

Chapter Ag 31

DAIRY PLANT STANDARDS

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Ag 31.01 Definitions. As used herein unless the context otherwise requires:

(1) "Department" means the state of Wisconsin department of agriculture, trade and consumer protection.

(2) "Approved laboratory" means a dairy laboratory approved by the department for the conduct of milk quality and butterfat tests.

(3) "C-I-P system" means food processing equipment in which pipelines and other product contact surfaces are so designed, constructed and permanently installed as to be cleaned-in-place.

(4) "Dairy plant" means a dairy plant as defined in section 97.20 (1) (a), Stats.

(5) "Dairy plant operator" means any person who owns, operates, controls or is in charge of the operation of a dairy plant.

(6) "Dairy product" or "product" means a dairy product as defined in ss. 97.20 (1) (b) and 97.24 (1) (b), Stats.

(7) "Milk" means the milk of cows or goats and includes skim milk and cream.

(8) "Milk hauler" means any person who transports milk from a dairy farm to a dairy plant or other processing or distribution locations.

(9) "Milk quality test" means the standard plate count, plate loop count, coliform count, sediment test, inhibitory substance test, Wisconsin mastitis test, direct microscopic somatic cell count, disc assay, and any other test for milk as described in "Standard Methods for the Examination of Dairy Products", Thirteenth Edition (1972), copies of which are on file at the offices of the department, the secretary of state and the revisor of statutes, and may be obtained from the American Public Health Association, Inc., 1015 Eighteenth Street N.W., Washington, DC.

(10) "Person" means an individual, partnership, firm, association, corporation, or any other business unit or entity.

(11) "Producer" means any person who owns, controls or operates a dairy farm and sells milk produced on the farm from cows or goats, and includes Grade A producers under s. 97.24, Stats., and Wis. Adm. Code chapter Ag 80.

(12) "Sanitize" means to destroy pathogens and other organisms, insofar as practicable, by the application of any sanitizing substance or process to product contact surfaces of dairy equipment or utensils which are otherwise clean. The sanitizing treatment or process shall not adversely affect the equipment or utensils or the quality of the milk or milk product coming in contact therewith, and shall be acceptable to the department.

History: Cr. Register, October, 1978, No. 274, eff. 1-1-79.

Ag 31.02 Dairy plant premises. Dairy plant premises shall be kept in a clean and orderly condition, free from foul odors, smoke, excessive air pollution, and waste materials. Driveways and dirt surfaces in the immediate plant area shall be surfaced or otherwise treated to minimize dust. A drainage system shall be provided to allow rapid drainage of all water away from plant buildings, including surface water around the plant or on the premises, to prevent a nuisance or health hazard. The immediate premises surrounding the plant and buildings used in connection with the operation of the plant, shall be free from refuse, rubbish, and waste materials to prevent harborage of rodents, insects and other vermin.

History: Cr. Register, October, 1978, No. 274, eff. 1-1-79.

Ag 31.03 Dairy plant construction and maintenance. (1) **PLANT BUILDINGS.** The dairy plant and all buildings used in connection with the dairy plant shall be of sound construction and be kept clean and in a good state of repair to prevent the accumulation of dust, dirt, mold and other insanitary conditions, and the entry or harboring of insects, vermin, rodents and other animals.

(2) **FLOORS.** The floors of all rooms in which milk or dairy products are processed or handled, or in which milk utensils are washed, shall be constructed of concrete or other equally impervious and readily cleanable material. The floor shall be smooth, sloped to provide adequate drainage, provided with trapped drains, and kept clean and in good repair, except that:

(a) Refrigerated storage rooms used for storing dairy products need not be provided with floor drains when the floors are sloped to drain to one or more exits to prevent pooling of liquids.

(b) Storage rooms for storing dry ingredients or packaging materials, or both, may be constructed of tightly joined wood and need not be equipped with floor drains.

(3) **WALLS AND CEILINGS.** Walls and ceilings of rooms in which milk or dairy products are processed, handled or stored, or in which milk containers, utensils, and equipment are washed, shall be smoothly finished, washable, constructed of light colored material which is substantially impervious to moisture, and be kept clean and in good repair.

(4) **OUTSIDE OPENINGS.** (a) Outside openings of plants, including doors, windows, skylights and transoms, shall be effectively protected or screened against the entrance of insects, birds, rodents and dirt. Outside doors shall be self-closing. Outside conveyor openings and other special type outside openings shall be effectively protected at all times against the entrance of insects and rodents by use of doors, screens, flaps, fans or tunnels. Outside openings for sanitary pipelines shall be covered when not in use. Service pipe openings shall be completely cemented or fitted with tight metal collars.

(b) Outside doors shall be solid self-closing doors, and windows shall be glazed. All doors and windows shall be kept closed during dusty weather conditions. Screen doors, if used, shall open outward and be self-closing.

(5) LIGHTING AND VENTILATION. (a) Lighting, whether natural or artificial, shall be well distributed in all processing rooms. All rooms in which dairy products are processed, manufactured or packaged, or where utensils are washed, shall be lighted with at least 30 foot-candles of light intensity on all working surfaces and at least 50 foot-candles of light intensity in areas where dairy products are graded or examined for condition and quality. In all other rooms at least 5 foot-candles of light intensity, measured at a distance of 30 inches from the floor, shall be provided. Light bulbs, fluorescent tubes, fixtures, skylights, or other glass suspended over products shall be shielded or protected to prevent contamination of such products from broken glass.

(b) Adequate heating, ventilation, or air conditioning shall be provided for all rooms to permit maintenance of sanitary conditions. Exhaust or inlet fans, vents, hoods, and temperature and humidity controls shall be provided as necessary to control or regulate room temperatures and minimize or eliminate objectionable odors, moisture condensation, or mold. Inlet fans shall be provided with an adequate air filtering device to eliminate dirt and dust from incoming air. Ventilation systems shall be cleaned periodically as needed and maintained in good repair. Exhaust outlets shall be screened or provided with self-closing louvers to prevent the entrance of insects when not in use.

