Commonwealth of Massachusetts

DEPARTMENT OF AGRICULTURAL RESOURCES

DIVISION OF ANIMAL HEALTH

Guidelines for Farm Bulk Milk Collection Procedures

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GUIDELINES FOR FARM BULK MILK COLLECTION PROCEDURES

PURPOSE

The purpose of this guideline is twofold. First, it is intended to provide an advisory and information to the hauler-- the vital link between producers and handlers-- on the techniques, principles, and procedures to be used on the job of collecting bulk milk at the farms and delivering it to the handlers' plants. Second, this guideline is intended to help establish uniform milk collection procedures as required by the *Pasteurized Milk Ordinance*[1] (PMO) and Massachusetts General Laws for all Hauler/Samplers within the Massachusetts dairy industry.

INTRODUCTION

The farm bulk milk pickup driver plays a unique and important role in the milk marketing system, representing both the buyer and seller of raw milk. The bulk milk pickup driver's judgment and decisions with regard to the quantity, sampling, and quality of the milk received at the farm has a direct effect upon milk payment and the quality of the milk products offered for sale.

A farm bulk milk pickup driver must possess many skills in addition to being able to negotiate large tractor-trailer units over a variety of terrain under all types of weather conditions. The driver is first a food handler. Personal appearance and the appearance of the truck operated reflect upon this role.

A farm bulk milk pickup driver must be able to determine and record milk weights accurately and to collect and care for milk samples properly. The Hauler/Sampler should have a keen sense of smell and be able to identify milk odors. It is important to have an appreciation and responsibility for the cleanliness and sanitation in the handling and protection of milk entrusted to the care of the Hauler/Sampler, and sufficient time must be taken to perform the duties in the proper way.

Regardless of who washes and sanitizes the farm bulk milk pickup truck including the pump, hoses, valve lid, gasket, vent and sample dipper, the driver is responsible for the vehicle and all its equipment. Poor cleaning and sanitizing can cause significant damage to a quality product.

A milk pickup driver is very important link in the chain of events that moves the milk from the cow to the table. A chain is only as strong as its weakest link. There is a great responsibility involved with performing as a middle link between the producers of dairy products and the processor. By being the middle link, the milk hauler is in a position to maintain and improve communication between each party for the betterment of the dairy industry as a whole.

GENERAL INFORMATION

Licensing

Over the Road Milk Tankers

Each milk tank truck must be approved, carry a permit and be inspected annually to transport dairy products in the Commonwealth of Massachusetts. The driver shall be knowledgeable of the requirements for this permit, be responsible for such maintenance, and be able to produce the Tank Permit and the most recently completed Milk Tank Truck Inspection (Form FDA 2399B) upon request.

Hauler/Samplers

[1] As published by the US Public Health Service.

Each farm bulk-milk pickup driver, whether full-time, part-time, a relief driver, or an emergency driver, must be licensed if assigned to receive, accept, measure and sample milk at a farm in the Commonwealth of Massachusetts. It is necessary to receive training in handling and sampling of milk before anyone can hold a hauler/sampler license. Application can be made in writing or by telephone for such a license from the Division of Biosecurity & Regulatory Services of the Massachusetts Department of Agricultural Resources. ([617] 626-1813)

Applicants for a Hauler/Samplers license must be qualified, trained and evaluated. This includes both submitting to an exam and a field evaluation administered by the Department. Also, licensed Hauler/Samplers must participate in a course or workshop, to maintain and increase the efficiency of the Hauler/Sampler and to be made aware of new policy or information.

A bulk milk hauler shall not collect milk from any dairy farm in the Commonwealth of Massachusetts for delivery to a milk plant, receiving station or transfer station unless such farm holds a valid Certificate of Registration from the Commonwealth of Massachusetts as issued by the Department of Agricultural Resources.

1. **Personal Appearance.**
   Haulers shall practice good hygiene, shall maintain a neat and clean appearance and not use tobacco in the milk room.

