

1958

## EC1322 Revised 1958 Nebraska Grade A Milk Production

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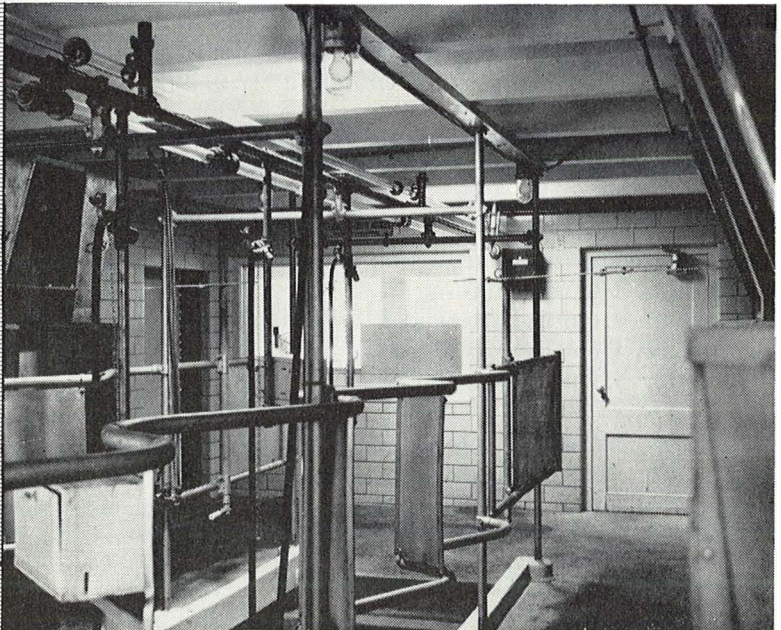
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# Nebraska Grade A Milk Production

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requirements and  
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EXTENSION SERVICE  
UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE  
AND U. S. DEPARTMENT OF AGRICULTURE  
COOPERATING  
W. V. LAMBERT, DIRECTOR

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## PREFACE

The U. S. Public Health Service, in cooperation with state and local regulatory agencies and the dairy industry, has published recommended requirements for the production of Grade A milk. The latest edition of these requirements was issued in 1953. Although these recommendations have no legal standing as such, they have been adopted by many towns and cities as local milk ordinances and some states have adopted them as minimum standards for the production of Grade A milk.

One of the problems that has faced the dairy industry, however, has been the occasional difference in interpretation of Grade A requirements found between different markets. In 1953 the State of Nebraska adopted the U. S. Public Health Service recommendations as minimum standards for the production of Grade A milk. This action had the effect of making uniform the requirements for Grade A milk throughout the entire state.

The purpose of this publication is twofold, (1) to make the regulations available to Grade A producers, county agricultural agents, fieldmen, milk haulers and others who are concerned with sanitary regulations and (2) to promote between different markets a uniform interpretation of the regulations for the production of Grade A milk.

Material in this bulletin is divided into four parts, (1) the actual legal requirement, (2) the public health reason for the requirement, (3) what has been deemed to be satisfactory compliance over the entire country and (4) an explanation of how these requirements can be most satisfactorily complied with in Nebraska.

Parts (1), (2) and (3) are taken directly from the USPHS Recommended Milk Ordinance and Code, 1953 Edition and the Nebraska Grade A Milk and Milk Products Rules and Regulations, 1953. Part (4) (Explanation) has been drawn up by the Nebraska Grade A Steering Committee. This committee is composed of representatives of regulatory agencies, the dairy industry and the University of Nebraska. During the time this bulletin was being prepared the following individuals were members of this committee:

Name	Address	Representing
M. D. Graham, Chairman	Omaha	Milk Processors
J. L. King	Omaha	Milk Processors
S. H. Rasey	Omaha	Milk Processors
M. B. Crabill	Omaha	Local Health Department
Orville DeFrain	Lincoln	Local Health Department
L. F. Hanson	Grand Island	Local Health Department
Oscar Wiberg	Scottsbluff	Local Health Department
Dorsey Davis	Wahoo	Nebr.-Iowa Coop. Milk Ass'n.
Ed Anderson	Valley	Nebr.-Iowa Coop. Milk Ass'n.
Willard Grant	Omaha	Nebr.-Iowa Coop. Milk Ass'n.
Robert Kochler	Fremont	Nebr.-Iowa Coop. Milk Ass'n.
Lawrence Liebers	Lincoln	Producer-Distributor
Myron Rumery	North Platte	University of Nebraska
T. A. Evans	Lincoln	University of Nebraska
John L. Jobs	Lincoln	Nebr.-Iowa Milk Carriers Ass'n.
George Luenenburg	Arlington	Nebr.-Iowa Milk Carriers Ass'n.



In addition to the above named members of the Steering Committee, the following individuals assisted with the preparation of this material: Chas. Fahrenbach, State Department of Health; Gould Flagg and H. H. Gannon, State Department of Agriculture; E. A. Olson and M. L. Mumgaard, Agricultural Extension Service; and P. L. Kelly, Chairman, Dairy Department, University of Nebraska.

Material in this bulletin will serve as a guide for both present and prospective Grade A milk producers. Before doing any building or making any alterations in present facilities, however, the producer should contact either the local health department or the State Department of Agriculture, Lincoln.

Material in this publication was compiled and edited by T. A. Evans, Extension Dairy Marketing Specialist, University of Nebraska.

The following material is in the same order as found in the 1953 Milk Ordinance and Code (third printing), pages 48 to 73. Copies of the complete bulletin (Milk Ordinance and Code, 1953 Recommendations of the Public Health Service) can be obtained by writing your Senator or Congressman, Washington, D. C.

## DEFINITIONS

1. *Milk*—the lacteal secretion, practically free from colostrum, obtained by the complete milking of one or more healthy cows, which contains not less than 8¼ per cent milk solids not fat and not less than 3¼ per cent milkfat.
2. *Cream*—a portion of milk which contains not less than 18 per cent milkfat.
3. *Milk Producer*—any person who owns or controls one or more cows, from which a part or all of the milk or milk products is sold, or offered for sale.
4. *Milk Distributor*—any person who offers for sale or sells to another any milk or milk products for human consumption as such.
5. *Producer-Distributor*—a milk producer who is also a milk distributor.
6. *Dairy or Dairy Farm*—any place or premises where one or more cows are kept, a part or all of the milk or milk products from which is sold or offered for sale.
7. *Dairy Barn or Stable*—a structure in which cows are housed, fed and milked.
8. *Milking Room or Parlor*—a structure in which cows are milked and fed concentrates but are not housed.
9. *Milk Room*—a room wholly or partly enclosed by the structure in which the cows are milked, in which raw milk is cooled and stored, utensils and equipment are washed, sanitized and stored, and other operations incidental to the production of milk are conducted.
10. *Milk House*—Same as milk room, except that it is not a part of, but may or may not be connected with any other structure.

## GRADE A RAW MILK FOR PASTEURIZATION

Grade A raw milk for pasteurization is raw milk from producer dairies conforming with the following items of sanitation. The bacterial plate count or the direct microscopic clump count of the milk, as delivered from the farm, shall not exceed 200,000 per milliliter, as determined in accordance with Section 6.<sup>1</sup>

### Item 1r. Cows—Health

#### Regulation

All milk for pasteurization shall be from herds located in a modified accredited tuberculosis-free area, as determined by the United States Department of Agriculture, and which have been tested for tuberculosis not more than six years prior to the adoption of this ordinance and at least every six years after such test: Provided, that herds located in an area that fails to maintain such accredited status, or that has an incidence of bovine tuberculosis in excess of 0.2 per cent, shall have been accredited by said Department as tuberculosis-free, or shall have passed an annual tuberculin test. All additions to such herds shall be free from tuberculosis. Said tests and retests shall be made, and any reactors disposed of, in accordance with the latest requirements approved by the United States Department of Agriculture, for tuberculosis-free, accredited herds in effect at the time of the adoption of this ordinance. A certificate identifying each animal, signed by the veterinarian or attested to by the health officer, and filed as directed by the health officer, shall be evidence of the above test.

Within 3 years after the adoption of this ordinance, all milk and milk products for pasteurization shall be from herds certified by the State Livestock Sanitary Authority as following either Plan A or Plan B approved by the USDA for the eradication of brucellosis. Evidence of this certification shall be filed as directed by the health officer. All additions to the herds shall be brucellosis-free. Tests and retests shall be made, and any reactors disposed of, in accordance with the latest requirements approved by the USDA, in effect at the time of the adoption of this ordinance.

A certificate identifying each animal, signed by the veterinarian and the director of the laboratory making the test, and filed as directed by the health officer, shall be evidence of the above test.

Cows which show a complete induration<sup>2</sup> of one quarter or extensive induration in one or more quarters of the udder upon physical examination, whether secreting abnormal milk or not, shall be permanently excluded from the milking herd: Provided, that this shall not apply in the case of a quarter that is completely dry. Cows giving

<sup>1</sup> Milk Ordinance & Code, 1953 Recommendations of the Public Health Service, p. 43.

<sup>2</sup> "Induration of the udder" means replacement of the normal glandular tissue by fibrous tissue.

bloody, stringy or otherwise abnormal milk, but without entire or extensive induration of the udder, shall be excluded from the herd until re-examination shows that the milk has become normal.

For other diseases, such tests and examinations as the health officer may require after consultation with State Livestock Sanitary Officials shall be made at intervals and by methods prescribed by him, and any diseased animals or reactors shall be disposed of as he may require.

### **Public-Health Reason**

The health of the cow is a very important consideration, because a number of diseases of cattle, including tuberculosis, brucellosis, Q-fever, salmonellosis, staphylococcal infection, and streptococcal infection, may be transmitted to man through the medium of milk. The organisms of most of these diseases may get into the milk either directly from the udder, or indirectly through infected body discharges which may drop, splash, or be blown into the milk.

The great reduction in the incidence of bovine tuberculosis in man in recent years indicates that the practice of good sanitation in animal husbandry, the testing of cattle and removal of the reactors from the herds and the pasteurization of milk, have been effective in the control of this disease. The reservoir of bovine tuberculosis still exists, however; hence, constant vigilance against this disease must be continued by industry and health agencies.

The incidence of brucellosis in man, on the other hand, is increasing at the present time, and a greater effort is required to reduce the extent of infection in cattle, and its transmission to man through milk.

Q-fever is a relatively newly recognized disease of cattle which may be transmitted to man through the use of milk. Within the last few years, this disease has reached endemic proportions in man in some parts of this country. Although no means of controlling Q-fever in cattle has yet been developed, pasteurization of the milk is the most practical safeguard against its transmission to man through milk.

Bovine mastitis is an inflammatory and, generally, highly communicable disease of the bovine udder. Usually, the inciting organism is a streptococcus of bovine origin (type B), but the disease is often caused by a staphylococcus or other infectious agent. Occasionally, cows' udders become infected with hemolytic streptococci of human origin, which may result in milk-borne epidemics of scarlet fever or septic sore throat. The toxins of staphylococci, and possibly other organisms, in milk may cause severe gastroenteritis. Some of these toxins are not destroyed by pasteurization.

### **Satisfactory Compliance**

(1) **Tuberculosis**—All milk for pasteurization shall be from herds which are located in a modified accredited tuberculosis-free area, as determined by the U. S. Department of Agriculture, and which have been tested for tuberculosis not more than six years prior to the adoption of this ordinance and at least every six years after such test.



Herds which are located in areas that fail to maintain modified accredited tuberculosis-free area status, or areas in which the incidence of bovine tuberculosis is higher than 0.2 per cent, either must be accredited by the USDA as being tuberculosis-free, or must have passed an annual tuberculin test.