(6) ROOM SEPARATION. (a) A separate room shall be maintained for the receiving of milk. Boiler, tool and toilet rooms shall be separated from rooms where products are processed, manufactured, packaged or stored. No ingredients or packaging materials shall be stored or held in processing rooms beyond those required for daily operations. Locker and lunch rooms shall be separated from pasteurizing and processing rooms in new plants constructed after January 1, 1979.

(b) No rooms in which milk or dairy products are processed, handled or stored, or in which utensils, ingredients or packaging materials or clean utensils are kept, shall open directly into living quarters without a solid tight-fitting door.

(7) TOILET FACILITIES. (a) Every dairy plant shall be provided with toilet facilities conforming to the rules of the state of Wisconsin department of health and social services.

(b) An employe toilet room shall be conveniently located and equipped with hand-washing facilities with hot and cold running water, soap, and single service towels or air drying equipment. A dressing room, if provided, where employes may change and store clothing, shall be separate from processing, packaging, or storage rooms. Toilet rooms shall be properly ventilated to outer air and equipped with self-closing doors. A legible sign shall be posted conspicuously in each toilet and dressing room directing employes to wash their hands before returning to work.

(8) WATER SUPPLY. (a) An ample supply of potable water shall be available for all processing, drinking and handwashing purposes. Bacteriological examinations shall be made of water supplies at least once every 6 months to determine their purity and potability. Tests shall be conducted by the state laboratory of hygiene or a laboratory certified by

the state of Wisconsin department of health and social services. The results of water tests shall be kept on file at the dairy plant for at least 12 months.

(b) The location, construction and operation of any well shall comply with the Wisconsin well code, Wis. Adm. Code chapter NR 112. Tests shall be conducted whenever changes in the water system are made which may affect the quality of the water supply.

(c) Condensing water and vacuum water shall be of potable quality if the evaporator or vacuum-heat equipment is not constructed and controlled to prevent the contamination of the evaporator or vacuum-heat equipment, or their contents by condensing water.

(9) **WASTE DISPOSAL.** Liquid wastes shall be removed from the plant and premises by means of a sewage system with sufficient slope and capacity to remove all liquid waste. Sewage and industrial wastes shall be disposed of in a sanitary manner and in accordance with the provisions of state and local laws or regulations. Containers used for the collection of refuse or waste shall be constructed of metal or other impervious materials, kept covered with tight fitting lids, placed outside the plant, and be cleaned before reuse. Refuse or waste shall not be allowed to accumulate in and about the premises and shall be removed as often as necessary to maintain the premises in a clean and sanitary condition.

(10) **HANDWASHING FACILITIES; PROCESSING AREA.** Processing areas shall be provided with convenient handwashing facilities, including hot and cold or warm running water, soap, and sanitary towels. Self-closing metal or plastic waste containers shall be provided for used towels and other wastes. Handwashing facilities shall be kept clean. The use of a common towel is prohibited. Vats for washing equipment shall not be used for handwashing facilities.

History: Cr. Register, October, 1978, No. 274, eff. 1-1-79.

Ag 31.04 Personnel. (1) **CLEANLINESS.** Persons working in the plant shall wash their hands before beginning work and before returning to work after using toilet facilities, eating, smoking, or engaging in other activities which may result in soiling their hands. Expectoration or use of tobacco in any form is prohibited in any room or compartment where exposed products are prepared, processed, stored or otherwise handled. Clean, light-colored, washable outer garments and caps, and hair nets or hair restraints shall be worn when engaged in receiving, sampling, processing or packaging products.

(2) **HEALTH.** No person afflicted with a communicable disease, or who has a discharging or infected wound, sore or lesion on hands, arms or other exposed portions of the body, shall be permitted in any room or compartment where products are processed or handled. An employe returning to work following illness from communicable disease requiring quarantine shall present a certificate from the attending physician to establish proof of complete recovery.

History: Cr. Register, October, 1978, No. 274, eff. 1-1-79.

Ag 31.05 Dairy plant cleanliness. All rooms in which milk and dairy products are handled, processed or stored, or in which containers, utensils, ingredients or equipment are washed or stored, shall be kept neat, clean, and free of evidence of insects and rodents. Only equipment and ingredients directly related to processing operations or to the handling

of containers, utensils and equipment shall be permitted in the pasteurizing, processing, cooling, packaging, and bulk milk storage rooms. Any exhaust stacks, elevators and elevator pits, conveyors and similar facilities shall be inspected and cleaned at regular intervals. Pesticides shall be used only for purposes for which they have been registered and in accordance with label directions.

History: Cr. Register, October, 1978, No. 274, eff. 1-1-79.

Ag 31.06 Facilities and equipment. (1) **EQUIPMENT; GENERAL.** (a) All product contact equipment, piping or connections used in the processing, manufacturing, handling or packaging of dairy products, shall be constructed of stainless steel or other equally corrosion-resistant material which can be readily cleaned. No processing equipment shall be used which is rusted or corroded or in such a defective condition that it may result in contamination of milk and dairy products. Plastic, rubber and rubberlike materials, or other non-metallic parts having product contact surfaces shall meet requirements generally considered acceptable in the food processing industry. All equipment and piping shall be so designed as to be easily accessible for cleaning and be kept in good repair and free from cracks and corroded surfaces.

(b) Stationary equipment, including welded sanitary lines designed for cleaning-in-place, may be used subject to department approval. Where rigid pipelines are not practicable, flexible pipeline of approved plastic or other sanitary materials may be used for the transfer of partially processed products during intermediate stages of production in the manufacture of cheese and for the loading and unloading of bulk tank trucks, provided the flexible pipeline does not exceed 25 feet in length. Not more than 48 inches of approved flexible pipeline may be used between different pieces of equipment to eliminate vibration.

(c) Product pumps shall be of a sanitary type, which can be easily dismantled for cleaning, or of approved C-I-P construction. Cleaned-in-place sanitary piping and equipment shall be self-draining.

(d) Newly installed processing equipment shall be located at least 24 inches from any wall or any other piece of equipment more than 48 inches long. This does not apply to storage and silo tanks where the face of such tanks extends through a wall in the processing room.

