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GOOD MANUFACTURING PRACTICES FOR
MILK COLLECTION CENTER

National Bureau of Agricultural Commodity and Food Standards
Ministry of Agriculture and Cooperatives
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Technical Committee on the Elaboration of Thai Agricultural Standard on Good Manufacturing Practices for Milk

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Raw milk is an important agricultural commodity and food for Thailand. Therefore, quality, hygiene and safety for consumption in production processes of every stage of food chain shall be taken into account. The Agricultural Standards Committee deems it necessary to establish the standard for Good Manufacturing Practices for Milk Collection Center in order to control the milk production, increase the milk quality management to be effective and conformed with the standards as well as enhance the ability in competitiveness to the international market in the future.

This standard is based on the following documents:


The resolution of the 1/2548 session of the National Committee on Agricultural Commodity and Food Standards on 30 May B.E 2548 (2005) deems it necessary to establish the Thai Agricultural Commodity and Food Standard on Good Manufacturing Practices for Milk Collection Center. This standard would be beneficial to production improvement, trade facilitation and consumer protection.

Therefore, the National Committee on Agricultural Commodity and Food Standards, mandated by the resolution of the Cabinet on 19 December B.E. 2545 (2002), notifies the establishment of the Thai Agricultural Commodity and Food Standard on Good Manufacturing Practices for Milk Collection Center to be used as a voluntary standard as attached herewith.

Notified on 5 August B.E. 2548 (2005)

(Khunying Sudarat Keyuraphan)
Minister of Agriculture and Cooperatives
Chairperson of the National Committee on Agricultural Commodity and Food Standards
GOOD MANUFACTURING PRACTICES FOR
MILK COLLECTION CENTER

1 SCOPE

This standard establishes criteria for the improvement of practices, management and quality examination of raw milk in the milk collection center in order to obtain suitable quality and safety of raw milk for further processes.

2 DEFINITIONS

2.1 Raw milk means milk produced by cow after calving not less than three days and free from colostrums without having undergone processes.

2.2 Milk collection center means an establishment where raw milk is collected from any GAP farm member. The collection center shall have adequate equipment and containers for raw milk, including storage. Effective systems of temperature and quality control of raw milk should be in place prior to transportation to dairy processing plants.

2.3 Milk collecting area means an area designed to facilitate raw milk receiving, quality testing and storage, which equipped with adequate and hygienic machines and equipment.

2.4 Laboratory and quality control room means a room where raw milk is tested for its quality and it shall be separated from the milk collecting area.

2.5 Milk collecting equipment means specifically designed equipment for raw milk collecting. It consists of raw milk receiving tanks, filter systems, pipelines, pumps, storage tanks, machines, and other related equipment and tools.

2.6 Receiving tank means a specifically designed container used for receiving raw milk before transferring to the cooling system.

2.7 Plate heat exchanger (PHE) means a set of device used for the immediate reduction of raw milk temperature by the utilization of principle of heat exchanger.

2.8 Storage tank without cooling system means a specifically designed container without using any device or plate heat exchanger to reduce the raw milk temperature but able to maintain a constant temperature of raw milk.

2.9 Cooling tank means a specifically designed container used for the raw milk storage with device or plate heat exchangers to reduce the raw milk temperature and able to maintain a constant temperature of raw milk a specifically designed container used for the storage of raw milk by using device or plate heat exchangers to reduce the raw milk temperature and able to maintain a constant temperature of raw milk.

2.10 Cleaning in place (CIP) means an effective cleaning system for internal surface of containers and equipment for raw milk transfer, which are associated with the storage of raw milk, in order to prevent cross contamination.
2.11 **Cooling system** means a set of device producing cooling water delivered to the cooling plate in order to decrease the raw milk temperature before transferring to the raw milk collecting tank.

2.12 **Member of the milk collection center** means a registered dairy farm member who delivers certified GAP raw milk to the milk collection center.

2.13 **The facilities system** means electricity and water supply used inside the milk collection center.

2.14 **Promoting system for good quality raw milk production at farm level** means the promotion of qualified raw milk production from farm to the milk collection center which covers farm management, animal health management, raw milk production, storage and transportation, including environmental management and information system management of the milk collection center.