All tests and retests for tuberculosis, and the disposal of reactors, shall be made either officially under the supervision of the USDA, or privately by a veterinarian accredited by the USDA. All additions to these herds, except calves born into the herd, shall be from herds certified by USDA as accredited tuberculosis-free herds, or shall be negative to a test made not more than 30 days prior to the addition to the herd.

(2) **Brucellosis**—Within the period specified in the third paragraph of this item, all herds producing milk which is to be pasteurized shall be certified as following either Plan A or Plan B approved by the USDA for the eradication of brucellosis, or certified to be free of brucellosis by the State Veterinarian.

All additions to the herd, except calves born into the herd, or vaccinated in accordance with the provisions for calf vaccination in the following paragraph, shall be free of brucellosis as determined by a negative test made not more than 30 days prior to such addition. The certification to be furnished by the producer shall consist of a copy of the test or vaccination chart approved by the USDA and issued by the State Livestock Sanitary Official.

This Ordinance does not prohibit the use of calf vaccination in herds required to be brucellosis-free. Calves which have been vaccinated at the age of 4 to 8 months with a vaccine approved by the USDA may be retained in the herd if they carry a blood-serum agglutination titer no higher than incomplete in a 1 to 100 dilution; and, prior to the time the animal becomes a milk producer such titer is stabilized or receding as determined by tests made at intervals of not less than 30 days or more than 60 days, and that there is no other evidence of brucellosis infection in the herd.

The health officer should follow the recommendations of the State and Federal livestock-disease-control officials, and assist them in developing brucellosis-free certified herds and areas. He should file his request for cooperative testing with the State veterinarian.

Ultimately, this ordinance will be revised to require all milk producing herds to be under Plan A; therefore, a dairyman who has brucellosis reactors in his herd is urged to eliminate a sufficient number of such reactors each year so that all reactors will have been removed from the herd within a period of 3 years after his entry into Plan B. A longer period of time may be needed in isolated instances where the incidence of brucellosis in the herd is higher than 50 per cent.

(3) **Other Diseases**—The milking herd shall be observed closely for evidence of disease. Satisfactory compliance with this item, with



respect to all diseases in dairy cattle, shall be based upon the diagnosis of a licensed veterinarian. With the exception of reactors for brucellosis under the USDA Plan B for the control of brucellosis, all diseased animals shall be removed from the herd and no milk therefrom shall be offered for sale.

### **Explanation**

**Tuberculosis**—For current requirements relative to testing herds for tuberculosis, it is suggested that both producers contemplating the production and those already producing Grade A milk consult their local veterinarian. It should be remembered that all herds producing Grade A milk must be tested at least once each six years and that a certificate signed by the veterinarian identifying each animal must be on file at a location approved by the local health officer.

**Brucellosis**—Owners of dairy herds desiring to produce Grade A raw milk will comply when a satisfactory blood test is on file in the Bureau of Animal Industry office.

Herds which have been approved for Grade A production and in which reactors or suspects are revealed in subsequent blood tests may continue delivering milk when the herd is handled according to requirements.

Any producer contemplating the production of Grade A raw milk should consult his veterinarian for the information and procedures needed to comply with the brucellosis regulations.

### **Item 2r. Milking Barn—Lighting**

#### **Regulation**

A milking barn, stable or parlor shall be provided. It shall be provided with adequate light, properly distributed, for both day and night milking.

#### **Public-Health Reason**

With milking done elsewhere than in a suitable place provided for this purpose, the milk may be contaminated. Adequate light makes it more probable that the barn will be clean, and that the cows will be milked in a sanitary manner.

#### **Satisfactory Compliance**

There shall be provided a milking barn, stable, or parlor. The milking portion of the barn shall be provided with sufficient natural or artificial light, so arranged as to insure that all surfaces and working areas will be easily visible. A minimum of 4 square feet of window space for each 60 square feet of floor space is recommended for new construction.

Artificial lighting must be provided for night milking, and must be used when natural light is not sufficient. This requirement shall

be considered satisfied when all portions of the barn are so lighted by natural or artificial light that cleaning and milking operations can be effectively performed.

### **Explanation**

#### **1. Remodeling old construction**

a. Doors opening to the outside should not be included as window area unless they contain windows.

b. Doors opening into vestibule or milking room or parlor should not be included as window area even though they may contain windows.

c. Include as many windows as practical but not an excessive number because of high heat loss and condensation problems.

#### **2. New construction**

a. Include 4 square feet of window space per 60 square feet of floor space in stallion type barn.

b. If possible, provide window area equal to 10 per cent of floor area in milking room or parlor.

c. Plastic windows permit less light transmission, amount of light coming through depending on color, brand, etc., and require considerably more square feet of window area.

d. Fixed windows are preferable if mechanical ventilation is used.

e. Glass blocks permit less light transmission and also cause high heat loss. Ordinarily, if glass blocks are used, the amount of window area should be doubled.

f. In milking room or parlor with "milking pit" install one light outlet opposite the rear of each cow on center line of pit area and one light outlet at each entrance and exit.

g. In milking room or parlor with cows in stallion type stalls install one light outlet for each 3 cows in front and one light outlet for each 2 cows in rear passageway.

h. In conventional stall barns install one light outlet every 2 to 3 stallions in litter alley and every 10 to 15 feet in feed alley.

### **Item 3r. Milking Barn—Air Space and Ventilation**

#### **Regulation**

Such sections of the milking barn, stable or parlor, where cows are kept or milked, shall be well ventilated, and shall be so arranged as to avoid overcrowding.

#### **Public-Health Reason**

This item is required in order to avoid overcrowding, and to insure proper ventilation.

#### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when there is sufficient air space and air circulation to minimize odors, to prevent

excessive condensation, and to permit rapid drying of floors. No overcrowding shall be permitted. It is recommended that a minimum of 400 cubic feet of air space per stanchion be provided in new barns.

### **Explanation**

1. Stanchion width—Recommend 42 inches, minimum of 40 inches.

2. Ventilation

a. An exhaust fan with suitable fresh air inlets is recommended for both conventional stanchion barns and milking rooms or parlors.

b. If use of mechanical ventilation is not possible, windows tipped back at the top will furnish some ventilation.

c. In cases where condensation persists mechanical ventilation and insulation should be installed.

d. Mechanical ventilation equipment should be large enough to provide at least six air changes per hour.

3. Insulation—To insure a dry and warm milking area, milking parlor walls and ceiling should be insulated. (Reference—Standards for Design and Operation of Loose Housing Systems for Dairy Cattle in the North Central Region, p. 306).

4. Heating—Building should be so constructed and heating equipment provided so that the temperature can be maintained at or above 45° F. during milking and not less than 35° F. between milkings.

### **Item 4r. Milking Barn—Floors—Animals**

#### **Regulation**

The floors and gutters of that portion of the barn, stable or parlor, in which cows are milked, shall be constructed of concrete or other approved, impervious and easily-cleaned material. Floors and gutters shall be graded so as to drain properly, and shall be kept clean and in good repair. No swine or fowl shall be permitted in the milking barn, stable or parlor. If horses, dry cows, calves or bulls should be stabled therein, they shall be confined in stalls, stanchions or pens, which shall be kept clean and in good repair.

#### **4r. (a). Floor Construction**

##### **Public-Health Reason**

Floors constructed of concrete or other impervious materials can be kept clean more easily than floors constructed of wood, earth or similar materials, and are, therefore, more apt to be kept clean.

##### **Satisfactory Compliance**

Floors should be made of good quality concrete, but may be of other similarly impervious material. Manure gutters shall be of concrete. Only such portions of milking-barn floors to which cows have access shall be required to be surfaced with impervious material. Feed alleys are included in this exemption, provided that they are floored

with tight wood or its equivalent, and are protected from washings or drainage from other parts of the barn floor. It is recommended, however, that feed troughs be of smooth-surfaced concrete with rounded corners and graded to drain, in order to facilitate cleaning.

Other portions of the barn shall be separated from the milking portion by railings or partitions. When bull pens, maternity pens or calf pens are not separated from the milking portion by a tight partition, the floors of such portions of the barn must be constructed of concrete or equally impervious material. If such other portions of the barn are not kept clean and free of dust and objectionable odors, tight partitions are required; in fact, tight partitions are recommended for all cases.

The floor should have an untroweled surface, in order to prevent slipping. When necessary to keep cattle in the milking barn, the floors may be bedded in order to prevent discomfort.

Concrete floors, in barns under construction or reconstruction, should have curbs where the floor joins the walls. These are desirable in order to promote cleanliness in the angles of the floor and walls, and to avoid rotting of wall sills and studs.

Technically gutters are not required under the wording of this section, but they should be urged by the inspector as a means of promoting cleanliness and improving drainage.

### **Explanation**

a. While gutters are not specifically required it is strongly recommended that they be provided in stanchion type barns.

b. In order to facilitate cleaning it is recommended that gutters be provided with drains.

c. Gutters are not required in pit type milking parlors but floor should be properly sloped to trapped drain to facilitate cleaning.

d. Manger curb to which stanchion is attached should be constructed in such a way that feed and debris will not collect. Concrete construction is recommended.

e. A small diameter pipe (1"-2") through the stanchion curb will provide a manger drain that will permit flushing and washing down of the manger.

f. If possible, concrete floors should be curbed with the same material up to a minimum height of six inches with the joint rounded at junction of floor and wall for easier cleaning and drainage.

g. Concrete floors in milking parlors should be finished with a wood float rather than a steel trowel. (Reference—Building Concrete Farm Structures)



#### **4r. (b). Floor Cleanliness**

##### **Public-Health Reason**

A clean floor reduces the chances of contamination of the milk or milk pails during milking. The presence of other animals increases uncleanness.

##### **Satisfactory Compliance**

This item shall be deemed to have been satisfied if the milking barn, stable or parlor floor is free of accumulations of filth or litter, except such as have accumulated since the beginning of the last milking period, provided that the floor is clean at the beginning of each milking period, and if swine and fowl are kept out of the milking barn.

When floors of milking barns are bedded, bedding containing more than one milking's accumulation of manure shall be considered as equivalent to unclean floors.

The method of cleaning is immaterial. Dairymen whose barns are provided with water under pressure should scrub the floors after each milking with a stiff-bristled brush. In barns in which water under pressure is not available, the floors may be brushed dry and limed. In the latter event, care should be exercised to prevent caking of the lime. When lime or phosphate is used, it shall be spread evenly on the floor as a thin coating. If clean floors are not maintained by this method, the inspector should require cleansing with water.

##### **Explanation**

It is required that horses also be excluded from the milking barn, stable, room or parlor.

#### **Item 5r. Milking Barn—Walls and Ceiling**

##### **Regulation**

The interior walls and the ceilings of the milking barn, stable or parlor shall be whitewashed or painted as often as may be necessary, or finished in an approved manner, and shall be kept clean and in good repair. Where there is a second story above the milking barn, stable or parlor, the ceiling shall be tight. If feed should be ground or mixed, or sweet feed should be stored, in a feed room or feed-storage space which adjoins the milking space, it shall be separated from the milking space by a dust-tight partition and door.

##### **Public-Health Reason**

Whitewashed, painted or properly finished walls and ceilings encourage cleanliness. Tight ceilings and feed rooms reduce the likelihood of dust and extraneous material getting into the milk.

##### **Satisfactory Compliance**

This item shall be deemed to have been satisfied if the walls and ceilings:

1. Have been whitewashed, or finished with cold-water paint, once every year or oftener if necessary.

2. Have been painted once every two years, or oftener if necessary. Barns newly constructed of wood shall be painted when completed.

3. Have interior finished surfaces of concrete, concrete block, brick, tile, galvanized iron, plaster or similar material, which may be accepted without painting; except that joints and rafters of the roof structure shall not be required to be whitewashed or painted, but must be kept clean; the use of wallboard attached to the rafters to make the ceiling tight shall be accepted; glazed windows shall be kept clean.