(2) **UTENSILS.** All utensils used in the receiving, storing, processing, manufacturing, packaging and handling of milk or milk products, or any ingredients thereof, shall be of smooth, non-absorbent, stainless steel, approved plastic or equally corrosion-resistant material with flush seams. No utensils which are badly worn, rusted or corroded or which cannot be rendered clean and sanitary by washing shall be used. No lead solder shall be permitted to come in contact with milk or dairy products.

(3) **PASTEURIZATION AND PASTEURIZATION EQUIPMENT.** (a) 1. Whenever pasteurization of a product is required by a standard of identity as set forth in 21 CFR 133, or a product is otherwise represented as having been pasteurized, it shall be pasteurized in equipment which will heat every particle of milk or skim milk to at least 145° F., and cream and other dairy products to at least 150° F., and hold them at such temperature continuously for at least 30 minutes; or heat every particle of milk and skim milk to at least 161° F., and cream and other dairy products to at least 166° F., and hold them at such temperature continuously for at

least 15 seconds. Ice cream or ice milk mix and dairy frozen desserts shall be heated to at least 175° F. for at least 25 seconds or to at least 155° F. for at least 30 minutes as provided under Wis. Adm. Code ch. Ag 70. Condensed products for re-pasteurization shall be heated to 166° F. for 25 seconds. Cream for butter making shall be heated to at least 185° F. for at least 15 seconds or 165° F. for 30 minutes. This subsection shall not prohibit any other process which is equally effective and approved by the department.

2. Pasteurizing equipment in plants subject to requirements under Wis. Adm. Code chs. Ag 70 and 80, shall conform to standards and requirements of par. (b). Pasteurizing equipment requirements specified under par. (b) shall apply to all dairy plants after July 1, 1981.

3. The temperature sensor of the recorder-controller on an HTST pasteurizer shall be examined by the department for accuracy and sealed at the required temperature and holding time. The department seal shall not be removed without prior notice to the department except in an emergency. If the seal is removed because of an emergency, the department shall be notified of such removal within 24 hours.

(b) Pasteurizing equipment shall conform to accepted industry standards for the sanitary construction, installation, testing and operation of high-temperature short-time pasteurizers (HTST) and sanitary standards for non-coil type batch pasteurizers. All component equipment or optional component equipment of high-temperature short-time pasteurizers (HTST), except heating and cooling equipment, shall be connected to each other with sanitary pipelines and fittings and so installed as not to have an adverse effect on the time, temperature, and pressure relationships of the HTST system. Such HTST system, parts and equipment shall be installed to facilitate easy access for cleaning, maintenance and inspection.

1. The raw product constant level tank shall be installed so that all contents will drain to the outlet before the outlet becomes uncovered. The tank outlet shall be directly connected to the raw product inlet of the regenerative section, or when a raw product booster pump is used, the tank outlet shall be connected to the inlet of the booster pump. The tank shall be installed so that its top rim is always lower than the lowest product level in the regenerator.

2. When product to product regeneration is employed, the pasteurized product, between its outlet from the regenerator and the nearest point downstream open to the atmosphere, shall rise to a vertical elevation of at least 12 inches above the highest raw product level downstream from the constant level tank, and shall be open to the atmosphere at this or a higher elevation. An effective vacuum breaker of sanitary design shall be considered as being open to the atmosphere.

3. When a plate type heat exchanger is installed, the processor shall have available for the department a diagram showing the plate port arrangement in proper operating sequence.

4. The timing pump or device shall be installed upstream from the holder and the driving motor and starter shall be interwired with all components.

5. Holding tube supports shall be installed and adjusted to maintain all parts of the holding tube in a fixed position, and to maintain the minimum upward slope.

6. The timing electrode fitting to the inlet of the holding tube shall be installed with sanitary fittings.

7. The temperature sensor of the recorder-controller shall be installed in the connection provided for in the recorder-controller.

8. The flow-diversion device shall be so interconnected with the recorder-controller that at sublegal and legal temperatures the flow-diversion device will automatically assume the diverted and forward-flow positions, respectively, except that during circulating cleaning the flow-diversion device may assume the forward-flow position or be cycled at sublegal temperatures provided the control required to do this is a programmed control that is failsafe and interlocked with the timing pump so that the timing pump cannot run under this condition.

9. The timing pump shall be interwired with the flow-diversion device and the recorder-controller so that the timing pump cannot run at sublegal temperatures, unless the flow-diversion device is in its fully diverted position.

10. The hot product temperature control shall be installed as part of the heating media system.

11. The hot product indicating thermometer shall be installed in the fitting at the outlet end of the holding tube.

12. The cold product indicating thermometer, if provided, shall be installed in the pipeline from the outlet of the cooling section and close to the press.

13. Connecting sanitary pipe and fittings of all components of the HTST pasteurizer shall be without dead-ends, except for openings on sanitary fittings.

14. When the heating media system is not built integral with other components of the pasteurizer, it may be installed in other than the product processing room.

15. Sanitary piping is not required for connecting the heating media unit with the heating section of the pasteurizer. However, when a plate type heat exchanger is used, the piping shall not prevent movement of the plates.

16. Water supply to the heating media system shall be protected against back flow by an air gap of not less than 2 diameters with a minimum of one inch, or other effective back flow preventive device.

17. The equipment used in recooling and recirculating of the cooling medium shall be installed, whenever practical, in other than product processing rooms.

18. Sanitary piping is not required for connecting the cooling medium unit with the cooling section of the pasteurizer. However, when a plate type heat exchanger is used, the piping shall not prevent movement of the plates.

19. Water supply of the cooling medium system shall be protected against back flow by an air gap of not less than 2 diameters with a minimum of one inch, or other effective back flow preventive device.

20. Where recirculating cooling medium is used, it shall be properly protected from contamination.

21. Control devices shall be inter-wired or piped with all component equipment or optional component equipment. The control panel shall be supported to minimize vibration.

22. If a homogenizer is used as a timing pump, or if inter-wiring of homogenizer and timing pump is required, a time delay relay may be installed in the electrical circuit to the homogenizer, so that during the normal transit time of the flow-diversion device the homogenizer motor will remain running. The time delay relay shall provide a delay of not more than one second. If the homogenizer motor stops, it shall not restart automatically and will not restart at sublethal temperatures, unless the flow-diversion device is in its fully diverted position. The time delay relay may be of the fixed time or adjustable time type. If the time delay relay is adjustable, means of sealing the unit shall be provided.