### 3 REQUIREMENTS AND INSPECTION METHODS

<table>
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<tr>
<th>Items</th>
<th>Requirements</th>
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| 1. Components of milk collection center | 1. License and lists of registered members shall be available.  
2. Location shall be distanced from any source of pollution, such as dust, toxic substances from agriculture and industry or there shall be availability of effective prevention and control system.  
3. Building shall be strongly constructed and hygienically designed in order to prevent cross contamination affecting raw milk quality. | Visual inspection.  
If there is a risk, raw milk shall be tested. |
| 2. Milk collection center management | 1. Areas shall be clearly separated, orderly and clean, especially among milk collecting area, laboratory and quality control room, office, machine and equipment operating area, and chemical storage room.  
2. Sufficient washing areas and cleaning tools for empty raw milk containers after raw milk delivery shall be provided for members. | Visual inspection. |
<p>| 3. Management of machines and equipment and tools for raw milk receiving | 1. Machines and equipment shall be appropriately designed and installed for the convenience and effectiveness of use. | Visual inspection, check records and operations, and check the validation of raw |</p>
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<tr>
<th>Items</th>
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<tr>
<td>2. Receiving tanks with filters shall be adequate, hygienic and</td>
<td>2. Receiving tanks with filters shall be adequate, hygienic and convenient for use. 3. Other equipment related to raw milk receiving shall be standardized, such as raw milk scale. 3. Milk hoses, water hoses, pipelines, and other tools used in combination with the hoses shall be clearly separated according to their purpose of use. 4. Pumps, valves and piping system shall be strong and hygienic. Particularly, the parts directly contact with the raw milk shall be made of non-corrosive materials, no reaction to raw milk, and able to clean thoroughly.</td>
<td>milk scale.</td>
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<td>Convenient for use. 3. Other equipment related to raw milk</td>
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<td>shall be made of non-corrosive materials, no reaction to raw milk,</td>
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<td>and able to clean thoroughly.</td>
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<td>4. Raw milk cooling system management</td>
<td>1. Raw milk cooling system shall be designed to match the cooling capacity and its use. 2. Water quality control and filtration for cooling water piping system shall be in place. 3. Temperature measurement device shall be installed in an appropriate position and able to function properly. 4. Times and temperatures of cooling water shall be recorded before and during raw milk receiving. 5. Times and temperatures of raw milk shall be recorded during and after the receiving. 6. Raw milk quality within the receiving tank shall be controlled by sampling raw milk both after receiving and before transporting to dairy processing plants for analysis in the laboratory and quality control room.</td>
<td>Visual inspection, and check records of operation and test results of raw milk quality.</td>
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<td>5. Storage tank management</td>
<td>1. Cleanliness and temperature maintenance within the storage tanks shall be effectively controlled by using standardized temperature measurement</td>
<td>Visual inspection, and check records of operation and test results of raw milk quality.</td>
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<td>Items</td>
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<td>2.</td>
<td>Raw milk shall be subject to quality control thereby sampling for analysis prior to being kept in storage tank and transporting to dairy processing plants.</td>
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<td>3.</td>
<td>Storage tanks, pipelines, and valves shall be thoroughly cleanable and able to drain completely.</td>
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<td>4.</td>
<td>Preventive measures against raw milk contamination from grease in the mixing tanks shall be in place.</td>
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<td>6. Cleaning-in-Place</td>
<td>1. Cleaning-in-Place (CIP) systems shall be hygienically designed for thoroughly and effectively cleaning appropriate for use and able to prevent cross-contamination.</td>
<td>Visual inspection and check records of operation and test results of raw milk quality and chemicals. Visual inspection, and check records of operation and test results of raw milk quality and chemicals used.</td>
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<td>2. Temperature measurement device shall be installed in an appropriate position, and able to function properly and accurately.</td>
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<td>3. Cleaning and maintenance of equipment shall be in place in order to be ready for use.</td>
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<td>4. Milk hoses shall be cleaned by CIP system.</td>
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<td>5. Systems for testing water quality and chemicals used shall be in place.</td>
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<td>6. Inspection of CIP system shall be recorded, namely, times of cleaning procedure, concentrations of chemicals used, control of rates of chemical and water circulation, and temperatures.</td>
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<td>7. Check the pH of chemical residues remained in the raw milk pipelines.</td>
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<td>7. Maintenance of machines and equipment</td>
<td>1. Operational plan, records of operation, inspection and maintenance of machines and equipment shall be available.</td>
<td>Check records of operation and visual inspection.</td>
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<td>2. Adequate spare parts shall be available and stored properly.</td>
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<td><strong>8. Utility management</strong></td>
<td>1. It shall be appropriately designed for operational spaces, i.e. sufficient light, neatly and hygienically installed electric socket, wire and light bulb. 2. Light installation shall be adequate and hygienic in every operating area. 3. Electric generators shall be spared in case of power blackout.</td>
<td>Visual inspection.</td>
</tr>
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<td><strong>8.1 Electricity</strong></td>
<td>1. Water quantity shall be sufficient and its quality shall meet potable water standards according to laws and regulations. 2. Water pipeline system shall be effectively used.</td>
<td>Visual inspection.</td>
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<td><strong>8.2 Water supply</strong></td>
<td>1. Transportation of raw milk shall be prepared appropriately and hygienically. 2. Standard of sampling method shall be observed. Raw milk samples shall be drawn from transport vehicles for quality testing before transporting to processing plants. 3. Quality control during transportation shall be in place. 4. Transport vehicle shall be cleaned after each delivery of raw milk to processing plants. 5. Results of transportation shall be inspected, monitored and evaluated by observing and interviewing operators. 6. Records or reports shall be kept at the milk collection center for not less than 2 years.</td>
<td>Visual inspection and check the results of the transported raw milk quality.</td>
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<tr>
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| **9.2 Raw milk transport vehicle** | 1. Raw milk transport tanks shall be designed and insulated to maintain steady/constant temperature or its variation not over 2°C until reaching its destination.  
2. Outlet valve system shall be independently controlled and installed at an appropriate position in a hygienic manner without any dead-end area or crevice leading to the leftover of raw milk in the tank. The system shall be equipped with device to prevent cross-contamination.  
3. Security device for unattended opening lid and valve opening during transportation shall be equipped.  
4. Rubber seal of the tank lid shall be in good condition, no cracking, clean, and insulated to maintain a constant temperature.  
5. Pipeline system shall be hygienic and able to clean thoroughly.  
6. Cleanliness of tank chamber shall be controlled by CIP system. The cleaning shall include outside surface of the tank. | |
2. Quality of raw milk from members shall be tested and clear criteria for rejection shall be announced at the milk collection center.  
3. Purchase prices of raw milk shall be set according to the quality.  
4. Payment for members of the milk collection center shall be timely scheduled. | Visual inspection, check records of operation, and raw milk quality test results. |
| **11. Personnel management** | 1. Personnel in charge of raw milk receiving and transport shall follow the good hygienic practices during their operation and have medical examination at least once a year.  
2. All personnel shall be trained to acquire knowledge and skills for their effective operation. | Check records and reports of training. |
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| 12. Safety measures and environmental management | 1. Safety control measures shall be strictly implemented.  
2. Control systems and preventive measures against disease carrier animals shall be in place.  
3. Waste disposal system shall be in place.  
4. Management system for chemicals and their containers shall be in place.  
5. Waste water treatment system shall be in place.  
6. The entry of pets into the center is prohibited.  
7. Operational plan shall be followed up and evaluated periodically. | Check records and visual inspection. |
2. Equipment, tools and device used for raw milk quality testing shall be complied with the standards, clean, adequate and appropriate for use.  
3. All chemicals shall be stored orderly and clearly labelled.  
4. Good quality raw milk promotion programme for individual farm member shall be set and implemented. | Check records and visual inspection. |

