinet or suitable container in the milkroom for storage of single-service items such as strainer pads, gaskets, paper towels, etc. Do not use single-service items more than one time.

MILKING PROCEDURE

Regulations require that udders and flanks of all milking cows be kept clean. Manure, dirt, hair and other soil readily gain entrance to milk from these sources, adding significantly thereby to the sediment content of milk. Clip

and brush flanks and udders regularly. Wash and wipe dry udders and teats in approved sanitizer just prior to milking. Always use disposable paper towels, one or more per cow, and discard used towels before moving to the next cow. Not only will cows be kept cleaner, bacteria counts will be reduced, spread of mastitis bacteria will be minimized, and cows will milk faster and more completely (see Food Science and Nutrition Fact Sheet No. 11).

Cleaning and Sanitizing Milking Equipment

All milking equipment, all equipment in which milk comes in contact, should be washed, rinsed, drained, and stored in a dry condition after milking or after use. Sanitize and properly drain sanitizer from equipment just prior to use. If improperly used, detergents and sanitizers will cause off-flavors in milk. Some, if present in milk, may reduce or prevent cheese and other milk cultures from growing; products go to waste. For information on cleaning and sanitizing milking equipment, see Food Science and Nutrition Fact Sheet No.9.

WATER SUPPLIES

Regulations require a safe sanitary water supply for cleaning dairy equipment. Water may originate from a spring, a dug well, driven well, bored or drilled well as long as it complies with standards set forth by the Minnesota Department of Health Water Well Construction Code (7 MCAR, Sec. 1.210 - 1.224). If an existing water supply on a manufacturing grade dairy farm does not at present comply with standards for location and construction of wells, the supply may yet be used -- no new well need be constructed -- if the water supply is tested annually (by an approved laboratory) and found to be safe and sanitary.

If water supplies from improperly located wells do not prove safe, or if repairs or reconstruction of a well is found necessary, a new well (or the repaired well) must meet construction requirements as set forth by the Minnesota Department of Health Water Well Construction Code and the Minnesota Department

of Agriculture.

Before putting in a new water and/or sewage installation, you should secure approval of your plans from the local health or milk regulatory personnel. The following general regulations normally apply:

Well Location: Locate a new well a minimum of 150 feet from a preparation or storage area of spray material or commercial fertilizer that may result in pollution of soil or ground water. Place the well at least 100 feet from below-grade manure storage areas if in conformance with Minnesota Pollution Control Agency (MPCA) rule SW 52(2)(E).

A new well should also be located a minimum of 75 feet from cesspools or sewage leaching pits. Allow 50 feet between the well and a septic tank, sub-surface disposal field, grave, animal or poultry yard or building, privy, or other contaminants that may drain into the soil.

Also place a new well a minimum of 20 feet from a buried sewer constructed of cast iron or plastic pipe (ASTM 2665 for polyvinyl chloride pipe or ASTM 2661 for ABS acrylonitrile - butadiene - styrene pipe as prescribed in the Minnesota plumbing code 7 MCAR, Sec. 1.123 C.3.) with tested water-tight joints, a pit or unfilled space below ground surface, a sump or a petroleum storage tank; except that a well may be drilled closer than 20 feet to an approved basement, but no closer than as provided in 7 MCAR, Sec. 1.217 D.1.

Still other location standards exist for wells with casings of less than 50 feet in depth that do not encounter less than 10 feet of impervious material. These wells must be placed at least 150 feet from cesspools, leaching pits, or dry wells, and at least 100 feet from sub-surface disposal fields, manure storage piles, or similar sources of contamination.

A sealed well casing must extend from at least 10 feet below ground surface to at least 6 inches above the well platform. Install a concrete slab at least

4 feet square around the well casing, unless excepted by the Minnesota Well Code. Have the surface slope away from the well.

In Minnesota, all future well construction must comply with standards of the Minnesota Department of Health as designated in Code 7 MCAR, Sec. 1.210 - 1.224. No inlets are permitted through which safe water may be contaminated. No cross connections should exist between a safe and an unapproved or unsafe water supply.