23. When an auxiliary pump is used in a HTST pasteurizer system, it must be installed and operated in such a way that it will not 1) interfere with the detection of, or stoppage of, the forward flow of unpasteurized product, 2) influence the proper pressure relationship within the regenerator, and 3) reduce the holding time below the required minimum.

24. In a HTST pasteurizing system supplying pasteurized product to an evaporator, when a circulating auxiliary pump is installed to obtain a greater velocity through a heater than that which would be produced by the timing pump, a sanitary recirculating pump shall be provided.

25. The sanitary recirculating line shall be of the same size or larger than the inlet of the circulating pump without valves or restrictions, provided that when a smaller size line than the inlet to the circulating pump is used, and contains valves or other restrictions, the circulating pump motor shall be inter-wired with the timing pump motor.

26. All electric wiring interconnections shall be in a permanent conduit, except that rubber covered cable may be used for final connection in accordance with the local electrical code, with no electrical connections to defeat the purpose of any provision of these rules.

(4) C-I-P SYSTEMS. (a) All product contact surfaces of sanitary piping utilized in C-I-P systems shall be at least as smooth as number 4 mill finish on stainless steel sheets.

(b) The finish of solution contact surfaces, whether sheet, tube, casting, or other type of surface, shall be equal in cleanability to stainless steel with number 4 finish, or number 2-B mill finish, as applied to stainless steel sheet and shall be pit free.

(c) Product lines, including equipment and solution lines shall have C-I-P fittings or welded joints.

(d) Welded joints shall be smooth and free from pits, cracks, or other defects.

(e) Removable fittings may be used with or without gaskets and shall be of such design as to form substantially flush interior joints.

(f) Appurtenances having product contact surfaces shall be cleanable, either when in an assembled position or when disassembled. Removable parts shall be readily dismountable.

(g) All internal angles of 135° or less on product contact surfaces, or on solution contact surfaces, shall have minimum radii of ¼" except where smaller radii are required for essential functional reasons, such as for sealing ring grooves and in pumps.

(h) All solution contact surfaces shall be cleanable, either when in an assembled position or when disassembled. They shall contain no pockets or crevices that are not readily cleanable. Removable parts shall be readily demountable. Solution system appurtenances shall be accessible for inspection to determine freedom from biological, chemical, or physical soil contamination.

(i) Non-product contact surfaces shall have a smooth finish, be free of pockets and crevices, and be readily cleanable.

(5) INSTALLATION OF C-I-P PIPELINE CIRCUITS. (a) Prior to installation of C-I-P pipeline circuits a drawing or equivalent plan shall be made available to the department by the plant operator for each installation, or subsequent addition or modification, showing each permanent circuit to be cleaned, noting thereon the size and length of piping, fittings, pitch, drain points, access points, relative elevations, locations and specifications of circulating unit, and other pertinent data.

(b) The C-I-P pipeline together with gaskets if used, shall be supported so that they remain in alignment and position. The support system shall be designed so as to preclude electrolytic action between supports and pipelines.

(c) Each separate cleaning circuit, including product and solution lines, shall be provided with a sufficient number of access points, such as valves, fittings, or removable sections to make possible adequate inspection and examination of the interior surfaces.

(d) Relatively horizontal lines shall be self-draining and pitched to drain points.

(e) The circulating unit, consisting of a motor driven pump and solution tank, shall provide a minimum average solution velocity at any instance of not less than 5 feet per second through each pipe or fittings in the circuit. If split flow arrangement, pressure differential must be maintained to serve the 5 feet per second minimum flow rate. This operation is to be checked by observation and tests.

(f) C-I-P systems shall be designed so that the suction intake of the primary circulating pump shall be flooded at all times during the cleaning cycle.

(g) Solution temperature shall be automatically controlled by the use of a temperature regulator with a response range of plus or minus 5° F.

(h) The system shall be provided with a recording thermometer having a scale range of 60° to 180° F. with extension of scale on either side permitted, graduated in time scale divisions of not more than 15 min-

utes. Between 110° and 180° F., the chart shall be graduated in temperature divisions of not more than 2° F., spaced not less than 1/16 inch apart, and be accurate within 2° F., plus or minus. The sensor shall be protected against damage at 212° F. The sensing element of the recording thermometer shall be located in the return solution line as near the solution tank as possible.

(i) All connections between the solution circuit and the product circuit shall be so constructed as to positively prevent the commingling of the product and the solution during processing.

(j) All welding of sanitary product pipelines and solution lines shall be made by the Tungston Shield Arc Method or its equivalent. The following precautions shall be taken:

1. Inner backup gas shall be used to protect and control the interior of the weld.

2. The weld surface interior, face and exterior shall be cleaned and free of all foreign matter and surface oxide before welding. Iron free abrasives shall be used when cleaning surfaces.

3. All tube and fitting ends shall be square cut and deburred.

4. Welding procedures shall assume uniform and complete penetration of weld at all times.

5. All welds having pits, craters, ridges, or imbedded foreign materials shall be removed and the joints shall be properly rewelded.

6. Internal and external grinding or polishing of welds is not required.

7. An acceptable sample weld piece shall be provided at the beginning of each day or when required.

8. A boroscope or other acceptable inspection device, to inspect representative welds, shall be made available by the plant operator.

Note: Systems and milking and milk handling equipment which conform to the current "3-A Accepted Practices for the Design, Fabrication and Installation of Milking and Milk Handling Equipment", published by the International Association of Milk, Food and Environmental Sanitarians, Inc., Box 701, Ames, Iowa, will meet the requirements of this section.

History: Cr. Register, October, 1978, No. 274, eff. 1-1-79; am. (1) (b), Register, November, 1980, No. 299, eff. 12-1-80.