4 GUIDANCE ON GOOD HYGIENIC PRACTICES FOR MILK COLLECTION CENTER

Guidance on good hygienic practices for milk collection center is aimed to be used as recommendations for receiving, collection, storage and transportation of raw milk, thereby its quality conforming to the standard before delivery to dairy processing plants to produce safe and suitable dairy products for consumption. The details are described in Appendix A.
APPENDIX A
GUIDANCE ON GOOD HYGIENIC PRACTICES FOR
MILK COLLECTION CENTER

1 Components of milk collection center

1.1 License and list of registered members

1.1.1 Milk collection center shall be licensed by the Department of Livestock Development.

1.1.2 A farmer shall register with only one milk collection center. Repeat registration with other milk collection centers is not allowed.

1.2 Location

1.2.1 Milk collection center shall be in the appropriate location distanced from any source of pollution, such as dust, smoke, livestock farm and rubbish dump.

1.2.2 The area shall not be subjected to flooding. The ground shall be stable, not subside, aggregate or shrink in order to avoid cracking and collapse of the building.

1.2.3 There shall be sufficient space for accommodation, parking, waste water treatment and other essential inputs.

1.2.4 Roads surrounding the building shall be maintained in good conditions and not generate any dust.

1.2.5 Convenient transportation and sufficient public utilities

1.2.6 Areas that have risk posed by hazardous substances from agriculture and industry should be avoided.

1.2.7 The area shall have good drainage with no water-logging.

1.2.8 The location is subjected to approval by the local government.

1.3 Raw milk receiving building

1.3.1 General conditions

1.3.1.1 Building shall be strongly and hygienically designed and constructed to prevent cross-contamination from exterior, and to be safe and proper for operation.