4. Are in good condition, with ceiling tight where there is a second story above the milking portion of the barn. If a hay opening is provided from the loft into the milking portion of the barn, such opening shall be provided with a tight door, which shall be kept closed when not actually in use. A dust-tight partition, provided with doors that are kept closed except when in actual use, shall separate the milking portion of the barn from any feed room in which feed is ground or mixed, or in which sweet feed is stored. Feed may be stored in the milking portion of the barn only in such manner as will not increase the dust content of the air, attract flies or interfere with cleaning of the floor (as in covered, dust-tight boxes or bins). Open feed dollies may be used for distributing the feed, but not for storing feed, in the milking barn.

When conditions warrant, the health officer may approve a barn without four walls extending from floor to roof, or a shed-type barn, provided the requirement of Item 4r prohibiting animals and fowl entering the barn is satisfied. Cattle housing areas (stables without stanchions, such as loose housing stables, pen stable, resting barns, holding barns, loafing sheds, wandering sheds, etc.) may be of shed-type construction, provided no milking is conducted therein. (They are classified as part of the cowyard under Item 6r.)

### **Explanation**

1. Use of whitewash is not recommended.

2. If feed is stored over the milking barn or parlor the ceiling should be sealed by one of the following methods:

a. Floor of mow or feed room constructed with tongue and groove flooring.

b. Use of a suitable tight material such as hard board, with joints sealed, laid on top of old floor.

3. Sealing material installed across joists may provide an ideal rodent harborage.

### **Item 6r. Cowyard**

#### **Regulation**

The cowyard shall be graded and drained as well as is practicable, and shall be so kept that there are no standing pools of water nor ac-

cumulations of organic wastes: Provided, that, in loafing and/or cattle housing areas, manure droppings shall be removed, or clean bedding added, at sufficiently frequent intervals to prevent the accumulation of manure on cows' udders and flanks. Swine shall be kept out.

#### **6r. (a). Grading and Draining of the Cowyard**

##### **Public-Health Reason**

The cowyard is interpreted to be that enclosed or unenclosed area in which the cows are apt to congregate, approximately adjacent to the barn, including cattle housing areas. This area is, therefore, particularly apt to become filthy with manure droppings, which may result in the soiling of the cows' udders and flanks. The grading and drainage of the cowyard, as far as practicable, are required because wet conditions are conducive to fly breeding, and make it difficult to keep manure removed and the cows clean.

##### **Satisfactory Compliance**

This item shall be deemed to have been satisfied:

1. When the cowyard has been graded and drained as well as local conditions will permit; all low places must in all cases be filled; and approaches to the barn door, and to stock tanks, should be preferably of concrete.

2. When the wastes from the barn and milk room are not allowed to pool in the yard.

The most satisfactory means of conducting milking barn wastes and wash water beyond the cowyard limits is through the construction of a drain. The drain, preferably, should be lined with concrete, tile or brick, although a well-kept, open earth ditch may be accepted. Open drains should be recommended, because of the danger of frequent clogging of closed drains, unless closed drains of adequate diameter and slope can be provided.

Cowyards which are muddy due to recent rains should not be considered as defective.

##### **Explanation**

1. It is recommended that a concrete apron one foot wider than entrance and at least 8 feet long be provided at the point where the cows enter the milking barn.

2. With elevated stalls or where a slope is encountered, steps are recommended rather than a sloping ramp. Steps should have an 18 to 24 inch run and not more than an 8 inch rise. Surface of steps should have a broom finish to help prevent cows slipping.

3. It is recommended that cowyards with poor drainage be paved. If costs make it possible to pave only a part of the cowyard each year, consideration should be given to long-range planning for proper drainage, arrangement, etc.

4. Gutter drainage



a. Open ditch drains through the cowyard may be used provided they carry drainage beyond the cowyard limit without pooling. Open drains should, preferably, be wide, shallow and concreted.

b. Covered tile drains are preferable to open ditch drains but the following conditions should be observed:

(1) A settling basin is provided at the outlet of gutter drain to retain as much of the solid material as possible.

(2) Drain lines are so located that traffic from heavy vehicles will not crush the tile.

(3) Adequate slope is provided from outlet of settling basin to end of tile (*not less than 1 foot nor more than 2 foot drop in 100 feet of drain with uniform slope throughout*).

(4) Drain is large enough to prevent clogging (6" minimum).

(5) "Cleanouts" are provided at all bends where greater than one-eighth tile-bends are used.

(6) "Cleanouts" are provided for each 100 feet of drain tile.

#### **6r. (b). Cleanliness of the Cowyard**

##### **Public-Health Reason**

If manure and barn sweepings are allowed to accumulate in the cowyard, fly breeding will be promoted, and the cows, because of their habit of lying down, will be more apt to have manure-soiled udders.

##### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when the cowyard is kept clean, and swine are not permitted in the cowyard.

Cattle housing areas (stables without stanchions, such as loose housing stables, pen stables, resting barns, holding barns, loafing sheds or wandering sheds) shall be considered as part of the cowyard. Manure, soiled bedding and waste feed may not be stored, or permitted to accumulate therein, in such manner as to permit the soiling of the cows' udders and flanks, nor be maintained in such manner that the manure pack is not properly drained or does not provide a reasonably firm footing for the animals. Excessive accumulations of waste animal feed shall be considered a violation of this item.

##### **Explanation**

For proper size of loafing area, holding pen, etc., see Standards for Design and Operation of Loose Housing Systems.

#### **Item 7r. Manure Disposal**

##### **Regulation**

All manure shall be removed, and stored or disposed of in such manner as best to prevent the breeding of flies therein and the access of cows to piles thereof.

##### **Public-Health Reason**

Improper manure disposal induces the breeding of flies, which are



considered capable of transmitting infection, by physical contact or through excreta, to milk or milk utensils. Flies visit insanitary places, and may carry disease organisms on their bodies. They may carry living bacteria for as long as 4 weeks within their bodies, and may pass them on to succeeding generations by infecting the eggs. The virus of poliomyelitis was isolated from flies during an epidemic. Community fly control, in Hidalgo County, Texas, resulted in a significant reduction in the amount of shigella and salmonella infection in humans.

Cows should not have access to piles of manure, in order to avoid the soiling of udders and the spread of diseases among cattle.

### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when the manure is:

1. Spread upon the fields.
2. Stored for not more than 4 days in a pile on the ground surface, and then spread upon the fields.
3. Stored for not more than 7 days in an impervious-floored bin, or upon an impervious-curbed platform, and then spread or stored in a tight, screened and trapped manure shed.
4. Fly breeding is minimized by the maintenance of clean surroundings and the use of effective larvicides or insecticides.
5. Requirements (1) to (4) above shall apply only during the fly-breeding season.
6. Manure and soiled bedding, if stored in a pile, shall be inaccessible to the cows.

### **Item 8r. Milk House or Room—Construction and Equipment Regulation**

There shall be provided a milk house or milk room, in which the cooling, handling and storing of milk and milk products, and the washing, bactericidal treatment and storing of milk containers and utensils, shall be done.

(a) The milk house or room shall be provided with a smooth floor, constructed of concrete or other impervious material, maintained in good repair, and graded to provide proper drainage.

(b) It shall have walls and ceilings of such construction as to permit easy cleaning, and shall be well painted, or finished in an approved manner.

(c) It shall be well lighted and well ventilated.

(d) It shall have all openings effectively screened, including outward-opening self-closing doors, unless other effective means are provided to prevent the entrance of flies.

(e) It shall be used for no purposes other than those specified above, except as may be approved by the health officer; it shall not open directly into a milking barn or stable, nor into any room used for

domestic purposes; it shall be provided with adequate facilities for heating water to clean utensils; and it shall be equipped with 2-compartment, stationary, wash and rinse vats. The cleaning and other operations shall be located and conducted so as to prevent any contamination of the milk or of cleaned equipment.

### **Public-Health Reason**

Unless a suitable, separate place is provided for the cooling, handling and storing of milk, and the washing, bactericidal treatment and storing of milk utensils, the milk or the utensils may become contaminated.

### **Satisfactory Compliance**

The first sentence of this item shall be deemed to have been satisfied when:

1. A separate milk house or milk room is provided for the cooling, handling and storing of milk and milk products, and the washing, bactericidal treatment and storing of milk utensils.

2. The milk house or room is conveniently located, as determined by (a) the availability of water, (b) the distance milk must be carried from the barn, and (c) drainage.

3. None of the milk house operations is conducted elsewhere. An exception may be made in the case of pipeline milkers which are cleaned and given bactericidal treatment in place in such manner as to comply with the provisions of Items 13r and 14r and are approved by the health officer.

## **8r (a). Floors**

### **Public-Health Reason**

A well-drained floor of concrete or other impervious material promotes cleanliness.

### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when the floor consists of concrete, brick, tile, asphalt macadam or other composition material, laid so as to be impervious and to drain properly.

Drain pipes should be carefully set before the floor is laid. A grade of one-fourth to one-half inch per foot gives ample floor drainage; where the drainage is such as to produce odors, a trapped drain should be provided. The finish of the floor should be as smooth as possible, and the junction of the floors and walls should be curbed and the joints rounded to avoid angles which collect and hold dirt. When the milk house is of frame construction, all walls, including partitions, should be made of impervious material up to a minimum height of 12 inches.

Milk house floors with depressions in which liquids stand are unsatisfactory. Smooth floors, the drainage of which is poor, are unsatisfactory.

## **Explanation**

1. Trapped and vented drains are recommended.
2. In larger milk houses with a bulk tank it may be desirable to have two floor drains, one for washings from the tank and the other to handle waste water from the utensil wash vat.
3. Drains should be located as near the source of waste water as possible.

(Reference—National Plumbing Code, ASA A40.8—1955, American Society of Mechanical Engineers)

## **8r (b). Walls and Ceilings**

### **Public-Health Reason**

Construction which permits easy cleaning promotes cleanliness.

### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when all parts of the walls and ceiling are in good repair and, except for light openings, are composed of:

1. Smooth-dressed lumber, sheet metal or plaster board, well painted with a light-colored, washable paint; or
2. Tile, cement block, brick, concrete or cement plaster, provided that the surfaces and joints are smooth.

The milk room should not be required to be ceiled overhead, unless flies cannot otherwise be kept out (as in the case of corrugated-metal roofing, where openings under corrugations cannot easily be fly-proofed) or unless the roof construction is such that the underside cannot be kept clean and free of cobwebs.

Unsheathed, inside walls of the milk room may be approved, provided the inside surfaces of the outer sheathing and all framing surfaces are smooth-dressed and painted. This interpretation applies to partitions, also.

## **Explanation**

1. Recommend that milk room walls be lined with (1) exterior plywood, (2) smooth matched lumber, (3) tempered pressed wood, (4) Portland cement plaster, (5) concrete masonry, (6) glazed tile or (7) material of equal impermeability.
2. Lining material should have a minimum thickness of  $\frac{1}{4}$  inch, unless backed with heavier material.
3. All joints should be finished flush for easier cleaning.
4. Walls and ceiling should be insulated with a good quality insulation and a vapor barrier.

(Reference—Standards for Design and Operation of Loose Housing Systems for Dairy Cattle in the North Central Region, p. 306)

5. New metal alloys have been developed that may be used for lining milk houses but cannot be unconditionally recommended until they have been in use long enough to properly evaluate their resistance



to corrosion, etc. If corrugated metal is used the corrugations should be installed vertically.

### **8r (c). Lighting and Ventilation**

#### **Public-Health Reason**

Ample light promotes cleanliness, and proper ventilation reduces the likelihood of odors and condensation.

#### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when the window space is not less than 10 per cent of the floor area, and light is reasonably evenly distributed, and when the milk house is adequately ventilated to minimize odors and condensation on floors, walls, ceiling and clean utensils.