Ag 31.07 Equipment cleaning and sanitizing. (1) **STANDARDS AND PROCEDURES; GENERAL.** (a) Equipment, sanitary piping and utensils used in receiving, storing, processing, manufacturing, packaging and handling milk or dairy products and ingredients thereof, and all product contact surfaces of homogenizers, high pressure pumps and lines, shall be kept clean. All such equipment shall be cleaned at the end of each day's operation. Before use, all equipment coming in contact with milk products shall be subject to an effective bactericidal or sanitizing treatment. Equipment not designed for cleaned-in-place cleaning shall be disassembled, thoroughly cleaned and sanitized. No cleaners, detergents, wetting or sanitizing agents adversely affecting or capable of contaminating milk or dairy products or ingredients thereof, shall be used. Steel wool or metal sponges shall not be used in the cleaning of equipment or utensils.

(b) Milk and cream cans shall be cleaned, subjected to bactericidal treatment and dried before removal from the plant for reuse. Can washers shall be kept free from accumulation of scale. Packing glands on all agitators, pumps and vats shall be inspected regularly and kept clean.

(c) Each dairy product transport tank shall, prior to each use, be washed and sanitized, and tagged with a washing and sanitizing tag showing the date of washing and sanitizing, the name of the person who washed and sanitized the tank, and the name and location of the plant where the washing and sanitizing was done. The tag shall be attached to the outlet valve and shall not be removed until the tank is again washed and sanitized. The tag or other record of each washing and sanitizing shall be kept by the plant where the washing and sanitizing was done for a period of 90 days.

(2) **CLEANING AND SANITIZING PROCEDURE FOR C-I-P PIPELINE CIRCUITS.** C-I-P cleaning shall be used only for equipment and pipeline systems designed, engineered, and installed for C-I-P cleaning.

(a) An effective rinsing, cleaning and sanitizing program shall be adopted by plant operators to keep C-I-P systems in a clean condition. The recommendations of the cleaning compound manufacturer shall be followed with respect to the circulating time, temperature, and concentration of specific acid or alkaline solutions and bactericides to be used.

(b) Immediately after concluding the day's operations, all connections between cleaned-in-place lines and processing equipment not included in the cleaning circuit shall be removed, the openings capped, by-pass connections made, and the lines rinsed thoroughly with tempered water not less than 120° F., continuously discarding the rinse water near the downstream end of the solution return line until the discarded effluent is clear.

(c) All solution and product contact surfaces not cleanable by mechanical cleaning procedures shall be cleaned manually.

(d) An effective detergent solution shall be circulated through the C-I-P circuit for such period of time and at such concentration and temperature as necessary for the effective removal of the soil residue in the circuit. The detergent solution shall be rinsed thoroughly from the circuit. An acid detergent may be used, when needed, as a supplement to the routine circulation. Acid detergent treatment shall be followed with a thorough rinsing of the circuit.

(e) All product contact surfaces shall be sanitized with one or a combination of the following methods:

1. The circulation of water through the circuit for 5 minutes at a minimum temperature of 170° F. at the discharge end of the circuit, and then drain.

2. The pumping of an approved chemical sanitizing solution of acceptable strength and recommended temperature through product lines and equipment for at least one minute, and then drain.

3. The use of steam at a temperature of 170° F. for 15 minutes or at a temperature of 200° F. for 5 minutes as measured at the drain outlet.

Ag 31.08 Storage. (1) **STORAGE OF CLEAN CONTAINERS AND EQUIPMENT.** Containers and other utensils used in the handling, storage or transportation of milk or dairy products shall, unless stored in a sanitizing solution, be so stored to drain dry and be kept free from contamination.

(2) **STORAGE OF SINGLE-SERVICE ARTICLES.** Single-service articles used in handling, processing and packaging milk and dairy products and coming in direct contact with milk and dairy products shall be purchased and stored in sanitary cartons, be kept in a clean dry place until used, and handled in a sanitary manner.

(3) **STORAGE OF PRODUCTS AND INGREDIENTS.** Products and ingredients shall be stored or arranged in an orderly manner in aisles, rows, sections or lots so as to permit ready access for inspection and adequate cleaning of the room or area in which they are stored. No products shall be placed directly on wet floors or exposed to foreign substances, odors or conditions which might cause package or product damage or contamination. Insecticides, rodenticides and other toxic materials shall be kept in their original containers and stored in a separate room or cabinet away from products, ingredients and packaging supplies.

History: Cr. Register, October, 1978, No. 274, eff. 1-1-79.

Ag 31.09 Cooling and handling milk and cream. (1) **COOLING OF MILK AND FLUID DAIRY PRODUCTS.** Temperature of milk shall not exceed 50° F. when delivered to the plant unless it is delivered within 2 hours after milking. Milk received at the plant shall be cooled to and held at 50° F. or lower unless processed within 2 hours after receipt. Milk and fluid dairy products, other than cream or whey cream, held for manufacturing purposes, shall be kept at 50° F. or lower while at the plant or during transport between plants.

(2) **COOLING AND HANDLING CREAM AND WHEY CREAM.** (a) Cream, whey cream, or whey cream from drippings, shall be cooled at the plant where separated or received to 40° F. within 2 hours after it is separated or received, and maintained at that temperature until used.

(b) Cream and whey cream may not be sold or delivered to another plant for human food purposes if the titratable acidity of whey cream exceeds 0.20% or if cream or whey cream is held for more than 7 days at the plant where separated.

(c) All cream or whey cream shall be examined organoleptically prior to leaving the plant where separated or produced. No cream or whey cream having an unsatisfactory flavor or odor, because of the prior addition of approved chemical agents to the milk from which the cream was derived, or for any other reason, shall be sold or used for human food purposes.

(3) **COW AND GOAT MILK.** Cow milk and goat milk shall be handled separately and may not be commingled.

History: Cr. Register, October, 1978, No. 274, eff. 1-1-79.

Ag 31.10 Construction plans. Dairy plants to be constructed, reconstructed or extensively altered shall conform to the requirements of this chapter. Plans and specifications for dairy plants to be constructed, reconstructed, or extensively altered shall be submitted to the department for its approval before the work is begun. Such plans shall be reviewed

by the department and returned to the dairy plant operator within 14 days after their receipt, together with comments and objections.

History: Cr. Register, October, 1978, No. 274, eff. 1-1-79.