2. **Necessary Equipment**
   It is essential that the bulk milk pickup driver and the truck being operated have on hand the necessary equipment to pick up milk. Since universal sampling is the most frequently used method of sampling milk, only the equipment needed for universal sampling is listed below:

   a) **Sample case and retainer**: The sample case should be constructed of rigid metal, plastic, or other approved material for safe transportation of the samples to the laboratory. The case must have ample space to hold a rack or flotation retainer, as required, to keep the samples in an upright position with the neck of the sample containers above the surface of the cooling medium.
   b) **Refrigerant**: A refrigerant is required to maintain the samples at 32°-40°F (0°-4.4°C). The level of the refrigerant should be kept at the level of the milk in the sample containers, with the containers suspended at least one half inch off the bottom of the case. The preferred refrigerant is ice and water. In most cases, using the flotation retainer, put four inches or more of ice in the insulated case then fill with water to the level of the ice to adequately hold the samples on a daily run. The sample containers should be pressed all the way down into the flotation retainer.
   c) **Sample transfer instruments**: Several types of clean and sanitized or sterilized instruments may be used (1) seamless stainless steel tube; (2) seamless stainless steel dipper, preferably with a capacity of at least 35 mL and with a handle long enough to reach 6 to 8 inches into the product; (3) single-service sample straw; (4) A Bob J. which is a stainless steel rod or Rally J. which is an expandable stainless steel rod, both having a clip to retain the sample container; (5) or any other approved means for removing the sample from the farm bulk tank in a sanitary manner without contaminating either the sample or the supply.
   d) **Sample containers**: Must be kept clean and dry. Provided by the dairy plant, sample containers, have met strict standards for manufacture, and must have leak-proof caps. For universal fresh milk sampling, the containers must be large enough to hold at least 20 ml and must have a place for sample identification. The sample container the industry is supplying, has a volume of 50 ml and, filled to the line (3/4 full), contains 35 mL (1.18 Oz.). Before use, universal sample containers should be carried in such a place and in such a manner as to be kept clean and dry and properly protected. Proper protection would be to store them in a plastic bag in a clean, covered container. A container with a hinged cover which will fall shut when the sample container is

removed would be ideal. They must not be carried loose nor kept in the refrigerated sample case prior to use.

e) **Sampling instrument container with Sanitizing solution**: Sampling dippers carried on bulk tank trucks shall be stored in a tightly closed tube of sanitizer solution. Wash dipper and tube-holding rack in sanitizer solution each day after use. Prepare sanitizing solution fresh daily and check with applicable test kit. Some bulk milk pickup trucks are designed to retain a removable, tightly closed, stainless steel tube for the milk sampling ladle and sanitizer. Many haulers use a modified, recycled, laundry-detergent container with a tight, screw-on cap for storing the sampling ladle in sanitizer as is required.

f) **The sanitizing solution**: must be of proper strength and should be discarded and replaced with a fresh solution after each tanker load of milk is picked up or sooner if necessary. Many dairy plants provide a proper sanitizing solution. Two commonly used sanitizers and the strengths in which they should be used are: Iodine: 25 parts per million; or Chlorine: 200 parts per million. That would be about two ounces (four tablespoons) of Clorox in two gallons of water, or about two capfuls in the two-quart-sized, recycled, soap container that may be approved. Any greater strength is not recommended.

g) **Sanitizer field test-kit**: Used to indicate the parts-per-million (PPM) strength of the sanitizing solution.

h) **Dial or digital thermometer**: Accurate to ±1°C. (±2°F.). Bi-metal thermometers are recommended for haulers to determine the temperature of milk. Glass, mercury-type thermometers, although more accurate than bi-metal ones, shall not be used because glass and mercury may fall into the milk should the thermometer be broken during use.

Thermometers, dial type or electronic must be checked:

- Initially against a certified thermometer.
- From time to time by submerging the stem 2 to 4 inches in a mixture of three parts ice/one part water with constant agitation. When the pointer of the dial type thermometer comes to rest, it should register 0°C (32°F). When necessary, the pointer should be adjusted to the correct temperature by turning the external adjustment nut while firmly grasping the dial.
- Once each six months, the thermometer must be checked for accuracy by a lab technician with an officially calibrated thermometer in a 32-40°F (O°-4.4°C) liquid in the laboratory. When checked the thermometer must have a label attached to the case with the date of re-calibration and the initials of the lab technician. Cellophane tape applied over the attached label will protect it from water and wear.

i) **Watch**: A watch or timing devise to time the duration of agitation of the milk in the bulk tank prior to sampling and from which to note and record the time of arrival at the milkroom as required.

j) **Waterproof, indelible marker**: Waterproof, felt tip pen to use when it is necessary to identify or mark a sample container for any reason and identify the temperature control sample as required.

k) **Pen**: Ball point pen with indelible ink for all the necessary paperwork along with an adequate supply of daily weight notices or bulk tank delivery tickets. (Some ball writers contain an ink, which is not water-proof, and which will blur and become illegible when spattered on.)