Milk houses in dusty locations shall be required to have glazed windows and solid doors, which shall be kept closed during dusty weather.

Artificial lighting is also important. The milk house must be well lighted for periods when there is insufficient natural light. A minimum of 10 foot-candles of light shall be provided at all working surfaces from natural and/or artificial light sources.

#### **Explanation**

##### **1. Lighting**

a. One light fixture should be provided for each 100 square feet of floor area so located as to illuminate work areas. (See page 39 for lighting requirements in milk houses using bulk tanks.)

b. Total illumination should equal 2 watts per square foot of floor area.

c. Light fixtures should not be located directly over the bulk tank but should be located in such a way that the interior of the tank can be examined for cleanliness.

##### **2. Ventilation**

a. Mechanical ventilation is recommended and is required by many local health departments. See page 39 for details of "presurized" system suggested for use in milk houses having bulk tanks.

b. If mechanical ventilation is not required by local health authorities and not deemed necessary or practical, tilt-in windows, ceiling vent, wall ducts, etc., may be used.

c. In order to prevent moisture collecting on walls and ceiling adequate insulation in addition to proper ventilation is necessary.

##### **3. Heating**

Building should be so constructed and heating equipment provided so that temperature can be maintained at or above 45° F.



## 8r (d). Screening

### Public-Health Reason

Effective screening trends to prevent the presence of flies, which are a public-health menace. Flies may infect the milk with disease germs, which may multiply and become sufficiently numerous to present a public-health hazard. For disease transmission by flies, see Item 7r (Public-Health Reason).

### Satisfactory Compliance

This item shall be deemed to have been satisfied if all openings are effectively screened during the season when flies are present, and outer doors open outward and are self-closing, unless other effective means are provided to prevent the entrance of flies, such as electric screens or screen panels.

Broken, torn or poorly-fitted screens shall not be considered satisfactory compliance. Fly exclusion can be made more effective when screen doors open outward and are provided with closing devices, such as spring hinge, pulley and weight, coil spring or similar measures. Poorly-fitting doors can be provided with flaps of canvas, linoleum or other material.

A frequently overlooked entrance for flies is an open drain through the wall of the milk house. All such openings need to be properly screened or provided with flaps.

Screen cloth, tacked on the outside of the window frames so as to cover the openings completely without unduly obstructing light, shall be approved. If the screens are exposed to stress of any kind, light bars of wood across them will prevent breaks or tears. Screen cloth coarser than 16 mesh to the inch shall not be used.

Screen doors to fit standard door frames may be purchased in most hardware stores. The screen cloth of such doors should be protected by strips of wood, or by a piece of hardware cloth, placed across the bottom panel and at the level where the hands or elbows are generally placed in opening the door.

A screened milk house extension used for storage of utensils, if in existence at the time of the adoption of this Ordinance, shall be approved as part of the milk house, provided that it has a tight roof, and that the interior is not exposed to dust. If such extensions are exposed to dust, they shall be made dustproof.

### Explanation

1. If screens are used for fly control they should be in place throughout the fly season. (In this area fly season may extend from April 1 through October 31.)

2. Screen doors and window screens are not required in all cases. If windows are used for ventilation during fly season they must be screened. If a screen door is not used the solid door on the milk house or milk room must open outward.

## 8r (e). Miscellaneous Requirements

### Public-Health Reason

A well-equipped milk house which is separated from the barn and the living quarters provides a safeguard against the exposure of milk and milk utensils to infection from persons other than regular milk handlers, and from insects and dust.

### Satisfactory Compliance

The following constitutes satisfactory compliance with this item:

1. The milk house is used for no purpose, except as may be permitted by the health officer, other than the cooling, handling and storage of milk and milk products, and the cleaning, bactericidal treatment and storage of milk containers and utensils. The health officer should permit the handling of no other products in the milk room which would be likely to contaminate milk, or otherwise create a public-health hazard. Permission to handle other products should be provisional, and subject to revocation if found objectionable.

2. The milk house does not open directly into a barn or stable, or into a room used for domestic purposes; except that when the barn or milking parlor is used only for milking and the feeding of concentrates, and not for the housing of cattle, a direct opening into the milk house may be permitted when a solid, self-closing door, opening outward from the milk house, is provided.

Satisfactory compliance may be effected also by (a) complete separation of barn and milk house, (b) construction of a passageway (breezeway) which is completely open on at least one side or (c) construction of a vestibule between the barn and milk house.

When compliance with this requirement is effected by the construction of a vestibule, the vestibule must have two self-closing doors, so arranged that both doors will not be open at the same time. Such doors may swing inward, outward or both ways, but at least one of them must be solid. Vestibule construction must comply with milk house requirements, with respect to screening, cleanliness and drainage.

The delivery of milk from the barn into the milk house by use of properly protected conductors, or the passing of pails or cans directly into the milk house through a small opening which is provided with a tight-fitting, self-closing, solid door, shall not be considered a violation of the indirect opening requirements.

3. Each milk house is provided with adequate facilities for the heating of water for the cleaning of utensils. Water should be piped into existing milk houses, and shall be piped into all milk houses hereafter constructed, reconstructed, or extensively altered, except where it is impractical to obtain a satisfactory supply on the premises.

4. The milk house is equipped with stationary wash-and-rinse vats having at least two compartments, one for washing and the other for

rinsing and bactericidal treatment. Both compartments shall be of sufficient size to hold the largest milk can used.

5. Waste water from the washing of utensils and the scrubbing of the milk house is conducted away. The milk house, preferably, should be located where natural drainage is good. Wastes from the milk room shall be disposed of in an acceptable, sanitary manner approved by the health officer.

### Explanation

#### 1. Vestibules

a. Vestibules are not required between a milk room and a milking parlor which is used only for milking and feeding of concentrates and not for the housing of cows.

b. Where a vestibule is not required the solid door between the milk room and milking parlor must open outward from the milk room and be self-closing.

c. Where a vestibule is used the following points should be noted:

(1) Construction features should be the same as for milk house or milk room.

(2) Windows are not required but if provided and they are open during fly season, they must be screened.

(3) Painting of the walls is recommended.

#### 2. Water heater

a. For producing milk to be marketed in cans and a pipeline is not used, a minimum recommended size of water heater is 20-gallon capacity.

b. For producing milk with a bulk tank or when a pipeline is used a larger size water heater is recommended. (See page 39)

c. A producer who is going into the production of Grade A milk for the first time should anticipate the possibility of installing either a pipeline or bulk tank, or both, at some future date and possibly install a water heater of a size that will furnish adequate hot water for cleaning this equipment.

#### 3. Waste disposal

a. Trapped and vented drains should be used in the milk house, minimum size of outlet 4 inches.

b. Waste water should be conducted away from the milk house either (1) directly to a settling basin, (2) into the milking parlor drainage system or (3) into the gutter of the milking barn.

c. Human waste from a toilet located in the milking plant should be disposed of through an approved waste disposal system. (See Item 10r—Toilet).

(Reference—National Plumbing Code)

#### 4. Size of milk house (new construction)<sup>3</sup>

<sup>3</sup> A producer who is going into Grade A production for the first time should anticipate the possibility of installing a bulk tank at some future date and build his milk house accordingly.



Milk production in gallons per day	Recommended floor area (sq. ft.) (Minimum suggested width 12 ft.)	
	Can Milk	E.O.D.* Bulk
50 or less	144	168
50-100	168	216
Over 100	192**	240**

\* Every other day.

\*\* Add 0.4 square feet for each gallon of milk over 160 gallons produced daily to the column which applies.

### **Item 9r. Milk House or Room—Cleanliness and Flies**

#### **Regulation**

The floors, walls, ceilings and equipment of the milk house or milk room shall be kept clean at all times. All necessary means for the elimination of flies shall be used.

#### **Public-Health Reason**

Cleanliness and freedom from flies in the milk room reduce the likelihood of contamination of the milk. For disease hazards from flies, see Item 7r (Public-Health Reason).

#### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when:

1. The floors, walls, windows, shelves, tables, wash vats and other milk room equipment are clean.
2. The milk room is free of trash and articles not used in milk room work.
3. The use of insecticides or other effective fly-control measures results in the absence of flies from the milk house while milk is being handled, and very few or no flies at other times. Care should be taken to protect the milk and milk room equipment against contamination by insecticides.

It is recommended that gas engines, and other machinery not essential to milk room operations, not be located in the milk room.

#### **Explanation**

1. It is recommended that the vacuum pump not be located in the milk house.
2. Wall openings for pipelines leading into milk house must have protection against entrance of flies.
3. Fly sprays, poisons, medical supplies used to treat farm animals or other toxic substances are not permitted to be stored in the milk house.

### **Item 10r. Toilet**

#### **Regulation**

Every dairy farm shall be provided with one or more sanitary

toilets, conveniently located, and properly constructed, operated and maintained, so that the waste is inaccessible to flies, and does not pollute the surface soil nor contaminate any water supply.

### **Public-Health Reason**

The organisms of typhoid fever, dysentery and colitis are present in the body wastes of persons who have these diseases. In the case of typhoid fever, well persons (carriers) also may discharge the organisms in their body wastes. If a toilet is not flytight, and so constructed as to prevent overflow, infection may be carried from the excreta to the milk, either by flies or through the pollution of water supplies or streams to which the cows have access.

### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when:

1. There is at least one flush toilet, connected to a sewer system or to an individual sewage-disposal plant, constructed and operated in accordance with plans and instructions of the State Health Authority; or

2. A chemical toilet, or earth pit privy, or other type of privy is provided, constructed and operated in accordance with plans and instructions of the State Health Authority in those States permitting the use of these types of toilets.

3. A toilet is convenient to the milking barn and the milk house, and there is no evidence of human defecation or urination about the dairy premises except in the toilets provided for these purposes.

4. The toilet wastes are inaccessible to flies, and do not pollute the surface soil, nor contaminate any water supply.

5. The toilet does not open directly into the milk room, and is kept clean.

### **Explanation**

#### **1. Flush toilet**

- a. It is recommended that the toilet room not open directly into the milking barn or milking parlor.

- b. Human waste should be disposed of by means of a septic tank and disposal field as outlined in Code. (Reference—Farm Sewage Disposal, E. C. 703, University of Nebraska)

- c. A cesspool, leaching or seepage pit, or tile seepage field over 5 feet deep cannot be used for disposal of wastes. (Reference—Nebraska State Department of Health Rules and Regulations)

#### **2. Pit privy**

- a. Must have self-closing lids on seat.

- b. Flies and rodents must not have access to the pit.

- c. If there is a separate urinal in the privy, the entire privy structure must be fly tight and have a self-closing door.

## **Item 11r. Water Supply**

### **Regulation**

Water for all dairy purposes shall be from a supply properly located, protected and operated, and shall be easily accessible, adequate and of a safe, sanitary quality.

### **Public-Health Reason**

A dairy farm water supply should be accessible in order to encourage its use in ample quantity in cleaning operations; it should be adequate so that cleaning and rinsing will be thorough; and it should be of safe, sanitary quality in order to avoid the contamination of milk utensils.

A polluted water supply, used in the rinsing of the dairy utensils and containers, may be more dangerous than a similar water supply which is used for drinking purposes only. Bacteria grow much faster in milk than in water, and the severity of an attack of a given disease depends largely upon the size of the dose of disease organisms taken into the system. Therefore, a small number of disease organisms consumed in a glass of water from a polluted well may possibly result in no harm, whereas, if left in a milk utensil which has been rinsed with the water, they may, after several hours' growth in the milk, increase in such numbers as to cause disease when consumed.

### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when:

1. The water supply is from a public water supply which is approved by the State Health Authority, or from a spring, dug well, driven well, bored well or drilled well which complies with the standards of the State Health Authority and, at least, the minimum standards outlined in Appendix D, page 158, 1953 Edition of USPHS Milk Ordinance and Code (third printing).