Ag 31.11 Dairy plant records. (1) Every dairy plant operator shall keep for at least one year a record of each producer showing the results of farm inspections conducted during the calendar year, the date and results of all milk quality tests, and the date and quantity of any insanitary or adulterated milk received from each producer and rejected by the plant.

(2) The dairy plant operator shall furnish a copy of all farm inspection reports and milk quality test results to each producer as required under Wis. Adm. Code ch. Ag 30. Milk quality test results showing that the producer's milk is of acceptable sanitary quality shall be furnished each producer within at least 30 days after completion of such tests. Such test results may be delivered to the producer by the milk hauler.

(3) A water sample test report current within 24 months shall be kept on file by dairy plants for each producer.

(4) Dairy plants shall maintain records of pasteurization or heat treatment of all milk or dairy products processed by them in the past 6 months. Such records shall consist of recording charts or other records accurately showing the date of pasteurization or heat treatment, the temperature at which pasteurized or heat treated, and the name of the individual in charge of the pasteurization or heat treatment operation. The records shall include a record of a daily check of the recording thermometer for accuracy, the date on which the check was made, and the name of the person who checked the thermometer.

(5) Every dairy plant shall maintain for at least 90 days temperature recording charts or other records of each cleaning of a C-I-P system.

History: Cr. Register, October, 1978, No. 274, eff. 1-1-79.

Ag 31.12 Department requested samples. Dairy plants, on reasonable notice, shall collect and furnish to the department fresh milk samples of milk received from individual producers. Samples may be requested once every 4 months or more often as the department considers necessary for animal health and milk quality testing and examination. All samples shall be identified with the patron number and date of collection, and shall be kept under refrigeration or ice at a temperature at or below 40° F. until they are transferred to department inspectors.

History: Cr. Register, October, 1978, No. 274, eff. 1-1-79.

Ag 31.13 Laboratories. Butterfat and milk quality tests shall be conducted only in laboratories approved by the department. All laboratories certified by the state of Wisconsin department of health and social services under s. 143.15, Stats., to conduct milk quality tests shall be approved by the department. Laboratories engaged in butterfat testing shall be approved only if equipped and staffed to conduct accurate butterfat tests as prescribed under Wis. Adm. Code ch. Ag 107. Laboratories with equipment in compliance with ch. Ag 107 meet the requirements of this section. After notice and opportunity for hearing the department may withdraw approval of any laboratory, whether or not certified under s. 143.15, Stats., if tests are not conducted in accordance

with prescribed laboratory test procedures, or test reports or results are false or inaccurate.

History: Cr. Register, October, 1978, No. 274, eff. 1-1-79.

Ag 31.14 Applicability. This chapter applies to the manufacturing or processing of ungraded dairy products, whether or not the products are made from grade A or ungraded milk. The processing of grade A milk and milk products shall be governed by ch. 80, Wis. Adm. Code. Plants receiving or processing both grade A and ungraded milk or milk products shall comply with this chapter for the manufacture or processing of ungraded dairy products, and with ch. Ag 80, Wis. Adm. Code, for the receipt and processing of grade A milk and milk products.

History: Cr. Register, October, 1978, No. 274, eff. 1-1-79; r. and recr. Register, November, 1980, No. 299, eff. 12-1-80.

Ag 31.05 Dairy plant cleanliness. All rooms in which milk and dairy products are handled, processed or stored, or in which containers, utensils, ingredients or equipment are washed or stored, shall be kept neat, clean, and free of evidence of insects and rodents. Only equipment and ingredients directly related to processing operations or to the handling of containers, utensils and equipment shall be permitted in the pasteurizing, processing, cooling, packaging, and bulk milk storage rooms. Any exhaust stacks, elevators and elevator pits, conveyors and similar facilities shall be inspected and cleaned at regular intervals. Pesticides shall be used only for purposes for which they have been registered and in accordance with label directions.

History: Cr. Register, October, 1978, No. 274, eff. 1-1-79.

Ag 31.06 Facilities and equipment. (1) **EQUIPMENT; GENERAL.** (a) All product contact equipment, piping or connections used in the processing, manufacturing, handling or packaging of dairy products, shall be constructed of stainless steel or other equally corrosion-resistant material which can be readily cleaned. No processing equipment shall be used which is rusted or corroded or in such a defective condition that it may result in contamination of milk and dairy products. Plastic, rubber and rubberlike materials, or other non-metallic parts having product contact surfaces shall meet requirements generally considered acceptable in the food processing industry. All equipment and piping shall be so designed as to be easily accessible for cleaning and be kept in good repair and free from cracks and corroded surfaces.

(b) Stationary equipment, including welded sanitary lines designed for cleaning-in-place, may be used subject to department approval. Where rigid pipelines are not practicable, flexible pipeline of approved plastic or other sanitary materials may be used for the transfer of partially processed products during intermediate stages of production in the manufacture of cheese and for the loading and unloading of bulk tank trucks, provided the flexible pipeline does not exceed 25 feet in length. Not more than 48 inches of approved flexible pipeline may be used between different pieces of equipment to eliminate vibration.

(c) Product pumps shall be of a sanitary type, which can be easily dismantled for cleaning, or of approved C-I-P construction. Cleaned-in-place sanitary piping and equipment shall be self-draining.

(d) Newly installed processing equipment shall be located at least 24 inches from any wall or any other piece of equipment more than 48 inches long. This does not apply to storage and silo tanks where the face of such tanks extends through a wall in the processing room.

(2) **UTENSILS.** All utensils used in the receiving, storing, processing, manufacturing, packaging and handling of milk or milk products, or any ingredients thereof, shall be of smooth, non-absorbent, stainless steel, approved plastic or equally corrosion-resistant material with flush seams. No utensils which are badly worn, rusted or corroded or which cannot be rendered clean and sanitary by washing shall be used. No lead solder shall be permitted to come in contact with milk or dairy products.