1.3.1.2 Wall shall be made of materials not causing contamination. Both interior and exterior surface shall be smooth without dirt accumulation, clean and undamaged, with no opening passage to prevent the entry of disease carrier animals.

1.3.1.3 Ceilings and beams shall be made of appropriate materials and clean, without dust and cobweb, and undamaged.

1.3.1.4 Floor is clean, undamaged and no water-logging.
1.3.1.5 Drains shall be undamaged, well flown and equipped with sieves before draining out of the building.

1.3.1.6 General measures for safety and good hygienic operation shall be in place and implemented in every room or area in order to prevent unauthorized persons from entering areas, such as signs of no entry at the raw milk receiving area, no smoking or dining at the operation areas.

1.3.2 **Separation room or area for raw milk receiving.**

1.3.2.1 Hygienic measures shall be in place before entering the building, room or area for raw milk receiving, i.e., disinfectant solution basin for boots or shoes to prevent contamination, hand wash basin with no hand operation and equipped with liquid soap and hand drying kits.

1.3.2.2 Doors or plastic curtains shall be closed tightly to prevent dust and insect, clean and undamaged.

1.3.2.3 Floor should be made of impact-resistant and non-corrosive materials, clean, undamaged, and no water-logging. Wall and floor connection shall not be at a ninety degree angle.

1.3.2.4 A drainage system shall be well flown, undamaged, clean, and equipped with sieves before draining out of the building. The types of drains are as follows:

   1) In case of closed drains, they shall be equipped with sieves.
   2) In case of open drains, they shall be equipped with U-shaped gutters.
   3) In case there is no drainage system, the floor shall be slope and able to rapidly drain out the water. In addition, drained water receiving area shall be ensured that there is no water-logging.

1.3.2.5 Indoor ventilation is as follows:

   1) Availability of a ventilation system or device for better air flow and not being dampening.
   2) Such system or device shall not be installed in an area that may pose a risk of contamination to raw milk.

1.3.2.6 Toilets inside the milk collection center shall be hygienic, located in appropriate positions, adequate and able to prevent cross-contamination effectively.

1.3.3 **Areas for raw milk receiving tanks**

1.3.3.1 The area should be distanced from parking area to prevent contamination.

1.3.3.2 Raw milk receiving tank should be placed at the height that cause no risk of contamination.

1.3.4 **Office, building and other facilities**

1.3.4.1 Office, building and other facilities in the milk collection center shall not cause any contamination to the raw milk receiving building, for instance, dining area and personnel locker.

1.3.4.2 Areas for promoting and services of production inputs for the members shall be separate from the raw milk receiving building.
2 Milk collection center Management

2.1 Areas shall be clearly separated, orderly and clean amongst raw milk receiving area, laboratory and quality control room, office, machine and equipment area, and chemical storage room.

2.2 Raw milk container washing areas shall be provided for members.

2.2.1 The washing area should be distanced from parking area to prevent contamination.

2.2.2 Floor shall be slope and able to rapidly drain out the water.

2.2.3 Sufficient and appropriate cleaning tools for empty raw milk containers shall be provided.

2.2.4 Adequate storage area for cleaning tools shall be provided.

3 Management of raw milk receiving machines, equipment and tools

3.1 Design and installation of machines and equipment

3.1.1 Adequate and effective machines and equipment shall be provided.

3.1.2 Machines and equipment installation system shall be in accordance with raw milk receiving lines.

3.1.3 Machines and equipment surface in contact with raw milk shall be made of rust-free metal.

3.1.4 Machines and equipment shall be installed in the positions that facilitate the operation, maintenance and cleaning.

3.1.5 Safety systems for personnel protection shall be in place.

3.2 Equipment and tools relevant to raw milk receiving

3.2.1 Filter of raw milk before pouring into the receiving tank shall be provided.

3.2.2 Raw milk receiving tank shall be rust-free metal without dead-end area and positioned at the height of no risk of contamination.

3.2.3 Raw milk scale shall be precise.

3.2.4 Pumps, valves and joints shall be strong, clean and hygienic. Part of contact surface shall be made of rust-free metal without any reaction to raw milk.