Pump Location: Install a pneumatic pressure water system - don't install any pump or pumping equipment in a pit. An approved pitless unit placed in an insulated above ground pumphouse is recommended. You may place the pressure tank of a pitless unit in the house basement or other similar location. But don't install the pump in a belowground room or pit off the house basement. And don't store other materials in an aboveground insulated pumphouse or other pump enclosure.

The base plate of a pump placed immediately over the well should form a watertight seal with the well casing.

Piping: You may use approved plastic, galvanized iron, or copper piping. If the pump is offset from the well, no suction pipe (all shallow well pumps and inlet pipes on jet pumps) should come in direct contact with the earth. Install all such piping inside a watertight casing. In a two-pipe system, one inside the other, attach the outer pipe to the pressure side and the inner pipe to the suction side of the pump.

Don't locate a water pipe within 10 feet (measured horizontally) of any sewer, drain, or other pipe that carries polluted water unless: (1) the bottom of the water pipeline is above the top of the sewer line, (2) the water line is placed on a solid shelf excavated to one side of the common trench, or (3) parts of the sewer line lying within 10 feet of the water line are of cast iron with

leaded joints or the equivalent.

Water from Sources Other Than Wells: Obtain detailed plans for developing and using water supplies from springs, cisterns, or sources other than wells from your local health or milk regulatory personnel.

New Water Supplies and Contaminated Water Supplies: New water supplies or water that has become contaminated must be thoroughly disinfected before being used. Use a solution containing not less than 50 parts per million (ppm) available chlorine. This treatment may not be necessary with a flowing well or spring. To check effectiveness of chlorination, samples must be analyzed bacteriologically. Repeat disinfection, if necessary, until you obtain satisfactory results.

DISPOSAL SYSTEM

Install a disposal system with sufficient capacity to dispose of all wastes from the milkroom and milking parlor. Wastes from a toilet stool must not run into the disposal system for milkroom and parlor wastes.

Milkroom and milking parlor wastes may be disposed of in a common disposal system. This combined waste has a considerable load of fibrous material that does not readily break down. A settling tank with a removable top that permits cleaning regularly is recommended. Liquid wastes then may be run off in a disposal field or seepage pit. Underground treatment is possible when the volume of liquid is small and soil allows good drainage. For moderate or high volumes of liquid, land surface or lagoon systems may serve best. See Agricultural Extension publication M-159, Treatment and Disposal of Milkhouse and Milking Parlor Wastes, for details.

CERTIFICATION AND INSPECTION OF FARMS

Dairy farms meeting the standards set forth in this publication should meet all certification requirements. However, certification per se requires an initial inspection and approval by a Minnesota Department of Agriculture Dairy Sanitarian or an approved representative of the Minnesota Department of Agriculture Dairy Industries Division. If the farm fails the initial inspection, a second inspection is made within an assigned time period before the final certification date of July 1, 1985. At this point, the farm is either approved -- and certified -- or authorization to sell milk for human food is withheld until the farm does in fact qualify. Provided that, if inspection reveals the need for extensive changes requiring capital investment, a reasonable extension of the time limits may be requested in writing from the Commissioner of Agriculture. When a farm is certified, the producer will be given a copy of the Farm Certification Report Form.

After the initial certification, all certified farms will be inspected annually to determine eligibility for recertification. The procedure followed for the annual inspection is the same as for the initial certification. If deemed necessary, the regulatory agency can require an examination of a herd by a licensed veterinarian.

Expiration or Revocation of Certification

Farm certification expires and becomes renewable 1 year after the date of certification unless revoked earlier for some specific reason. No certifications are transferable.

If at any time a Minnesota Department of Agriculture Dairy Sanitarian or the agency's approved representative finds that a certified farm no longer meets requirements for certification, the regulatory agency may allow reasonable time (probationary period) for the farm to be brought into compliance. Failing in this respect, the certification is revoked and milk can no longer be offered for human consumption.

If, at any time after certification has been withheld or revoked and the necessary changes are made on the farm, the producer may apply for reinspection. Finding the farm in compliance, a Minnesota Department of Agriculture Dairy Sanitarian or the agency's approved representative will then re-certify the dairy farm.