PRECAUTIONS

1. **Cleaning and Sanitizing Bulk Tank Trucks:** A bright, shiny tank truck leaves a lasting impression on the public and the dairy farmers. Generally the driver is not required to physically clean the inside of the tanker, but it is the responsibility of the driver to determine that the tank is clean and sanitized prior to picking up milk. The milk pump, hose, valve and pump compartment must be cleaned and sanitized after each delivery and a wash tag issued by the receiving plant.

2. **Do not contaminate the milk:** Outer clothing worn by any hauler must be clean and especially free of loose particles which may come off into the supply or the sample being taken. Be watchful for any condition or article in the milk room, which could be dislodged or spilled into the supply or the sample. Examples would be flaking or dripping ceiling surface, drugs or drug-handling equipment on the bulk tank or around the hand-washing facility or around the single-service towel supply.
3. **Do not pick up any milk that is held outside the producer's bulk tank**. This includes milk stored in milk cans, pails, milking machines, etc. This milk is not refrigerated and may have been incubated to have a very high number of bacteria or may contain growth inhibitors which may go undetected. Also, the milk outside the tank cannot be incorporated, so as to be able to get a representative sample of the entire bulk milk portion.
4. **Pick up all the milk** from every farm tank at least once each forty-eight (48) hours. Milk that is more than two days old is lower in quality.
5. **Sample all bulk milk portions separately** If there is more than one farm tank located in a dairy farm, each tank is to be separately sampled, measured, and checked for temperature, odor and appearance.
6. **Always pick up all the milk in the producer's bulk tank**. Partial pick-ups are not generally allowed, or are allowed only if the balance of the milk is picked up before the next milking. No partial pickup left until the next day. If all the milk in the tank is not picked up, the producer cannot wash the farm bulk tank thus increasing the possibility of a rejected load of milk. A partial pickup may also affect monthly component test averages.
7. **Do not pick up milk that cannot be agitated.** If the milk in a producer's tank is not at a level that can be reached by the agitator so as to be properly agitated, do not pick up the milk but notify the plant, the plant's fieldman and contact the producer directly or leave a written notice for him in a conspicuous place. Milk that is not agitated cannot be cooled properly or sampled correctly.

PICK-UP PROCEDURES

The sequence of events involved in the collection of farm bulk milk after the driver arrives at the farm and properly positions the truck at the milk house is outlined below. Detailed explanations and reasons for the different steps in the collection procedures and precautions, which shall be taken, are presented sequentially.

1. **Entering the milk room:** Turn on the lights in the milk house, as may be necessary.
2. **Accepting the milk:** The decision to accept or reject milk is one of the most difficult decisions that the farm bulk pickup driver has to make. However, this decision is important because defective milk from a single producer will spoil the quality and flavor of the entire truckload. It is advisable to always assume the milk is not acceptable, then take the necessary steps to prove that it is acceptable. If the quality of a producer's milk is suspect or considered unacceptable, the farm bulk pickup driver should collect a sample in the usual way but leave the milk in the bulk tank and immediately notify the plant, the plant's fieldman and contact the producer directly or leave a written notice for him in a conspicuous place.
3. **Evaluating Milk Quality**
   a) **Odor and Appearance:** Carefully examine the odor of the milk, smelling through the tank cover porthole or manhole and the appearance of the milk in good light with the tank cover wide open to determine if it is acceptable.

- To detect off odors, smell the milk through the porthole or manhole of the tank to check for sour, malty, feed, unclean, chemical or any other off odors. If you think you may detect an off odor but are unsure, warm a sample of the milk to approximately 100°F (37.8°C). At this temperature, the odor will intensify making it easier to detect.
- Visually inspect the milk in good light with the tank cover wide open for any apparent physical abnormalities-- signs of churning, freezing, excessive foaming, excessive sediment or floating matter should be warning signs.
- Normal milk is almost odorless, mildly sweet in taste, and ranges in color from bluish-white to golden yellow. A change in this normal odor and color of milk may result from bacterial growth caused by improper cooling, feeding, milking, and handling practices or unhealthy cows. To aid the farm bulk pickup driver in making the decision whether to accept or reject milk, there should be a familiarity with the following problems:

  i. Bloody milk: Milk from fresh or mastitic cows may contain blood. A small amount of bloody milk can give a large quantity of normal milk a reddish tinge.
  ii. Flaky milk: Flakes or curd particles may occur in milk as a result of mastitis or souring or destabilized protein. Milk from mastitic cows may show light flakiness or pronounced stringy curd particles. Flakiness due to souring of the milk is usually accompanied by a disagreeable sour milk odor.
  iii. Extraneous matter: Floating extraneous matter such as insects, hair, bedding, chaff, and straw is cause for rejection of milk. The presence of extraneous matter may result from careless handling of the milk, open doors, torn screens, dusty conditions, failed filtration systems and/or improper cleaning of the cows teats before milking.
  iv. Churned milk: Visible fat globules sticking to the side of the tank or floating in the milk are due to excessive agitation at warm temperatures either within the farm bulk tank or the milk transfer system.
  v. Frozen milk: Presence of ice in the milk is an indication that the farm bulk tank is malfunctioning and is cooling the milk below freezing. The particles will be noted floating on top of the milk or seen frozen to the cooling coils when the milk is removed from the tank.
  vi. Excessive foaming: A stable foam is caused by an agitator running at the wrong speed or a drop pipe leading into the farm bulk tank of insufficient in length.

Wash and Dry Hands Using the producer's hand washing facilities, thoroughly wash hands and dry them with a single-use, paper towel after connecting the truck hose to the farm bulk tank and again, as often as necessary, before collecting the sample or checking the milk temperature with the dial thermometer. This will help eliminate any soil on the hands which may contaminate the milk sample or the milk in the bulk tank. The hose is always very soiled by being dragged around on the floor and ground.

b) **Determining the milk temperature**

- The calibrated pocket thermometer must be sanitized before use. Remove the dial or digital thermometer from its case and insert the stem in the sanitizing solution for a minimum of 1 minute. Some haulers store the thermometer in a puncture hole in the top of the plastic instrument container, maintaining constant contact with the sanitizer.
- Remove the thermometer from the sanitizing solution and inserting the stem in the clip on the thermometer case, hold the stem of the thermometer 3 to 4 inches into the milk for 20 to 30 seconds until the pointer comes to rest to obtain an accurate temperature reading. Check the temperature of the milk and compare the reading with that of the bulk tank's thermometer, if any. Tank thermometers are often inaccurate. If the tank thermometer appears accurate, it

may be relied upon for noting the temperature of the milk at the time of pickup, providing the accuracy of the tank thermometer is verified and recorded at least once each month. Record this monthly check on the farm ticket for referral.

- The milk in a producer's farm bulk tank should not be over 40°F (4.4°C) when picked up. The optimum holding temperature of milk is 34° to 36°F (1.1° - 2.2°C). Check the temperature of the milk with your thermometer. If a tank of milk is too warm or too cold, inform the plant, the plant's fieldman and contact the producer directly or leave a written notice for him in a conspicuous place. Incorrect holding temperatures can have a significant effect on the quality of the milk.

c) **Verifying Bulktank Thermometer**

- At least once each month the Hauler shall verify the accuracy of the thermometer on each bulk tank and record results on the farm ticket. If the farm bulk tank is equipped with an approved temperature recording device as required in item 18r. of the PMO (pg. 50), such device shall be verified at least once a month by the Hauler using the calibrated pocket thermometer. The results of this verification shall be marked with a slash on the circular chart in current use while installed in the recording thermometer. Adjacent to this slash the temperature observed shall be written together with the identity of the Hauler. If the bulk tank thermometer is determined to be inoperative or incorrect by more than ±1°C (±2°F), that shall be so noted on the farm ticket, and the producer and the plant shall be notified.

4. **Rejecting Milk**: If for any reason it is felt that the milk in the producer's farm bulk tank is such that it may, if commingled, adversely affect and cause the bulk tank truckload of milk to be rejected, **sample the milk**, contact the plant, and the plant's fieldman and contact the producer directly or leave a written notice for the producer on the premises, **but do not pick up the milk**.