3.3 Milk hoses, water hoses, CIP hoses and other tools used in combination with the hoses.

3.3.1 Hoses shall be separated by types of operation, namely water hoses, milk hoses.
3.3.2 Milk hoses shall be made of materials not cause any contamination.

3.3.3 Clean, undamaged, and no crack

3.3.4 Tools used in combination with the hoses such as hose belt is made of rust-free metal.

3.3.5 After use, equipment and tools shall be properly placed and stored without contact to the floor.

3.4 Design, installation and condition of pipe system

3.4.1 Pipes shall be clean, undamaged and no crack in order to prevent raw milk contamination.

3.4.2 Raw milk contacted surface shall be made of rust-free materials without any reaction to raw milk.

3.4.3 Pipes shall be insulated in accordance with their use. The insulators shall not be damaged.

3.4.4 The symbols and signs shall be provided for each type of pipe and flow direction.

4 Raw Milk Cooling System Management

Design of raw milk cooling system shall be appropriate to its use and be able to support future expansion. Used water quality and filter system shall be controlled in the cooling pipes. Thermometer shall be installed at an appropriate position. Times and temperatures of cooling water before and during raw milk receiving, as well as those of raw milk during and after receiving shall be recorded. Quality of milk in the receiving tank shall be controlled and taken samples for analysis.

Raw milk cooling system shall be as follows:

4.1 Plate heat exchanger (PHE) and pipes

4.1.1 PHE shall be made of rust-free metal that is hygienically designed and installed.

4.1.2 Raw milk shall be passed through the PHE system in order to immediately lower the raw milk temperature not to exceed 4°C.

4.1.3 Device to measure the temperatures of inlet cooling water through the PHE as well as outlet raw milk shall be provided.

4.1.4 PHE and pipelines shall be thoroughly cleanable.

4.1.5 There shall be device or tools that are able to totally drain raw milk from the PHE.

4.1 Cooling water system

4.1.1 Water used in the cooling system shall be treated for its quality. In case the chemicals are used, only food grade chemicals are allowed.
4.1.2 Temperature measurement device shall be functional and installed in position that can be easily seen and readable.

4.1.3 Check the system or device and record the cooling water temperature prior to raw milk receiving.

4.1.4 Filter shall be provided in the cooling system before pumping water into the cooling plate.

4.2 Raw milk storage tank with cooling system

The cooling tank shall be able to reduce the raw milk temperature not to exceed 4 °C within 2 hours and maintain the raw milk temperature constantly. The raw milk shall be sampled for quality testing.

5 Storage Tank Management

Two types of raw milk storage tanks, namely storage tank and cooling tank, shall be managed as follows:

5.1 Cleanliness and internal temperature of the storage tanks shall be effectively controlled. The standard temperature measurement device shall be provided.

5.1.1 Equipment or system for thoroughly cleaning and disinfection shall be in place.

5.1.2 Accurate temperature measurement device shall be installed at appropriate positions.

5.2 Raw milk shall be subject to quality control thereby sampling for analysis prior to being kept in storage tank and transporting to dairy processing plants.

5.3 Storage tanks, pipelines and valves shall allow thorough cleaning and draining.

5.3.1 Tank and lid shall be made of rust-free metal with seamless internal weld, and clean.

5.3.2 Tank lid shall be tight with undamaged rubber seal.

5.3.3 Agitators shall be covered with clean lids and prevented the contamination of grease.

5.3.4 Impeller made of rust-free metal with one piece shaft.

5.3.5 Valve shall be attached to the tank body and able to drain completely.

6 Cleaning In Place (CIP)

6.1 Design and installation of CIP system

6.1.1 CIP system shall be clean, hygienic, and able to thoroughly clean and prevent cross contamination.

6.1.2 CIP device shall be effective so as to adequately transfer water and chemicals for cleaning milk pipeline at an appropriate flow rate, concentration, time and temperature.
6.1.3 Hot water producing device shall be adequately provided.

6.1.4 Temperature measurement device shall be installed in appropriate position, functional and accurate.

6.1.5 Pipelines shall be hygienically designed without dead-end areas or crevices where the CIP cannot be carried out thoroughly and cause cross contamination.

6.1.6 Pipelines shall be clearly identified according to their types of use, i.e., hot water, cooling water, acid, alkaline and raw milk pipelines.

6.1 Verification of CIP system

6.2.1 Water used for producing hot water shall be treated according to the potable water standard issued by the Ministry of Public Health. If the source of surface water is close to an agricultural area, the contamination of pesticide should be checked. If groundwater is used the water hardness should be checked.