2. No surface or cistern water supply is used, except under conditions approved by the State Health Authority.

3. There is no cross-connection between the safe water supply and any unsafe or questionable water supply, or any other source of pollution through which contamination of the safe water supply might be possible. Submerged inlets in cattle drinking cups, wash vats, etc., should be avoided.

4. The water supply is adequate in quantity to promote cleanliness.

5. The water supply is piped into, or is easily accessible to, both the milk house and the dairy barn, for cooling milk and washing utensils, udders, floors and hands, and for other purposes.

6. The well or other source of water is located and constructed in such a manner that neither underground nor surface contamination from any cesspool, privy, or other source of pollution can reach such water supply.



7. New private water supplies, and water supplies which may have become contaminated accidentally or following repair work, are thoroughly disinfected before being placed in use.

8. At least one inspection is made semi-annually to determine whether or not the location, construction and operation of the supply comply with the above requirements.

9. Samples for bacteriological examination are taken upon the initial approval of the physical structure, and thereafter when any repair or alteration of the water-supply system has been made. Bacteriological examinations shall be made in conformity with the standard methods recommended by the American Public Health Association, and the quality of the water shall be deemed safe by the State Health Authority.

### **Explanation**

1. Enclosed reservoirs or cisterns that are of approved construction can be filled from an approved water source and used as underground storage. If water is hauled, local health authorities should be consulted relative to regulations governing the hauling of water.

(Reference—Safe Water for the Farm, F. B. No. 1978)

2. A frost proof above ground pump house can be used to protect pumping equipment and pressure tank from freezing.

(Reference—Insulated Pump House, E. C. 701, University of Nebraska)

3. Pitless well units may be used providing no suction lines are laid directly in the ground and pump location and housing meet sanitary requirements.

### **Item 12r. Utensils—Construction**

#### **Regulation**

All multi-use containers, equipment and other utensils used in the handling, storage or transportation of milk or milk products shall be made of smooth, non-absorbent, non-corrodible, non-toxic material; shall be so constructed as to be easily cleaned, and shall be kept in good repair. Joints and seams shall be welded or soldered flush. Woven wire cloth shall not be used for straining milk. When milk is strained, strainer pads shall be used and shall not be re-used. All milk pails obtained hereafter shall be of the seamless, hooded type. All single-service articles used shall have been manufactured, packaged, transported and handled in a sanitary manner.

#### **Public-Health Reason**

Milk containers and other utensils without flush joints and seams, without smooth, easily cleaned, and accessible surfaces, and not made of durable, not readily corrodible material, are apt to harbor accumulations in which undesirable bacterial growth is supported. Single-service articles which have not been manufactured and handled in a sanitary manner may contaminate the milk.

Milk pails of small-mouth design, also known as hooded milk pails, decrease the possibility of hairs, dust, chaff and other undesirable foreign substances getting into the milk at the time of milking.

### **Satisfactory Compliance**

The following constitutes satisfactory compliance with this item:

1. All multi-use containers, utensils, pails and conductor pipes are constructed of smooth, heavy-gauge material, with a not readily corrodible surface which is non-absorbent and non-toxic (the use of cadmium is expressly prohibited), and are of such construction as to be easily cleaned. All joints and seams shall be flush, with a solid, welded or soldered, burnished surface. Storage vats and transportation tanks or vats shall comply with the applicable requirements of Items 5p and 10p, 1953 Edition, USPHS Milk Ordinance and Code.

2. All containers, utensils and other equipment are in good repair, and free of breaks and corroded places.

3. Strainers, if used, are so constructed as to utilize single-service strainer pads only, and such strainer pads are not re-used. Woven wire cloth strainers shall not be used.

4. All milk pails obtained after the adoption of this Ordinance are of the seamless, hooded type, with the opening not exceeding one-third of the area of that of an open pail of the same size. All milk pails must be of a small-mouth design approved by the health officer. If milking machines are used and stripping is done by hand, small-mouth pails shall be used. The practice of hand milking into small cups and pouring into pails is not approved.

5. All milking machines, including pails, heads, milk claws, milk tubing and other milk contact parts are so constructed as to be easily cleaned. All teat-cup liners, air and milk tubing, and other flexible parts shall be of a minimum length necessary for correct operation.

6. All single-service articles with which milk comes into contact are manufactured, packaged, transported and handled in a sanitary manner, in accordance with the requirements of section 7, item 10 p.<sup>4</sup> Shipping cases, tubes and boxes shall be so constructed as to protect the contents.

It is recommended that all milk cans have an umbrella-type cover. It is recommended, also, that milk pails be constructed with a handle on top of the hood, and a handle at the back near the bottom of the pail, in lieu of a wire bail.

### **Explanation**

1. Utensils constructed of aluminum do not stand up well under washing and sanitizing procedures commonly used in the milk house, and therefore, may violate this requirement.

<sup>4</sup> Milk Ordinance & Code, 1953 Recommendations of the Public Health Service, p. 84.

2. Threaded caps on claws are not recommended due to difficulty with cleaning.

3. Paragraph (6) refers to strainer pads, parchment papers, etc.

### **Item 13r. Utensils—Cleaning**

#### **Regulation**

All multi-use containers, equipment and other utensils used in the handling, storage, or transportation of milk and milk products shall be thoroughly cleaned after each usage.

#### **Public-Health Reason**

Milk cannot be kept clean or free of contamination if permitted to come into contact with unclean containers, utensils or equipment.

#### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when all multi-use containers, other utensils and equipment used in milking, or the cooling, handling, storage or transportation of milk and milk products, are thoroughly cleaned after each usage. Cleanliness may be determined by sight, touch or smell, by observation through a magnifying glass, by wiping with tissue or filter paper, and/or by other approved methods. Washing is facilitated by using warm water, a brush and a detergent suitable to the hardness of the water; also, by washing or rinsing as soon as possible after each usage.

### **Item 14r. Utensils—Bactericidal Treatment**

#### **Regulation**

All multi-use containers, equipment and other utensils used in the handling, storage or transportation of milk or milk products shall, before each usage, be subjected effectively to an approved bactericidal process utilizing steam, hot water, chemicals or hot air.

#### **Public-Health Reason**

Mere cleaning of containers, equipment and utensils does not insure the removal or destruction of all disease organisms which may have been present. Even very small numbers remaining may grow to dangerous proportions, since many kinds of disease bacteria grow rapidly in milk. For this reason, all milk containers, equipment and utensils must be treated with an effective bactericidal agent before each usage.

#### **Satisfactory Compliance**

By approved bactericidal process is meant the application of any method or substance for the destruction of pathogens, and of other organisms as far as is practicable, which is effective and which does not adversely affect the equipment, the milk or milk products, or the health of the consumers, and which is approved by the health officer.



The bactericidal procedures outlined below are designed to destroy vegetative bacteria, but not necessarily spores. Spore-forming bacteria may impart undesirable flavors to the milk, or may have undesirable effects. If it should be desirable to destroy all spores, more severe treatment is necessary, such as exposure to hypochlorites (see below) for extended periods.

Steam, hot water or hot air treatment shall not be accepted as fulfilling satisfactory compliance, unless the equipment or containers are completely immersed or exposed for the required time, or longer, at the required temperature, or higher, throughout the period of exposure. Pouring hot or so-called boiling water from vessel to vessel is not adequate, and shall not be accepted.

This item shall be deemed to have been satisfied if all milk containers, utensils and other equipment, with the exception of milking machine pulsators and air hoses, have been treated by one or more of the following methods:

1. Exposure to steam for at least 15 minutes at a temperature of at least 170° F., or for at least 5 minutes at a temperature of at least 200° F., in a steam cabinet equipped with an indicating thermometer which is located in the coldest zone.

2. Exposure to an enclosed jet of steam for not less than one minute.

3. Immersion in hot water at a temperature of at least 170° F. for at least 2 minutes, or exposure to a flow of hot water at a temperature of at least 170° F (at the outlet) for at least 5 minutes, as determined by use of a suitable thermometer.

4. Exposure to hot air at a temperature of at least 180° F. for at least 20 minutes, in a properly designed oven or hot air cabinet which is equipped with an indicating thermometer located in the coldest zone. Traces of moisture in cans or utensils which are inverted during heating will increase the bactericidal efficiency of hot air cabinets. However, cans must be thoroughly dried out during the heating process to prevent bacterial growth during subsequent storage.

5. Immersion for at least 2 minutes in, or exposure for at least 2 minutes to a flow of, an approved chemical bactericide of approved strength. All milk contact surfaces must be wetted by the bactericidal solution, and piping so treated must be filled. Bactericidal sprays may be used for large equipment. Bactericidal treatment with chemicals is not effective unless the surface has first been thoroughly cleaned. Chemical solutions, once used, shall not be reused for bactericidal treatment on any subsequent day, but may be reused for other purposes.

6. All surfaces of rubber parts of milking machines which come into contact with milk may be treated by filling with, or immersing in, a 0.5 per cent (1 tablespoon per gallon) lye solution, followed by a rinse before use. A fresh supply of lye solution must be used for each storage.

The health officer should satisfy himself that the efficiency of the process is such as to produce containers having a residual bacterial plate count of not more than one per milliliter of capacity, and equipment with not over 100 colonies per 8 square inches (or 2 per square centimeter) of milk contact surface in 3 out of 4 samples.

Since some bactericides have a specific action against certain types of bacteria, but may be less effective against others, it may be desirable, periodically, to alternate types of bactericidal treatment used. Any milk contact surface of equipment which is touched shall again be subjected to bactericidal treatment before being used.

### **Explanation**

1. Methods 3 and 5 are the most practical.
2. Dry storage of rubber parts is preferable. Bactericidal treatment must be given these parts in accordance with Method Number 3 or 5.
3. To prolong the life of inflations it is suggested that two sets be provided. While one is being used the other can be stored in a 5 per cent cold lye solution.

(Reference—Hoards Dairyman, March 25, 1958, p. 297)

### **Item 15r. Utensils—Storage**

#### **Regulation**

All containers and other utensils used in the handling, storage or transportation of milk or milk products, unless stored in bactericidal solutions, shall be stored so as to drain dry, and so as not to become contaminated before being used.

#### **Public-Health Reason**

Careless storage of milk utensils which previously have been properly treated is apt to result in recontamination of such utensils, thus rendering them unsafe.

#### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when:

1. All milk utensils and vessels are left in the treating chamber until used; or left in the bactericidal solution; or stored in the milk house on racks, in such manner as to protect them from contamination, inverting such articles as can be inverted. However, if approved by the health officer (see Item 8r), those parts of pipeline milkers which are cleaned in place may be stored in place. Storage racks should be constructed of metal, protected against rusting, with the lowest shelf not less than 24 inches above the floor.
2. Strainer pads, parchment papers and gaskets are kept, until used, in the original package with covers closed, or stored in a suitable container or cabinet and protected from contamination.
3. Utensils (including strainer disks, gaskets, inflations, parchment papers, etc.) are stored in such manner and in such location as

not to be contaminated by any insecticides, drugs or other toxic substances.

4. Clean cans or other containers are stored in the milk house within a reasonable time after delivery to the dairyman.

Unprotected storage along the highway shall be considered a violation of this item.

### **Explanation**

1. Containers should not be nested or stored one inside another.
2. Can lids must be stored, plug down, on rack.
3. Containers and equipment should be stored in such a way that there will be free circulation of air.
4. Specific storage facilities should be provided rather than have utensils and equipment stored in wash vats, on top of bulk tank, etc.

## **Item 16r. Utensils—Handling**

### **Regulation**

After bactericidal treatment, containers and other milk and milk product utensils shall be handled in such a manner as to prevent contamination of any surface with which milk or milk products come into contact.