5. **Accepting, odd pick-up or unusual milk:**
   - If the tank contains an odd number of milkings or partial milkings, or there are some signs of freezing, foaming or churning, or there is any other reason why the sample may be other than a universal sample, **mark the sample container with an "X."** Take care in placing the "X" in a position so that it does not prevent the producer number from being read. This will alert the laboratory personnel that the sample should not be used for butterfat testing. If you do "X" a sample, write a note on the back of the sample rack identification tag, which should be attached to the rack of samples, explaining the reason why the sample was "X'd.". The sample identification tag should also contain the following information: date, name of hauler/sampler and number of samples.
   - When pickups are made on an ongoing basis of an irregular number of milkings, or partial milking, it becomes very difficult to establish an adequate procedure to ensure accurate payment tests. Morning and evening milkings can vary considerably in butterfat, and other component contents. Samples from irregular pickups are not representative of a farm's entire production. If you have to routinely make irregular pickups, you must write the weight of the pickup (or the number of complete milkings) on the side of the vial. This is done so the laboratory or milk plant can calculate weighted average component tests to establish accurate payment for the producer.
   - When a producer's milk is picked up daily, write "ED" (every day) on the top of the vial. This tells the lab they need to test another sample in each testing period of the month, so at least two day's production is represented for butterfat or other component averaging in each period.
6. **Measuring Devices:** The Hauler should be familiar with the two types of measuring devices that are used for determining the volume of milk in the farm bulk tank. Both have a calibrated gage rod and a calibration chart. The calibration chart has been developed specifically for the tank in its permanent setting and the serially numbered gage rod identified on the calibration chart. If the

hauler observes that the tank has been disturbed from its permanent setting or that the number on the calibration chart does not correspond to the number on the calibrated rod, contact the plant, and the plant's fieldman.

a) **The stick-type gage rod** measures milk in inches and fractions of an inch or in centimeters and millimeters and is interpreted in conjunction with a calibration chart for conversion to pounds.

b) **An external scale plate** measures milk in inches and fractions of an inch or in centimeters and millimeters and is interpreted in conjunction with a calibration chart for conversion to pounds.

- New tanks over 2,000 gallons must use an external scale plate (external gage rod) and glass or plastic gage tube on the outside of the tank to measure the milk volume. To use this external gage assembly, milk from the bottom of the tank is allowed to enter the gage tube. The outlet valve must be opened slowly to prevent foaming of milk in the tube. The tube should be clean and dry prior to filling it with milk and taking the reading. If there is already milk in the gage tube upon arriving at the farm, it must be drained and the tube refilled with cold milk, otherwise an inaccurate reading will result. This is so because as the milk in the tube warms, it expands and gives a false, high reading. Errors of several hundred pounds can occur.

- Within a gage tube, the upper surface of the milk column in the tube is not flat. The milk column clings to the inner surface of the glass or plastic and in a wet tube appears higher on the edge than in the center having a concave or cup-shaped surface, but in a dry tube it appears higher in the center than on the edge having a convex or rounded up surface. This curved surface, whether rounded up or rounded down, is called a "meniscus". The curvature of the meniscus from the highest to lowest point may span several gradations on the scale plate.

- The correct method of reading a gage tube is to use the highest point in the center of the meniscus as the measuring point. A devise called a "vernier" is raised or lowered until it is aligned with the highest point in the center of the meniscus on the milk column in the gage tube. With one edge of the vernier on the highest point in the center of the meniscus, the same edge will correspond with a reading on the scale plate. If the measuring point is between gradations, use the gradation closest to the measuring point. If the measuring point appears exactly halfway between two gradations, record the nearest even-numbered gradation.

- As a precaution with the external gage tube, it should be observed that the tube is adequately vented at the top and open to the atmosphere. Any restriction in this venting, such as a sag in the line with entrapped water, will create an air lock in the gage tube, prevent the milk in the tube from seeking the true static level of the milk in the tank, and result in a false, low reading. Errors of several hundred pounds have been made in this way.

7. **Measuring the milk**: The measurement of the milk shall not be taken during agitation. If the bulk tank agitator is not running when you arrive in the milkroom and the milk is absolutely motionless, do the following:

a) Disable the agitator to prevent it from coming on automatically while attempting to measure the milk.

b) Remove the measuring gage rod from the milk, if the tank is so equipped, and wipe the stick well with a clean, dry, single-use paper towel. This residue, if not removed, can cause the milk in the bulk tank to climb up the stick resulting in an inaccurate reading.

c) To ensure a straight milk line when measuring the milk, lower the gage rod straight down until it reaches a point one-quarter inch from its base. Hold the gage rod in this position briefly then ease it down slowly until it seats itself firmly in its base.

d) Remove the gage rod immediately and read it in good light at eye level. This reading is the depth measurement.