6.2.2 Record of CIP monitoring system, i.e., duration of cleaning, concentration of chemical used, control of water and chemical circulation and temperature.

6.2.3 Determination of chemical residues in raw milk pipeline by measuring pH.

7 Maintenance of Machines and Equipment

7.1 Availability of effective operational plan and management concerning machine and equipment usage, checking, fixing and maintenance.

7.2 The scale and temperature measurement device shall be calibrated for at least once a year.

7.3 Availability of records of the scale and temperature measurement device calibration.

7.4 Operation, follow-up, and evaluation of the management plan, maintenance of machines and equipment shall be done periodically. Their records or reports shall be regularly checked.

7.5 Records or reports of machines and equipment maintenance shall be kept for at least 2 years.

8 Utility Management

8.1 Electricity

8.1.1 It shall be appropriately designed for operational spaces, i.e. sufficient light, neatly and hygienically installed electric socket, wire and light bulb.

8.1.2 Electrical control panel shall be in safety position. Installation of an electric wire shall be neatly and clean without damage.
8.1.3 Light bulb shall be equipped with clean bulb cover that has no dust, cobweb or dirty stain, particularly in the risk area of contamination in raw milk, such as an area over the raw milk receiving tank.

8.1.4 Light bulb shall be undamaged, able to provide sufficient light and functional at every operating area, particularly those areas that are the critical control point of food safety such as raw milk receiving tank area, cleaning area for equipment and tools and chemical preparation area for cleaning.

8.1.5 Installation of electric wires and sockets is neat, well arranged and shall be in the position that cause no contamination but safe for operators.

8.1.6 Electric generators shall be spared in case of power blackout.

8.1 Water supply

8.2.1 Water shall be of sufficient quantity and meet potable water standards according to relevant laws and regulations.

8.2.2 Operation plan for water supply of the in the milk collection center shall be practical and implemented.

9  Management of Transportation and Vehicles

9.1 Transportation

9.1.1 Transportation of raw milk shall be prepared appropriately and hygienically so as to prevent cross contamination.

9.1.2 Standard of sampling method shall be observed. Raw milk samples shall be drawn from transport vehicles for quality testing before transporting to processing plants.

9.1.3 Quality control during transportation shall be in place.

9.1.4 Transport vehicle shall be cleaned after each delivery of raw milk to processing plants.

9.1.5 Results of transportation shall be inspected, monitored and evaluated by observing and interviewing operators.

9.1.6 Records or reports shall be kept at the milk collection center for not less than 2 years.

9.2 Raw milk transport vehicle

9.2.1 Raw milk transport tanks shall be designed and insulated to maintain steady/constant temperature or its variation not over 2°C until reaching its destination.

9.2.2 Outlet valve system shall be independently controlled and installed at an appropriate position in a hygienic manner without any dead-end area or crevice leading to the leftover of raw milk in the tank. The system shall be equipped with device to prevent cross-contamination.
9.2.3 Rubber seal of the tank lid shall be in good condition, no cracking, clean, and insulated to maintain a constant temperature.

9.2.4 Security device for unattended opening of lid and valve during transportation shall be equipped.

9.2.5 Tank chamber, valves, lid and pipe shall be able to clean thoroughly by using CIP system or other cleaning methods. The cleaning shall include outside surface of the tank.

9.2.6 Loaded raw milk transport vehicle shall be parked in shaded area.

10 Management of Raw Milk Purchasing System

10.1 Time schedule for raw milk receiving shall be set.

10.2 Quality of raw milk from members shall be tested according to the quality requirements specified in the Thai Agricultural Standard for Raw Cow Milk and clear criteria for rejection shall be announced.

10.3 Purchase prices of raw milk shall be set according to the quality requirements specified in the Thai Agricultural Standard for Raw Cow Milk.

10.4 Payment for members shall be timely scheduled.

11 Personnel Management

11.1 Personal hygiene of raw milk receiving operators shall be monitored in order to reduce the possibility of contamination during the operations and recorded regularly for assessment as follows:

11.1.1 Nails shall be clipped and kept clean.
11.1.2 Uniform or clothes shall be clean.
11.1.3 Hair shall be entirely covered with cap as well as mouth and nose shall be covered with a mask during operations.
11.1.4 Apron shall be waterproof and clean.
11.1.5 Wear clean boots or shoes for use in a specific area.
11.1.6 Do not wear any accessories during the operations.
11.1.7 Record the results of personal hygiene inspection and dressing every week
11.1.8 Establish hygienic rules for operators who have any symptom of gastrointestinal diseases, respiratory diseases or wound that may cause risk of raw milk contamination.
11.1.9 Report annual health examination including tuberculosis, dermatitis, parasite and hepatitis.