(3) **PASTEURIZATION AND PASTEURIZATION EQUIPMENT.** (a) 1. Whenever pasteurization of a product is required by a standard of identity as set forth in 21 CFR 133, or a product is otherwise represented as having been pasteurized, it shall be pasteurized in equipment which will heat

every particle of milk or skim milk to at least 145° F., and cream and other dairy products to at least 150° F., and hold them at such temperature continuously for at least 30 minutes; or heat every particle of milk and skim milk to at least 161° F., and cream and other dairy products to at least 166° F., and hold them at such temperature continuously for at least 15 seconds. Ice cream or ice milk mix and dairy frozen desserts shall be heated to at least 175° F. for at least 25 seconds or to at least 155° F. for at least 30 minutes as provided under ch. Ag 70, Wis. Adm. Code. Condensed products for re-pasteurization shall be heated to 166° F. for 25 seconds. Cream for butter making shall be heated to at least 185° F. for at least 15 seconds or 165° F. for 30 minutes. This subsection shall not prohibit any other process which is equally effective and approved by the department.

2. Pasteurizing equipment in plants subject to requirements under chs. Ag 70 and 80, Wis. Adm. Code, shall conform to standards and requirements of par. (b). Pasteurizing equipment requirements specified under par. (b) shall apply to all dairy plants after July 1, 1981.

3. The temperature sensor of the recorder-controller on an HTST pasteurizer shall be examined by the department for accuracy and sealed at the required temperature and holding time. The department seal shall not be removed without prior notice to the department except in an emergency. If the seal is removed because of an emergency, the department shall be notified of such removal within 24 hours.

(b) Pasteurizing equipment shall conform to accepted industry standards for the sanitary construction, installation, testing and operation of high-temperature short-time pasteurizers (HTST) and sanitary standards for non-coil type batch pasteurizers. All component equipment or optional component equipment of high-temperature short-time pasteurizers (HTST), except heating and cooling equipment, shall be connected to each other with sanitary pipelines and fittings and so installed as not to have an adverse effect on the time, temperature, and pressure relationships of the HTST system. Such HTST system, parts and equipment shall be installed to facilitate easy access for cleaning, maintenance and inspection.

1. The raw product constant level tank shall be installed so that all contents will drain to the outlet before the outlet becomes uncovered. The tank outlet shall be directly connected to the raw product inlet of the regenerative section, or when a raw product booster pump is used, the tank outlet shall be connected to the inlet of the booster pump. The tank shall be installed so that its top rim is always lower than the lowest product level in the regenerator.

2. When product to product regeneration is employed, the pasteurized product, between its outlet from the regenerator and the nearest point downstream open to the atmosphere, shall rise to a vertical elevation of at least 12 inches above the highest raw product level downstream from the constant level tank, and shall be open to the atmosphere at this or a higher elevation. An effective vacuum breaker of sanitary design shall be considered as being open to the atmosphere.

3. When a plate type heat exchanger is installed, the processor shall have available for the department a diagram showing the plate port arrangement in proper operating sequence.

4. The timing pump or device shall be installed upstream from the holder and the driving motor and starter shall be interwired with all components.

5. Holding tube supports shall be installed and adjusted to maintain all parts of the holding tube in a fixed position, and to maintain the minimum upward slope.

6. The timing electrode fitting to the inlet of the holding tube shall be installed with sanitary fittings.

7. The temperature sensor of the recorder-controller shall be installed in the connection provided for in the recorder-controller.

8. The flow-diversion device shall be so interconnected with the recorder-controller that at sublegal and legal temperatures the flow-diversion device will automatically assume the diverted and forward-flow positions, respectively, except that during circulating cleaning the flow-diversion device may assume the forward-flow position or be cycled at sublegal temperatures provided the control required to do this is a programmed control that is failsafe and interlocked with the timing pump so that the timing pump cannot run under this condition.

9. The timing pump shall be interwired with the flow-diversion device and the recorder-controller so that the timing pump cannot run at sublegal temperatures, unless the flow-diversion device is in its fully diverted position.

10. The hot product temperature control shall be installed as part of the heating media system.

11. The hot product indicating thermometer shall be installed in the fitting at the outlet end of the holding tube.

12. The cold product indicating thermometer, if provided, shall be installed in the pipeline from the outlet of the cooling section and close to the press.

13. Connecting sanitary pipe and fittings of all components of the HTST pasteurizer shall be without dead-ends, except for openings on sanitary fittings.

14. When the heating media system is not built integral with other components of the pasteurizer, it may be installed in other than the product processing room.

15. Sanitary piping is not required for connecting the heating media unit with the heating section of the pasteurizer. However, when a plate type heat exchanger is used, the piping shall not prevent movement of the plates.

16. Water supply to the heating media system shall be protected against back flow by an air gap of not less than 2 diameters with a minimum of one inch, or other effective back flow preventive device.

17. The equipment used in recooling and recirculating of the cooling medium shall be installed, whenever practical, in other than product processing rooms.

18. Sanitary piping is not required for connecting the cooling medium unit with the cooling section of the pasteurizer. However, when a plate

type heat exchanger is used, the piping shall not prevent movement of the plates.

19. Water supply of the cooling medium system shall be protected against back flow by an air gap of not less than 2 diameters with a minimum of one inch, or other effective back flow preventive device.

20. Where recirculating cooling medium is used, it shall be properly protected from contamination.

21. Control devices shall be inter-wired or piped with all component equipment or optional component equipment. The control panel shall be supported to minimize vibration.

22. If a homogenizer is used as a timing pump, or if inter-wiring of homogenizer and timing pump is required, a time delay relay may be installed in the electrical circuit to the homogenizer, so that during the normal transit time of the flow-diversion device the homogenizer motor will remain running. The time delay relay shall provide a delay of not more than one second. If the homogenizer motor stops, it shall not restart automatically and will not restart at sublegal temperatures, unless the flow-diversion device is in its fully diverted position. The time delay relay may be of the fixed time or adjustable time type. If the time delay relay is adjustable, means of sealing the unit shall be provided.

23. When an auxiliary pump is used in a HTST pasteurizer system, it must be installed and operated in such a way that it will not 1) interfere with the detection of, or stoppage of, the forward flow of unpasteurized product, 2) influence the proper pressure relationship within the regenerator, and 3) reduce the holding time below the required minimum.