e) It is required to take at least two gage rod readings to check for consistency. Repeat the process, wiping the gage rod and lowering it carefully into the milk until two identical measurements are taken. Immediately record the depth measurement on the weight ticket.

f) Operate the external gage by opening a valve, milk from the bottom of the tank is allowed to run up a sight tube which is on the outside of the farm bulk tank. This tube should be clean and dry prior to filling it with milk and taking your reading. It is well to let the milk on very slowly so that the milk does not run up the sight tube beyond what would be the static level in the tank.

g) Raise or lower the vernier along the scale plate and sight tube and, holding the vernier square if necessary, take a reading as described above. This reading is the depth measurement.

h) Record the reading of the gage rod or scale plate immediately on the appropriate form. Then using the appropriate calibration chart record the conversion to pounds.

i) If the reading on the gage rod or scale plate is between two gradations, read it as if it were on the nearest gradation. If the milk level is exactly halfway between two gradations, read it to the nearest even gradation.

8. **Recording Results:** To avoid error, promptly record all results. Do not rely on memory. All the following information shall be included on your farm bulk milk receipt or farm ticket:

- Date and Time of arrival
- Depth reading on the gage rod
- Route identification
- Producer's identification (name or number)
- Hauler/Sampler's Mass. license number and signature or initials
- Milk quality-- unusual odor or appearance if detected
- Once a month, note the day the tank thermometer is checked, if relied upon.
- Milk temperature
- Converted milk weight
- Name of buyer or milk plant

Incorrect or incomplete recording can cause innumerable delays in sampling results and payment information. Careful attention to all notations is required for an efficient, effective line of communication.

9. **If the bulk tank agitator is not running** upon arrival in the milkroom and the milk is absolutely motionless, disable the agitator so it cannot start automatically, and measure the milk as has been described above.

10. **If the agitator is running** upon arrival, note the time, connect the hose, take the temperature and start the necessary paper work during the mandatory agitation time, 5 minutes minimum or longer as may be specified. Then shut the agitator off and allow the milk to become absolutely motionless before attempting to get an accurate gage reading to measure the depth and determine the weight. When the milk is absolutely motionless measure the milk as described above. Collect the sample, as described later on in this text, only after the milk has been properly agitated.

11. **Agitating the milk**: Start the agitator on the farm bulk tank and time it for the required period of agitation using a watch or other timing device. Sample the milk at the end of the agitation period with the agitator still running. The milk in all farm bulk tanks must be **agitated for a minimum of 5 minutes or more**. For tanks 1,500 gallons or larger, a 10-minute agitation time is required, or any other time according to the specifications of the manufacturer.

Proper tank agitation times cannot be overemphasized. Insufficient agitation time may be the largest single contributing factor to butter fat test variations. Since any bacteria or somatic cells present in milk tend to rise with the butterfat, the bacteria counts or the somatic cell counts can also be affected.

In the example shown below you can see how the raw milk bacteria count varied over 300,000 per milliliter between the milk near the surface of the tank-full and the milk near the bottom.

Bacteria Variation

Top of Unagitated Tank	350,000 per ml
Bottom of Unagitated Tank	10,000 per ml
Agitated Five Minutes	44,000 per ml

Proper agitation time in this case made the difference between a count that was within legal limits and one that was not. Premium loss or even market loss could result from such carelessness. Remember, the bacteria and somatic cells tend to rise with the cream portion of the milk.

Butterfat can also vary greatly if a tank is inadequately agitated. In the example below, there is almost six-tenths of a percent difference between an improperly and properly agitated tank of milk.

Butterfat Variation

Top of Tank (Unagitated)	4.50%
Bottom of Tank (Unagitated)	3.78%
Top of Tank Agitated 5 Minutes	3.91%

Since the butterfat content is used in the pricing of milk, it can be seen how much agitation-time can affect the producer or the buyer economically.

Even if the tank agitator is running or if it is one that agitates the milk for 5 minutes every hour, the driver must observe the milk being agitated for a minimum of 5 minutes before collecting the sample. This 5-minute agitation (or longer for large tanks, as required) will ensure that the milk is well mixed before sampling. The farmer has already put many hours into this milk, the hauler/sampler, certainly can take the necessary five minutes, to obtain that most representative sample.

Note: If the bulk tank agitator is running when you arrive in the milkroom, continue to agitate the milk for at least 5 minutes using a watch or other timing device to observe the actual agitation time.