11.2 Clearly assign duty for each personnel involving in all stages of production process and raw milk transportation, including promotion and service personnel.
11.3 Train and check the operators whose works are involving raw milk in order to acquire basic knowledge according to standard of good practices as follows:

11.3.1 Acquire basic knowledge on relevant operations, such as basic knowledge on milk production and its components, on milk-borne zoonoses and have experience on the work assigned.

11.3.2 Train operators before beginning work in order to assure their ability to practice the assignment.

11.3.3 Train the operators on the specific areas of their responsibility, i.e., repairing and maintenance of machines and equipment, calibration of the scale and temperature measurement device as well as laboratory analysis.

11.3.4 Train the driver on good hygienic practices for raw milk transportation.

11.3.5 Provide training to review and refresh their knowledge for at least once a year

11.3.6 Trainers and inspectors should be officers from the Department of Livestock Development or other authorities permitted thereby

12 Safety Measures and Environmental Management

Safety measures concerning operating areas, equipment, personnel, management of chemicals and their containers including environmental management in waste water treatment system shall be established according to laws.

12.1 Safety measures

12.1.1 Alarm device or system for operating areas shall be in place in order to remind operators to be more careful and to warn in the risky area in which the danger may occur.

12.1.2 First-Aid kit and training course thereof shall be provided.

12.1.3 Personal Protective Equipment (PPE) shall be provided to protect personnel from injury during chemical preparation. The PPE shall be indicated by sign, easily reached and properly used.

12.2 Hygienic and effective control systems and preventive measures against disease carrier animals shall be in place.

12.3 Hygienic waste disposal system shall be in place.

12.4 Management system for chemicals and their containers shall be in place.

12.4.1 Chemicals shall be labeled and stored in a proper shelf or locker with indication.

12.4.2 Chemicals that are no longer used and empty containers shall be eliminated by using proper methods not causing contamination.
12.5 Waste water treatment system and drains inside the building of milk collection center shall be as follows:

12.5.1 Closed drains shall be equipped with sieves in order to prevent clogging or gradual accumulation of debris.

12.5.2 Open drains shall be U-shaped in order to be cleaned easily and unable to accumulate debris.

12.5.3 In case of waste water drainage without using drain inside the building, the floor shall be slope and able to rapidly drain out in order to ensure that there is no waterlogging causing contamination.

12.5.4 Drains shall be in clean, undamaged and good conditions with sufficient slope for well drainage.

12.5.5 Drains shall have sieve for filtering prior to releasing outside the building, and for preventing the entry of insects and disease carrier animals.

12.5.6 Waste water treatment system shall not generate disturbing odour, pollution and contamination to the center.

12.5.7 Effectiveness of waste water treatment shall be monitored, recorded and kept the document for traceability purpose for at least 2 years.

12.6 The entry of pets into the center is prohibited.

12.7 Operational plan shall be followed up and evaluated periodically.

13 Milk quality control management

13.1 Raw milk management procedures

13.1.1 Preparing for raw milk receiving, milk collecting equipment cleaning and disinfection, and preparation of cooling water for temperature reduction.

13.1.2 Test and adjust scale for accuracy before use.

13.1.3 Record name of the dairy farm member who delivers raw milk, raw milk quantity and receiving time.

13.1.4 Collect the samples of raw milk by standard methods from the members for quality examination.

13.1.5 Reduce the raw milk temperature not to exceed 4°C under the control of cooling system so that the temperature can be maintained to meet the requirements at all times.

13.1.6 Operation and basic requirements for raw milk receiving or rejecting shall be complied with standard if hydrogen peroxide, antibiotics and microorganisms are found higher than the requirements.
13.1.7 Set the raw milk receiving duration for each transport vehicle to be unloaded within half an hour in order to prevent the growth of microorganisms during such time.

13.1.8 Set the total duration of raw milk receiving to be finished within 2 hours.

13.2 Maintenance of raw milk quality in collecting tanks

Standard Operating Procedures (SOP) or procedural chart for the maintenance of raw milk quality in collecting tanks shall be established as well as the record of operating results in order to review and verify operations in the following procedures:

13.2.1 Procedure of raw milk standard sample collection

13.2.2 Operation and basic requirements for raw milk quality maintenance

13.2.3 Management procedure when the raw milk quality test results are informed. This is to give the priorities of the availability and the use of information on raw milk quality shared among members of the milk collection center for improving raw milk quality in order to be standardized, consistent and able to be used as a document to verify the operations in each procedure as follows:

13.2.3.1 Inform members of the milk collection center the result thereof.

13.2.3.2 Inform overall results of raw milk quality received from members and the quality of raw milk rejected from dairy processing plants to the manager of the center.