### **Public-Health Reason**

Handling milk pails by inserting the fingers under the hood, carrying an armful of milk can covers against a soiled shirt or jacket, or similar handling of utensils, will nullify the effect of bactericidal treatment.

### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when none of the above or similar practices is in evidence.

## **Item 17r. Milking—Udders and Teats—Abnormal Milk**

### **Regulation**

Milking shall be done in the milking barn, stable or parlor. The udders and teats of all milking cows shall be clean and wiped with an approved bactericidal solution at the time of milking. Abnormal milk shall be kept out of the milk supply, and shall be so handled and disposed of as to preclude the infection of the cows and the contamination of milk utensils.

### **Public-Health Reason**

If milking is done elsewhere than in a suitable place provided for this purpose, the milk may become contaminated.

Cows frequently contaminate their udders by standing in polluted water, or by lying down in the pasture or cowyard. Unless the udders and teats are carefully cleaned just before milking, particles of filth are apt to drop into the milk. Such contamination of the milk is



particularly dangerous because cow manure may contain the organisms of brucellosis and tuberculosis, and polluted water may contain the organisms of typhoid fever and other intestinal diseases. Rinsing or wiping the udders and teats with bactericidal solution has the advantage of giving an additional margin of safety, with reference to such disease organisms as are not removed by ordinary cleaning, and it is helpful in the control of mastitis.

Abnormal milk may indicate a disease of the udder and should, therefore, be kept out of the milk supply and away from the cows and the milk utensils.

### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when:

1. Milking is done in the milking barn, stable or parlor; and
2. The cows' udders and teats look and feel clean, and have been rinsed with a bactericidal solution approved by the health officer just prior to milking; and
3. Any abnormal milk is kept out of the milk supply, and is so handled and disposed of as to preclude the infection of the cows and the contamination of the milk utensils.

It is recommended that the first streams of milk from each teat be discarded, and that the strip cup be used daily to examine this milk.

### **Explanation**

#### **1. Wiping the udder**

a. In this area some producers hesitate to wipe the cows' teats and udder with a bactericidal solution for fear of trouble with "chapping."

b. To prevent "chapping" the following procedure is recommended:

(1) Wipe the udder and teats dry after washing with a disposable paper "cow" towel. Use of a separate towel for each cow will help prevent spread of infection from one cow to another.

(2) Use a bactericide adapted for this purpose. There are suitable sanitizing agents that can be used for this purpose in addition to chlorine compounds. Consult your milk sanitarian or fieldman for information on bactericides approved for this purpose.

(3) Follow the directions on the container for making up an udder wash solution.

#### **2. Milking procedure**

a. Do not wash the cow's udder too far in advance of milking. (About 2 minutes for most rapid let-down of milk)

b. When a milking parlor is used a spray of warm water can be effectively used as a means of cleaning the udder before using the bactericidal wash. (This is especially important during wet, muddy weather.)

### 3. Abnormal milk

a. A strip cup should be used to detect any abnormality in a cow's milk.

b. *Milk from cows treated for mastitis with an antibiotic must not be included in the supply sent to market for at least 72 hours after final treatment.*

(1) Milk containing antibiotics cannot be made into cultured products such as cheese, buttermilk, etc.

(2) Milk containing antibiotics may have a detrimental effect on certain individuals consuming the milk.

(3) Federal regulations prohibit antibiotics in any dairy product.

## Item 18r. Milking—Flanks

### Regulation

The flanks, bellies and tails of all milking cows shall be free from visible dirt at the time of milking. All brushing shall be completed before milking commences.

### Public-Health Reason

Cleanliness of the cows is one of the most important factors affecting the bacterial count of the milk. Under usual farm conditions, cows accumulate on their bodies quantities of manure, caked mud, dust, chaff, loose hairs, etc. Practically all of these materials carry bacteria, and are apt to fall into the milking pail during the process of milking. This may result in contaminating the milk with bacteria.

### Satisfactory Compliance

This item shall be deemed to have been satisfied when:

1. Flanks, bellies and tails are free from dirt at the time of milking, as shown by sight and touch.
2. Brushing is completed before milking is begun.
3. Flanks, bellies, udders and tails are clipped to facilitate cleaning, when the cows are stabled for the winter.

### Explanation

1. The means to effectively keep cows free from visible dirt will vary somewhat in the various climate areas of the United States. In northern areas where cows are stabled for the winter the flanks, bellies, udders and tails are clipped to facilitate cleaning.

2. In Nebraska where cows are outside at least a portion of each day, sometimes in severe weather, some caution needs to be exercised. While the tails, flanks and bellies can be clipped as in other areas a large udder needs some protection in the colder seasons and overclipping might cause mastitis in sub-clinical cases.

## Item 19r. Milkers' Hands

### Regulation

Milkers' hands shall be washed clean, rinsed with an effective bac-

tericidal solution, and dried with a clean towel, immediately before milking and immediately after any interruption in the milking operation. Wet-hand milking is prohibited. Convenient facilities shall be provided for the washing of milkers' hands. No persons with an infected cut or lesion on hands or arms shall milk cows, or handle milk or milk utensils.

### **Public-Health Reason**

The reasons for bactericidal treatment of the hands of milkers are similar to those for bactericidal treatment of the udders. In the course of the preparation for milking, the hands of the milkers come into contact with almost identically the same kind of materials as may have contaminated the udders. During the course of his duties and natural habits outside of the milking barn, the dairyman's hands must be assumed to have been exposed to body discharges. Washing facilities are required in order to increase the assurance that milkers' hands will be washed.

Wet-hand milking increases the possibility of contaminating the milk.

If persons with infected sores on hands or arms handle milk or milk utensils, these may become contaminated with staphylococci which may cause entero-toxin poisoning in humans.

### **Satisfactory Compliance**

The following constitutes satisfactory compliance with this item:

1. There are no open sores or infected cuts on any milkers' hands or arms.

2. Before milking is begun, the milkers' hands have been thoroughly washed and rinsed with water to which an approved bactericide has been added.

3. Hands are clean and dry during milking. Hands are considered dry when they have been wiped with a wrung-out cloth that has been used to apply bactericidal rinse to the udder.

4. Hand-washing facilities are provided, in or convenient to the barn at the time of milking. These shall include either running water or a suitable vessel, an adequate supply of clean water and soap and a clean cloth for each milker, or clean paper toweling. When the hand-washing facilities provided are in the milk house, they must be adequate and convenient to the barn. Wash and rinse vats are not considered suitable hand-washing facilities.

5. The milkers' hands are rinsed in a bactericidal solution approved by the health officer whenever they become contaminated at any time during the milking period.

The hands of all milkers must be dipped and rinsed in a standard bactericidal solution, and wiped dry, before milking is begun. This applies to the stripper and to the person who handles the milking machines and attaches them to and removes them from the cows. A bucketful of bactericidal solution should be in the barn during hand



milking. Each time that a milker has finished milking a cow, has carried out the milk, has moved his stool to the next cow, and has applied the cow hobblers or anti-kickers (if used), he should rinse his hands in the solution. The first rinsing in the solution does not afford protection against recontamination from the cow's flanks, or even from the clothes and person of the milker.

### **Explanation**

1. The use of paper towels is recommended.
2. Hand-washing facilities should be as conveniently located as possible, particularly since others in addition to the producer may use them. It is recommended that the milk hauler wash his hands before loading the producer's milk and conveniently located hand-washing facilities will make it more probable that he does.

### **Item 20r. Clean Clothing**

#### **Regulation**

Milkers and milk handlers shall wear clean outer garments while milking or handling milk, milk products, containers, utensils or equipment.

#### **Public-Health Reason**

Because the hands of all workers frequently come into contact with their clothing, it is important that the clothes worn during the milking and the handling of the milk be clean.

#### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when milkers are seen to be wearing outer garments that are not excessively soiled.

Washable overgarments are not required, but milkers should be urged to have one suit of overalls for milking and another for general work, and the suits should be changed just before milking. If milkers wear clean aprons, this shall be considered satisfactory.

### **Item 21r. Milk Stools**

#### **Regulation**

Milk stools and surcingles shall be kept clean.

#### **Public-Health Reason**

Clean milk stools, and clean surcingles (or belly straps) reduce the likelihood of contamination of milkers' hands between the milking of one cow and the milking of another.

#### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when:

1. Milk stools are without padding and are so constructed as to be easily cleaned.
2. Milk stools and sucingles look and feel clean at all times.
3. Milk stools and surcingles are stored above the floor in a clean place in the barn or milk house when not in use.

**Explanation**

If milk stools are used, metal construction is recommended.

**Item 22r. Removal of Milk****Regulation**

Each pail or can of milk shall be removed immediately to the milk house or straining room. No milk shall be strained or poured in the barn unless it is protected from flies and other contamination.

**Public-Health Reason**

Keeping the milk in the barn until all or a large part of the herd has been milked is apt to expose it to flies and dust, and to delay cooling. Straining milk in the barn likewise exposes it to dust and flies.

**Satisfactory Compliance**

This item shall be deemed to have been satisfied when:

1. Each pail or can, when full, is immediately removed to the milk house.

2. Straining of the milk is done in the milk house or in a small, effectively screened straining room in or near the barn or stable, but not opening into it (although the latter method is not recommended because it delays cooling); or

3. Milk is poured and/or strained from the milk pails or milking machine pails into a 5 or 10 gallon clean milk can provided with a well-fitting cover over the strainer or can, and the cans are placed at such distance from the cows, or raised above the floor (as on a dolly or cart), as to be protected against manure and splash, with the cover closed except when milk is being poured; self-closing covers are recommended.

4. Milk is poured into conductors which protect the milk from contamination.

5. Milk is not poured or strained in feed rooms.

**Item 23r. Cooling****Regulation**

Milk for pasteurization, unless delivered to a milk plant or receiving station within 2 hours after completion of milking, shall be cooled immediately to 50° F. or less and shall be maintained at that temperature as determined in accordance with Section 6,<sup>5</sup> until delivered.

**Public-Health Reason**

Milk produced by disease-free cows and under clean conditions usually contains relatively few bacteria immediately after milking. These multiply to enormous numbers in a few hours unless the milk is cooled. When the milk is cooled quickly to 50° F. or less, however, there is only a slow increase in numbers of bacteria. In order to understand this, it is necessary to recall merely that bacteria are actual-

<sup>5</sup>Milk Ordinance & Code, 1953 Recommendations of the Public Health Service, p. 43.

ly infinitesimal plants, and that most plants do not grow in cold weather.

Usually, the bacteria in milk are harmless, and if this were always true there would be no reason to cool milk, except to delay souring. There is, however, no way for the dairyman or health officer to be absolutely sure that no disease bacteria have entered the milk even though observance of the other items of this Ordinance will greatly reduce this likelihood. The likelihood of transmitting disease is much increased when the milk contains large numbers of disease bacteria. Therefore, it is extremely important for milk to be cooled quickly, so that small numbers of bacteria which may have entered will not multiply.

### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when:

1. Milk for pasteurization is cooled to 50° F. or less within 2 hours after the milking of the herd is completed, and is maintained at 50° F. or less until it is delivered; or
2. The milk is delivered to a milk plant or receiving station within 2 hours after the completion of milking of the herd.

The health officer shall determine the temperature of the milk in accordance with Section 6<sup>6</sup> and the procedures outlined in Appendix E.<sup>7</sup>

The specifications for inspectors' general-purpose thermometers are designed to provide a thermometer suitable for determining both refrigeration temperatures and bactericidal treatment temperature at dairies and restaurants.

### **Item 24r. Vehicles and Surroundings**

#### **Regulation**

All vehicles used for the transportation of milk or milk products shall be constructed and operated so as to protect their contents from the sun, from freezing and from contamination.

The immediate surroundings of the dairy shall be kept in a clean, neat condition.