While the milk is agitating, take the universal fresh milk-sampling container, dipper, dipper container and sanitizing agent for the outlet valve, or single service sampling tubes into the milk house. Protect the milk sample container. Do not place it in a pocket, drop it, or in any way allow it to become soiled or wet, compromising the possibility of getting a sample representative of the milk in the tank. It is advisable to carry two or three sample containers in a zip-lock plastic bag into the milk room. This provides a protected supply in the event there is no safe, clean, dry place to put them down or one gets dropped

12. **Collecting the Milk Sample - Using the Universal Sampling Method:** The farm bulk milk pickup driver has the responsibility of obtaining a representative sample from the producer's farm bulk tank. It is imperative that the sample taken be representative of the lot from which it was selected and that it arrives at the laboratory with no changes in its chemical, physical, or biological, character. This is extremely important for the universal fresh milk sample taken at each pickup on the route, is used for a variety of quality tests including the detection of butterfat content, levels of contamination with bacteria, herd health, added water and residues of inhibitors (antibiotics) or certain other chemicals, and as a check on milk sampling techniques. These tests are only reliable if the tank of milk has been properly agitated and sampled, and the sample properly handled thereafter.

The Universal Sampling Method

The sampling method known as universal fresh milk sampling, whereby samples are collected every time milk is picked up at the farms, has become recognized as the best and most economical method of collecting samples for regulatory and industry testing of producer milk.

Different tests are performed on random samples and neither the milk producer nor the farm bulk pickup driver knows which tests are to be made on the samples being taken on any given day. Thus, the

universal fresh milk sampling method discourages the use of improper, unethical, and illegal practices of sampling milk.

With the universal fresh milk sampling system, every farm tank of milk is sampled regardless of its condition. Therefore, distinct, complete, and accurate markings of the sample are critical if confusion is to be avoided. A sample of all milk picked up at every farm regardless of quality is necessary for the following reasons:

- If the hauler rejects the tank of milk, the sample may provide evidence of the suspected problem.
- When a tank truckload of milk is rejected at the plant, testing the samples of milk collected from every producer whose milk was commingled in the load will facilitate tracing the problem back to the source.

There are several conditions and practices, which could adversely affect samples taken for butterfat-testing purposes. These include: (1) frozen milk, (2) churned or partially churned milk, (3) curdled milk, (4) excessive foaming, (5) samples taken while the milk is being transferred from the farm bulk tank to the tank truck, (6) sampling milk stored outside the calibrated portion of the farm bulk tank, (7) improper agitation, and (8) delay in sampling after the agitator has ceased to function. The bulk tank agitator shall have been operating for at least 5 minutes before and shall be operating during sample collection. Any one of these conditions or practices could result in a sample that does not truly represent the product it was taken from.

Frozen, churned, curdled, or foamy milk does not become uniform in composition even after extensive agitation. Frozen milk occurs when direct expansion refrigeration systems are turned on before milk enters the tank or if the thermostat is set too low or is not functioning properly. The condition shows as ice floating on the top of the milk, or as a layer of ice in the bottom of the tank.

Churned milk occurs as a result of slow or improper cooling in conjunction with excessive agitation. The defect is evident from free fat floating on top of the milk. Butterfat particles may range in size, from tiny flakes about the size of a pinhead to little yellow chunks about the size of a pea.

Milk that has curdled will almost always have a sour smell. Just before it curdles, the surface of the milk may appear to be slightly rough and it will have a sour smell.

Foam is higher in fat than milk below the foam layer. It is not possible to bring the dipper up through the foam layer without getting foam into the dipper. Even taking the sample away from the layer, if possible, would result in an inaccurate sample because some of the fat, which should be in the milk, is in the foam.

Taking a milk sample when the milk is being transferred from the farm tank into the tank truck or of milk stored in containers outside the bulk tank is not permitted because this practice results in inaccurate samples.

The receiving plant may require that the Hauler/Sampler collect compartment samples from the tank truck. These are used to screen for inhibitors. Inhibitors are any of a number of drugs or antibiotics, which could be found in the milk because of their use in a number of different ways to control disease in the milking herd. Very small amounts of inhibitors in the milk supply can be very serious for any consumer who has an allergic sensitivity to inhibitors. Very small amounts of inhibitors in the milk supply can also harden human pathogens to those inhibitors rendering those drugs ineffectual against those pathogens when they may be needed. It is the goal of the dairy industry to guarantee that milk will be 100% free of inhibitors. There are many different inhibitor tests that have been developed in recent years which can detect as little as two parts per billion in a milk supply.