13.2.3.3 Inform the raw milk quality test results rejected from dairy processing plants to all members.

13.2.3.4 Inform management measures for raw milk rejected from the dairy processing plants.

13.2.3.5 Inform corrective measures and follow up the improvement of raw milk quality of such member when unqualified raw milk is detected.

13.3 Raw milk quality control

13.3.1 Equipment and device used for raw milk testing shall be of standard, clean, ready for use and sufficient in quantity for the work, e.g., storage of quality raw milk, analysis of quality and measurement equipment.

13.3.2 Chemicals shall be stored orderly with clear labels and placed in an appropriate position.

13.3.3 There shall be standard requirements related to raw milk, water, chemicals and chemical preparation, cleanliness of the raw milk contact surface machines and equipment and raw milk vehicles and tankers as follows:

13.3.3.1 Criteria for raw milk receiving or rejection from dairy farm members, regarding fat levels, number of microorganisms, antibiotics and others.

13.3.3.2 Requirements for raw milk storage, regarding temperature, storage duration, standard plate count and physical characteristics.

13.3.3.3 Water used for cleaning raw milk contact surfaces of any equipment shall be clean and adjusted for its quality. The quality of water for final rinse and direct contact
the raw milk shall be standardized according to Notification of the Ministry of Public Health.

13.3.3.4 Inspection of machine and device cleanliness shall be conducted by organoleptic or laboratory testing.

13.3.3.5 Inspection of vehicle and tanker cleanliness shall be conducted by organoleptic or laboratory testing.

13.3.3.6 Requirement for preparation of chemical concentration used in the laboratory as well as for raw milk quality testing.

13.3.3.7 Requirement for preparation of chemical concentration used for cleaning or disinfection.

13.3.4 There shall be quality indicators for raw milk receiving and pricing. Assessment of raw milk quality shall be recorded regularly so that it can be applied for the benefits of raw milk receiving and pricing. The inspection methods are as follows:

13.3.4.1 Quality characteristics of raw milk shall be tested by organoleptic testing and observing the external appearance.

13.3.4.2 Protein sedimentation shall be examined by using 68% of Ethyl alcohol or Alizarin ethyl alcohol and confirmed the results by using clot on boiling test.

13.3.4.3 Specific gravity shall be determined for calculation of the “Total solids” and “Solid not fat” which indicate the addition of water.

13.3.4.4 Added water determination

13.3.4.5 Determination of fat content

13.3.4.6 Determination of Total solid

13.3.4.7 Determination of Solid not fat

13.3.4.8 Determination of Protein

13.3.4.9 Indirect testing to determine number of microorganisms in raw milk by using Methylene blue or Rezasurin reduction test

13.3.4.10 Total bacterial counts in raw milk

13.3.4.11 Somatic cell counts

13.3.4.12 Antibiotic residue testing

13.3.4.13 Testing for hydrogen peroxide contamination

13.4 Promoting system for good quality raw milk production

13.4.1 There shall be a written policy or plan to promote good raw milk quality production at farm level. All members of the center shall be informed and mutually agree to apply.

13.4.2 There shall be a promoting system for good quality raw milk production at farm level. In other word, the extension service of qualified raw milk production from farm to the milk collection center covering farm management, animal health management, raw milk production, storage and transportation, including environmental management and information system management of the milk collection center.
13.4.3 Promotion of qualified raw milk production shall be as follows:

13.4.3.1 There shall be requirements and practical guidelines for hygienic milking.

13.4.3.2 There shall be requirements and practical guidelines for maintenance and cleaning of milking machines in a hygienic manner.

13.4.3.3 There shall be requirements and practical guidelines for the prevention of antibiotic and chemical contamination.

13.4.3.4 There shall be requirements and practical guidelines for hygienic maintenance of raw milk quality during the transportation from farm to center.

13.4.3.5 There shall be requirements and practical guidelines for inspection of milk-borne zoonoses.

13.4.3.6 There shall be requirements and practical guidelines for feed and farm management in a hygienic manner.

13.4.3.7 Farm management database shall be applied in the extension service of the center.