#### **Public-Health Reason**

To protect milk during transportation, delivery vehicles must be properly constructed and operated. The surroundings of a dairy should be kept neat and clean to encourage cleanliness, and to increase the consumers' confidence.

### **Satisfactory Compliance**

This item shall be deemed to have been satisfied when:

1. Vehicles used for the transportation of milk are kept clean, both inside and outside.

<sup>6</sup> Milk Ordinance & Code, 1953 Recommendations of the Public Health Service, p. 43.

<sup>7</sup> Same, p. 172.



2. No substances capable of contaminating the milk are transported with it.

3. Vehicles are so constructed as to protect the milk or milk products from the sun, from freezing and from contamination.

4. The immediate surroundings of the dairy are kept neat and clean, and free of rodent harborages and insect breeding places.

#### **Explanation**

1. As a minimum requirement, trucks used to transport milk in cans should be equipped with a rigid, permanent, enclosed box. It should have a double roof with insulation between.

2. Where milk is taken to the road by the producer, a platform shelter to protect milk and empty cans should be provided.

3. See page 42 for information regarding bulk hauling vehicles.

### **RECOMMENDATIONS FOR HANDLING OF GRADE A BULK MILK FROM DAIRY FARM TO DAIRY PLANT**

#### **General**

A. Each producer desiring to install a farm holding and/or cooling tank shall make application to the regulatory agency having jurisdiction for permission to do so and shall furnish the following information:

1. Tank make, model and capacity.
2. A sketch (approximately to scale in space provided on application form) of the milk room floor plan showing location of tank, outlet of tank, wall opening for milk conductor tubing, other milk house equipment and access area for tank truck approach.
3. Estimated maximum and minimum daily production in gallons. Only a tank large enough to hold the milk received from five (5) milkings for every other day pick-up or three (3) milkings for every day pick-up at the estimated maximum production will be approved.

B. Only approved installations shall receive or retain a permit.

C. Farm tanks and all equipment used in connection with them shall comply with the applicable requirements of the current U. S. Public Health Service Milk Ordinance and Code and applicable 3A Standards in effect at the time of installation.

D. For recommended floor area of milk rooms see page 23.

E. The farm tank shall be located in the milk room so as to provide the following clearances:

1. Working side—36" from wall or other equipment.
2. Outlet valve end—36" from wall or other equipment.
3. Rear side—24" from wall or other equipment.
4. Rear side (opposite outlet valve end)—24" from wall or other equipment.

Provided, that in the case of existing Grade A producers, clearances as specified above may be waived if the producer demonstrates his ability to keep the interior and exterior surfaces of the bulk tank and the walls and floors of the milk house in a clean condition. Such tanks shall be located so as to provide at least 6 inches of clearance between the floor and bottom on tanks except that a 4 inch minimum clearance is acceptable if the bottom slopes upward to at least 6 inches in a horizontal distance of 12 inches, or be sealed to the floor in such a manner as to prevent accumulation of milk, water, dust and harborages of insects or rodents. Remote compressors which are located in milk rooms shall be so installed as to be easily cleanable and operate at peak efficiency. Floor drains shall not be located under the farm tank or milk outlet valve.

F. A fixed, properly encased opening not less than 6 inches above the floor of the milk house or the outside loading platform, whichever is higher, shall be provided in an exterior wall of the milk house to accommodate the milk conductor tubing used to pump the milk from the farm tank to the truck tank. Such openings shall not be less than 6 inches or more than 8 inches in size and shall be provided with a fly-tight, self-closing device.

G. When electricity is the motive power for the milk transport tank milk pump, a lock type electrical connection with ground and weatherproof type receptacle located on the outside of the building with a switch box located on the inside of the building shall be provided.

H. Water for washing farm tanks shall be under pressure. Hoses for washing the milk house and bulk tank shall be used for no other purpose and be stored on a rack convenient to the bulk tank. An automatic quick recovery hot water heater or hot water storage tank (pressure type) shall be provided, shall be not less than 30 gallons capacity and equipped with a thermostat capable of maintaining water at least 140° F. Extra capacity, higher temperatures, or both shall be provided for CIP installations, off peak heating and milk house heating or other hot water usages. Gas heaters, if used, shall be properly vented.

#### I. Lighting and Ventilation

1. Adequate evenly distributed artificial light with outlets, and directly over the tank, shall be so located that interior of tank can be examined for cleanliness. Two light outlets should be provided and, where wash vats are located on an inside wall and not adequately lighted, an additional outlet may be necessary over the wash vats. Adequate light will ordinarily be furnished by use of 150 watt bulbs in each outlet.

#### 2. Summer Ventilation

a. The desired method for controlling excessive temperature rises due to the cooling compressor in a milk room in Nebraska will be by use of the forced-air or pressure system. Capacity of the

ventilating fan must be 600 C.F.M. at  $\frac{1}{8}$ " s.p. for each horsepower of air cooled refrigeration equipment.

b. The air entering the milk room is to be drawn from a dust free area. Filters should provide at least 1 square inch of area for each 2 cubic feet/minute of air. The filters may be installed on either the suction or pressure side of the fan and should be placed so as to be easily inspected and changed or cleaned.

c. The ventilating system is to be arranged in such a way that it will permit the optimum quantity of air to be directed toward the compressor unit. Air outlets may be located so as to exhaust either to the outside air or into the milking barn, but must be equipped with automatic back flow dampers or shutters and otherwise protected from wind and weather conditions.

d. Controls for the ventilating system shall be automatic. They should control the system in such a manner that whenever the milk room temperature is over 80° F., or the milk room temperature is greater than the outside temperature, and the milk tank compressor is operating, the ventilating system will operate.

Suggested Methods:

1. Fans wired with compressor motor so they will operate together. Thermostat can be used to turn fans off at a minimum milk room temperature.

2. Differential thermostats: Inside and outside thermostats which control fan according to differential of outside and inside temperatures.

3. Thermostat influenced by heat only. In hot weather fans may run longer than needed.

### 3. Winter Ventilation

a. Building construction is of utmost importance for acceptable moisture control and adequate ventilation.

In Nebraska, building construction should be as follows, or equal to recommended standards. For further information, see Midwest Dairy Housing Plans obtainable from county extension agents or regulatory officials.

#### Sidewalls:

Concrete block .....	8" to 12"	—Cores filled with insulation
Cinder or light weight concrete block .....	8"	—Cores filled with insulation optional
Glazed clay tile.....	8"	
Glazed clay tile (cavity type) .....	2"	—Cavity filled with insulation
Wood frame .....	1" to 2"	—Insulation bats
Steel .....	1" to 2"	

#### Ceiling:

Fill or bat insulation.....2" to 4"

Windows: .....—Storm sash or double pane

b. The type of ventilating system will be the same for the winter months as for summer.



c. Capacity of the ventilating system will be considered satisfactory at 6 air changes per hour. This can be accomplished by various means, either a 2 fan system or a 2 speed fan, and the appropriate use of dampers or louvres and installation of a thermostat.

d. Dust and odor control would be required in winter same as in summer and the arrangement of the ventilating system should be such as to allow best possible moisture control.

e. Outlets may be installed according to desires of the operator, but with automatic back-flow control. (See Item (c) under Summer Ventilation)

f. A thermostat for minimum temperature control.

J. Farm tanks shall be protected from overhead contamination.

K. The truck approach shall be properly graded and surfaced to prevent pooling of water at the point of loading. Adequate artificial light shall be provided to illuminate this area to facilitate loading during hours when natural light is insufficient. This area shall be provided with a concrete slab or an asphalt surface of sufficient size to effectively protect the milk conducting hose from contamination.

L. Cleaning and bactericidal treatment shall conform to the applicable requirements of the current U. S. Public Health Service Milk Ordinance and Code. Farm tanks shall not be considered adequately treated unless milk contact surfaces have been first rinsed until visible solids are removed as soon as possible after being emptied, washed as soon as possible thereafter, and then, prior to the next milking exposed to 200 parts per million of chlorine or equivalent. In cases where farm tanks are equipped with removable drop pipes, a vat large enough and long enough for the washing and sanitation of this equipment shall be provided.

M. Indicating thermometers on all farm tanks shall be kept in proper operating condition. The driver shall possess an approved type thermometer to enable him to check the indicating thermometers of the farm bulk tanks. The regulatory agency, using an approved type thermometer, shall check, periodically, the indicating thermometers on farm bulk tanks to determine their accuracy.

N. Abnormal milk, adulterated milk and/or milk containing objectionable odors shall not be added to the bulk storage tank. The sampler and/or tester shall check the milk for abnormalities before pumping into the tank truck. The entire supply of milk in the farm tank shall be rejected if such milk is detected.

O. Miscellaneous protection from contamination: All steps necessary shall be employed to prevent the contamination of milk handled through bulk farm pickup. This shall pertain to all phases of this type of milk handling. The bulk farm tank and accessories shall be used for no other purpose than the handling of milk and the operations incident thereto.

## **The Transportation Tank**

A. Each plant or owner shall furnish the regulatory agency having jurisdiction with the following information:

1. Transportation tank:

A description of each transportation tank, including make, type, model and capacity, and a description of auxiliary accessories including pumps, milk conductor tubing and sampling equipment.

2. Operator:

Name and address of each transportation tank operator and quality control sampler.

B. The transportation tank and accessories in the milk handling operation shall comply with the applicable requirements of the current U. S. Public Health Service Ordinance and Code and 3A Standards for Transportation Tanks.

C. Suitable facilities, including hot and cold running water, detergent, brushes, sanitizers and sanitizing equipment, a concrete floor with proper drainage and waste disposal shall be provided for washing and sanitizing of transportation tanks.

Either a completely separate building with the above facilities or separate facilities within a building shall be provided for washing and sanitizing of tanks and accessories. Unless the tank truck is to be used within a few hours of the washing operation, the sanitizing of the truck should be omitted until just before the tank truck is to be used. During this interim the tank truck shall be protected from contamination by closing port holes, etc. If the tank truck is sanitized on a different date and at a different time from cleaning and washing operation, the tag should provide space for recording this information. The washing, sanitizing and maintenance of the transportation tank and accessories shall be the responsibility of the milk hauler. The regulatory agency having jurisdiction shall be informed in writing as to who is responsible for the cleaning, sanitizing and maintenance of the transportation tank.

D. The transportation tank and all accessories shall be thoroughly cleaned and sanitized after each usage and the tank tagged and sealed with tag attached indicating that the tank has been washed and/or sanitized. This tag shall also contain the name of the person doing the work and the date on which the work was done. The tag shall be removed by the hauler at his first pickup.

E. Single lengths of durable, non-toxic, flexible milk conductor tubing used for conveying milk from the farm tank to the transportation tank shall not exceed 8 feet except in those cases where adequate acceptable cleaning facilities are provided. The inside diameter of milk conductor tubing shall not be less than  $1\frac{3}{8}$  inches. If two lengths of tubing are used, they shall be connected either by the use of sanitary couplings or a piece of 3A Sanitary Tubing with clamps which can be removed without tools. The connections between the pump and the

vehicle tank, and between the pump and the milk conductor tubing shall remain assembled except when dismantled for cleaning. The open end of the milk tubing shall be capped with an approved protective cap at all times except when loading or unloading. The outlet valve, milk pump and the milk conductor tubing and samples shall be enclosed in a properly drained, insulated, dust tight cabinet.

F. The transportation tank and accessories shall be used for no other purpose than the handling of bulk raw milk for pasteurization unless approved by the regulatory agency.

G. Milk from each producer shall be collected at least every other day and delivered to the milk plant unless otherwise approved by the regulatory agency.

### **Operation of the Transportation Tank**

The operation of all transportation tanks shall be in accordance with the following requirements:

1. All milk haulers must possess written approval issued by the regulatory agency. All milk haulers shall be subject to such examination and abilities as the regulatory agency may prescribe in order to receive and retain such written approval.