24. In a HTST pasteurizing system supplying pasteurized product to an evaporator, when a circulating auxiliary pump is installed to obtain a greater velocity through a heater than that which would be produced by the timing pump, a sanitary recirculating pump shall be provided.

25. The sanitary recirculating line shall be of the same size or larger than the inlet of the circulating pump without valves or restrictions, provided that when a smaller size line than the inlet to the circulating pump is used, and contains valves or other restrictions, the circulating pump motor shall be inter-wired with the timing pump motor.

26. All electric wiring interconnections shall be in a permanent conduit, except that rubber covered cable may be used for final connection in accordance with the local electrical code, with no electrical connections to defeat the purpose of any provision of these rules.

(4) C-I-P SYSTEMS. (a) All product contact surfaces of sanitary piping utilized in C-I-P systems shall be at least as smooth as number 4 mill finish on stainless steel sheets.

(b) The finish of solution contact surfaces, whether sheet, tube, casting, or other type of surface, shall be equal in cleanability to stainless steel with number 4 finish, or number 2-B mill finish, as applied to stainless steel sheet and shall be pit free.

(c) Product lines, including equipment and solution lines shall have C-I-P fittings or welded joints.

(d) Welded joints shall be smooth and free from pits, cracks, or other defects.

(e) Removable fittings may be used with or without gaskets and shall be of such design as to form substantially flush interior joints.

(f) Appurtenances having product contact surfaces shall be cleanable, either when in an assembled position or when disassembled. Removable parts shall be readily dismountable.

(g) All internal angles of 135° or less on product contact surfaces, or on solution contact surfaces, shall have minimum radii of ¼" except where smaller radii are required for essential functional reasons, such as for sealing ring grooves and in pumps.

(h) All solution contact surfaces shall be cleanable, either when in an assembled position or when disassembled. They shall contain no pockets or crevices that are not readily cleanable. Removable parts shall be readily demountable. Solution system appurtenances shall be accessible for inspection to determine freedom from biological, chemical, or physical soil contamination.

(i) Non-product contact surfaces shall have a smooth finish, be free of pockets and crevices, and be readily cleanable.

(5) INSTALLATION OF C-I-P PIPELINE CIRCUITS. (a) Prior to installation of C-I-P pipeline circuits a drawing or equivalent plan shall be made available to the department by the plant operator for each installation, or subsequent addition or modification, showing each permanent circuit to be cleaned, noting thereon the size and length of piping, fittings, pitch, drain points, access points, relative elevations, locations and specifications of circulating unit, and other pertinent data.

(b) The C-I-P pipeline together with gaskets if used, shall be supported so that they remain in alignment and position. The support system shall be designed so as to preclude electrolytic action between supports and pipelines.

(c) Each separate cleaning circuit, including product and solution lines, shall be provided with a sufficient number of access points, such as valves, fittings, or removable sections to make possible adequate inspection and examination of the interior surfaces.

(d) Relatively horizontal lines shall be self-draining and pitched to drain points.

(e) The circulating unit, consisting of a motor driven pump and solution tank, shall provide a minimum average solution velocity at any instance of not less than 5 feet per second through each pipe or fittings in the circuit. If split flow arrangement, pressure differential must be maintained to serve the 5 feet per second minimum flow rate. This operation is to be checked by observation and tests.

(f) C-I-P systems shall be designed so that the suction intake of the primary circulating pump shall be flooded at all times during the cleaning cycle.

(g) Solution temperature shall be automatically controlled by the use of a temperature regulator with a response range of plus or minus 5° F.

(h) The system shall be provided with a recording thermometer having a scale range of 60° to 180° F. with extension of scale on either side permitted, graduated in time scale divisions of not more than 15 minutes. Between 110° and 180° F., the chart shall be graduated in temperature divisions of not more than 2° F., spaced not less than 1/16 inch apart, and be accurate within 2° F., plus or minus. The sensor shall be protected against damage at 212° F. The sensing element of the recording thermometer shall be located in the return solution line as near the solution tank as possible.

(i) All connections between the solution circuit and the product circuit shall be so constructed as to positively prevent the commingling of the product and the solution during processing.

(j) All welding of sanitary product pipelines and solution lines shall be made by the Tungston Shield Arc Method or its equivalent. The following precautions shall be taken:

1. Inner backup gas shall be used to protect and control the interior of the weld.

2. The weld surface interior, face and exterior shall be cleaned and free of all foreign matter and surface oxide before welding. Iron free abrasives shall be used when cleaning surfaces.

3. All tube and fitting ends shall be square cut and deburred.

4. Welding procedures shall assume uniform and complete penetration of weld at all times.

5. All welds having pits, craters, ridges, or imbedded foreign materials shall be removed and the joints shall be properly rewelded.

6. Internal and external grinding or polishing of welds is not required.

7. An acceptable sample weld piece shall be provided at the beginning of each day or when required.

8. A boroscope or other acceptable inspection device, to inspect representative welds, shall be made available by the plant operator.

Note: Systems and milking and milk handling equipment which conform to the current "3-A Accepted Practices for the Design, Fabrication and Installation of Milking and Milk Handling Equipment", published by the International Association of Milk, Food and Environmental Sanitarians, Inc., Box 701, Ames, Iowa, will meet the requirements of this section.

History: Cr. Register, October, 1978, No. 274, eff. 1-1-79; am. (1) (b), Register, November, 1980, No. 299, eff. 12-1-80.

Ag 31.07 Equipment cleaning and sanitizing. (1) **STANDARDS AND PROCEDURES; GENERAL.** (a) Equipment, sanitary piping and utensils used in receiving, storing, processing, manufacturing, packaging and handling milk or dairy products and ingredients thereof, and all product contact surfaces of homogenizers, high pressure pumps and lines, shall be kept clean. All such equipment shall be cleaned at the end of each day's operation. Before use, all equipment coming in contact with milk products shall be subject to an effective bactericidal or sanitizing treatment. Equipment not designed for cleaned-in-place cleaning shall be disassembled, thoroughly cleaned and sanitized. No cleaners, detergents, wetting or sanitizing agents adversely affecting or capable of contaminating milk or dairy products or ingredients thereof, shall be used.

Register, July, 1981, No. 307