2. The milk line shall be passed through a special port opening through the milk house wall. Port opening shall be closed when not in use.

3. It shall be the responsibility of the milk hauler to assure himself that in the event the plant washes and sanitizes the truck that this operation has been adequately performed, and that prior to use the truck has been properly sanitized; or in the event it is his responsibility that he sanitize the tank truck with an approved sanitizing solution of proper strength.

4. The milk hauler shall wash his hands immediately before gauging the milk.

5. The milk shall be observed and checked for abnormalities or adulteration, and all abnormal or adulterated milk shall be rejected.

6. The milk volume in the farm tank shall be determined in a sanitary manner.

7. The milk in the farm tank shall be thoroughly agitated (the minimum time for agitation shall be five minutes). Milk samples for analysis shall be taken in a sanitary manner into properly identified sterile containers. All sampling shall follow Standard Methods.

8. After the milk is pumped to the transportation tank, the milk conductor tubing shall be capped and returned to the vehicle storage cabinet. Care shall be taken to prevent soiling of the milk line by contact with the milk house floor, operator's hands or the ground.

9. The farm tank and accessories shall be rinsed free of milk with clean water immediately after emptying. This is the responsibility of the hauler.



10. The milk house doors shall be kept closed except when a person is passing through the doorway.

11. The milk hauler shall be responsible for proper use of the transportation tank and accessories.

12. Any milk hauler who hauls milk from farms not possessing written approval from the regulatory agency or who picks up milk for bulk hauling which is stored in cans at a farm under permit, may have his approval suspended or possibly revoked after an opportunity for a hearing by the regulatory agency. (This section is not construed to prohibit the temporary canning off of milk from bulk tanks while waiting to make up a complete route.)

### **Quality Control**

A. As often as is deemed necessary the regulatory agency may take samples for analysis from each farm tank or each transportation tank.

B. All milk samples taken from farm tanks or transportation tanks shall be taken in a sanitary manner in accordance with Standard Methods. Adequate means of agitation before sampling of the milk from the transportation tank shall be provided.

C. The regulatory agency shall have access to all records maintained by the receiving plant on butterfat, temperature and bacteriological sampling, and any other samples of bulk farm tank milk.

D. Milk samples for analysis shall be available on the farm tank pickup truck at all times during the collection period and delivery to the pasteurization plant, as required by the regulatory agency having jurisdiction.

### **Interference With Regulatory Agency**

Approval required herein may be suspended or revoked by interference with the regulatory agency in the performance of its duties.

### **Cleaning and Sanitizing Facilities for Feeder<sup>s</sup> Bulk Tank Trucks**

Since transfer facilities used to transfer milk from feeder type tank trucks to over-the-road tank trucks are essentially used for milk plant operations, said equipment, buildings, etc., shall comply with the applicable requirements of the current U. S. Public Health Service Milk Ordinance and Code.

In order to comply with the above the following requirements shall be met but shall not be considered a complete list of items necessary to comply with above sections. Transfer building shall have the following:

1. Concrete floors pitched to drain that are smooth and easily cleanable with adequate floor drains.

2. Area equal to 10 per cent of the floor area with windows which are clean and properly glazed. (Some glass blocks may be substituted in lieu of windows providing they do not interfere with proper ventilation.)

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<sup>s</sup> Smaller tank trucks used by a milk hauler to collect milk from individual farms to be transferred to a larger truck for transportation to market.

3. Impervious walls, painted white with a washable paint and of easily cleanable construction.

4. Hand-washing facilities, including hot and cold running water, soap and paper towels.

5. Water for washing under pressure, an automatic 80 gallon hot water storage tank (pressure type) equipped with a thermostat capable of maintaining water at least 140° F, (extra capacity, higher temperatures, or both, for CIP operations), and gas heaters, if used, properly vented. (Experience indicates sufficient hot water (160-180° F.) is a must for satisfactory in-place cleaning.)

6. Adequate lockers for clean boots and clothing to be used only for the purpose of washing tanks and equipment.

7. Adequate sprays, hoses, fittings, brushes, etc., for the washing and sanitizing of tanks, trucks and equipment.

8. Approved toilet and waste disposal facilities.

If milk from the farm is to be conducted to an over-the-road truck on the outside of the transfer facilities, the area where the over-the-road truck is parked shall be adequately surfaced.

The above building and facilities shall be used for no other purpose than for the transfer of Grade A milk and the washing of Grade A tanks and equipment. Samples for bacteriological analysis shall be properly iced and transported. On transferring milk from one truck to another only hoses which have, prior to the transfer, been thoroughly washed and sanitized shall be used; except that the hose used to load the truck, if not disconnected and if properly protected, may be used to unload the farm pickup tank. All reasonable precaution shall be taken to prevent contamination of milk or equipment by flies, dust, dirt or other contamination.

Ceiling vents shall be provided in the transfer building. If transfer is to be made to a truck outside the transfer building, a properly protected wall port shall be provided.

## **RECOMMENDED PROCEDURE FOR THE INSTALLATION AND CLEANING OF CLEANED-IN-PLACE MILK LINES ON THE FARM**

### **Material**

All equipment cleaned-in-place having any surface in contact with the milk and all solution lines, wash tank, fittings and pumps used in the circulating system should be constructed of stainless steel, heat resistant glass or similar corrosion-resistant material that is non-toxic and non-absorbent. (Note: Rubber may be permitted for connection of the solution line to the milk line.)

The vacuum line from the milk receiver to the moisture trap should be of stainless steel or glass.

All milk contact surfaces should be finished to an equivalent of not less than 120 grit finish, properly applied.

Gaskets, or other synthetic material in the milk zone when used, should be made of a low absorbent, relatively stable material which is smooth and non-toxic.

### **Construction**

Cleaned-in-place sanitary piping should conform to one of the following constructions:

1. Pipe lines with a gasket in the joint. Gaskets should be self-positioning, and of such design as to form a substantially flush interior joint.

2. Pipe lines with fittings without gaskets. The fittings should have self-positioning joints of such design and finish as to form a flush interior joint.

Equipment should be constructed so as to protect the milk from contamination.

### **Installation**

The milk pipe line system should be installed in a manner to permit inspection.

The lines should be supported so that pipes and gaskets remain in alignment and position.

The entire milk line that is under vacuum should be installed so as to have a positive drain toward the milk room. A slope of not less than 1 inch in 10 feet is suggested.

The vacuum line from the milk receiver should have a positive drain from the elbow to a moisture trap.

The volume of the wash tank should be at least 1½ times the volume of the pipe lines.

The vacuum line from the milk receiver should not extend above the milk receiver more than 12 inches, including the elbow.

The entire milk pipe line and solution line should be of the same inside diameter. In case it is necessary to use lines of different inside diameters, connections between the two should be made only in vertical sections of the installation.

No connecting valves should be permitted between the milk line and the solution line and any water line. The solution line and water lines should be disconnected from any solution or water supply during the milking period.

No physical connection should be permitted between the vacuum line and the milk line other than the moisture trap and the milk releaser. (Note: Weighing units using vacuum require an additional moisture trap.)

Sight glasses should not be permitted on milk pipe lines when such lines are to be cleaned by circulating systems.

Ends of the milk line and milk cocks should be capped when not in use. This applies to that portion of the pipe line in the milking barn area. It is recommended that milk cocks slope upward so as to be self draining.



The wash tank should be located in the milk house.

All milk pumps and attachments should be protected from possible contamination. If legs are used, they should be smooth with rounded ends and no exposed threads. Legs made of hollow stock should be sealed. On pumps with legs designed to be fixed to the floor, the minimum clearance between the lowest part of the base and the floor should be 6 inches or more. Bases when used should be constructed without ribs or flanges and should have a smooth top and bottom surface. Pumps, which because of their size and type cannot be mounted on legs, should be mounted on a base designed for grouting and sealing. All milk pumps and attachments should be a sufficient distance from walls to permit proper cleaning.

Any machinery that may emit oil, fumes, grease, odors or other objectionable material should not be located over or near milk equipment.

### **Cleaning Methods**

Suggested systems for cleaned-in-place milk pipe lines are:

1. Pressure circulation or recirculation using a pressure pump.
2. Vacuum circulation or recirculation.
3. Vacuum and gravity.

The circulating pump should be of a size sufficient to fill the pipe lines and insure proper cleaning solution velocities to cause enough turbulence for adequate cleaning.

Circulation or recirculation devices should deliver sufficient volume to effectively clean the equipment.

All accessory equipment which is included in the circulation system and which is not cleaned-in-place should be disassembled, washed separately and stored properly.

In the circulation method of cleaning, the procedure for cleaning all milk pipe lines after each usage should be:

- a. Pre-rinse with fresh water at a temperature of approximately 100° F. until the waste is clear.

- b. Wash by circulating a suitable washing compound using temperatures, concentrations and time of circulation recommended by the washing compound manufacturer. The minimum time of circulation should be 15 minutes.

- c. Rinse free of all washing solution with clean hot water. (Water supplies having temporary hardness should have rinse temperatures that will prevent film formation.) It is recommended that water softeners be installed where waters have over 12 grain hardness.

Used solutions should be discarded, the solution tank thoroughly cleaned after each milking, and fresh solutions prepared for each milking.

The outside of milk pipe lines and equipment should be kept clean.

A thermometer should be provided and used for determining the temperature of the cleaning solution.

### Bactericidal Treatment

Before starting to milk, the lines through which milk will flow should be given bactericidal treatment.

### REFERENCES

The following publications contain additional information and standards relating to Grade A requirements. These references are available at either the county agricultural agent's or the milk sanitarian's office. Some of these publications are available for distribution, others are limited in number and can be either borrowed or used at the agent's or sanitarian's office.

1. *Bulk Cooling and Storage of Milk on the Farm*, Cornell Extension Bulletin 899.
2. *Bulk Milk Handling*, Circular 510, University of Wisconsin Agricultural Extension Service.
3. *Building Concrete Farm Structures*, Portland Cement Association, 504 South 18th Street, Omaha 2, Nebraska.
4. *Farm Sewage Disposal*, Extension Circular 703, University of Nebraska Agricultural Extension Service.
5. *Farmstead Wiring Handbook*, Industry Committee on Interior Wiring Design, Room 2650, 420 Lexington Avenue, New York 17, New York.
6. *Grade A Milk and Milk Products, 1953*, Department of Agriculture and Inspection, Lincoln.
7. *Insulated Pump House*, Extension Circular 701, University of Nebraska Agricultural Extension Service.
8. *Loose Housing for Dairy Cattle*, Agricultural Information Bulletin 98, U. S. Department of Agriculture.
9. *Manual of Septic-Tank Practice*, USPHS Publication No. 526, U. S. Department of Health, Education and Welfare.
10. *Milk Ordinance and Code, 1953 Recommendations of the Public Health Service* (Third Printing), U. S. Department of Health, Education, and Welfare.
11. *Plans for Farm Milking Plants*, Midwest Plan Service.
12. *Plans for Stall Barns, Can Milkhouses and Bulk Milkhouses*, Midwest Plan Service.
13. *Proper Concrete Mixes for Small Jobs and Quantities of Materials Needed Using Nebraska Sand, Gravel Aggregate*, PCA, 504 South 18th Street, Omaha 2, Nebraska.
14. *Recommended Water Supply Practices*, State Department of Health, Lincoln.
15. *Rules and Regulations Pertaining to Public Health*, State Department of Health, Lincoln.
16. *Safe Water for the Farm*, F. B. No. 1978, U. S. Department of Agriculture.
17. *Stall Barns for Dairy Cattle*, Agricultural Information Bulletin 123, U. S. Department of Agriculture.
18. *Standards for Design and Operation of Loose Housing Systems for Dairy Cattle in the North Central Region*, Dairy Cattle Housing Sub-Committee, North Central Region, Farm Buildings Research Committee.