13. **Identify sample Container**: Before transferring the milk sample while the sample container is still clean and dry, permanently, clearly and legibly identify the sample container using the waterproof pen or pre-marked labels as may be provided, identifying the producer, the hauler and the date.

14. **Transferring the Milk Sample**:

- After at least 5 minutes of agitation, while the milk is still agitating, and prior to opening the tank valve, remove the sampling device which has been stored in a sanitary manner and proceed to obtain a sample.
- If the Bob-J sampling device is used the sample vial is placed in the holding clip and the vial and holder are immersed in the sanitizer for a minimum of one minute.
- Rinse the sanitized dipper at least three times in the milk before obtaining the sample. This will assure that none of the sanitizing solution will be in the milk sample.
- The sample shall be obtained from a depth of six to eight inches.
- Do not transfer the milk sample from the sampling devise to the sample container while held over the farm bulk tank. Turn away from the tank and fill the approved sample container 3/4 full (up to the line).
- After the sample of milk has been transferred to the sterile sample container, close the container, being certain it is tightly sealed.
- Rinse the dipper with cold water and return it to the sanitizing solution in the carrying case.
- Close the cover or lid on the farm bulk tank.
- **Do not delay! Place the sample immediately** in the rack in the refrigerant in the sample case. The sample must be placed in the mixture of ice and water quickly to keep it at a temperature between 32°-40°F (0°-4.4°C). The refrigerant should be maintained no higher than the milk level in the sample containers. The sample container should not be buried in the ice, but should be positioned and held with the volume of the sample down in the refrigerant. In this way the sample(s) will arrive in good condition (not incubated, churned or frozen) at the destination. Protect the samples against contamination. Until the samples are released to the authorized recipient, they are the bulk driver's personal responsibility. If it is necessary for the samples to be out of the driver's immediate control, steps must be taken to ensure they are secure. It may be necessary to lock them away or remove them from the truck to a secure location.

15. **Temperature Control Sample:** A second milk sample shall be taken at the first pickup of each route every day. This sample is used as a temperature control sample. Subject the temperature control sample to the same storage conditions as other samples during completion of the sampling schedule and subsequent transit to the laboratory. This sample container is to be marked with a "T", the date, time, and temperature when collected, the identity of the producer and the identity of the sample collector by initials or a number.

Note: The sample container should not be filled more than approximately two-thirds to three-quarters full. Filling the container only to this level allows ample headspace for properly agitating the sample at the laboratory before removing a portion for analysis. The sample containers being used by the industry are marked with a line to which they should be filled.

16. **Transferring the Milk Supply**

- **Bring in the transfer hose**: Pass the transfer hose through the hose port provided in the Milkroom wall. Using the hose port is important. Located above the floor it holds the transfer hose off the ground and the floor, helping to keep the hose clean, it allows that the door may be closed tightly to keep out pests. On some farms the hose port is the only convenient access for the hose to reach the outlet valve on the farm tank. Clean the transfer hose if necessary after bringing it in through the hose port.
- **Sanitize outlet valve**: Remove the valve cap, examine the uncapped bulk tank outlet valve. If the valve was capped and no milk residue is evident in the mouth of the valve or on the valve cap, it can be assumed the valve was washed and sanitized with the tank. If, however, the valve was not capped or a milk residue is evident in the mouth of the valve or on the valve cap, then it is necessary to wash and sanitize the valve before connecting the transfer hose to the tank. Some drivers carry a brush in the sanitizer container with which to sanitize after washing out the valve.
- **Connect hose**: Remove the hose cap, being sure to protect the hose cap from contamination, connect the milk transfer hose to the farm bulk tank outlet. Do not open the valve until after the weight has been recorded and the universal sample has been collected.
- **Pump out milk**: When the milk has been carefully evaluated, measured and the sample has been taken, with the tank agitator running and with the tank cover closed, but ajar if not vented, open the tank valve, start the milk pump, and transfer the milk to the tank truck. Under no circumstances is the milk to be measured or is the sample to be taken after the valve has been opened or while the milk is being pumped from the tank.
- **Stop agitation**: Turn off the agitator when the level of the milk is down to the paddles to avoid over-agitation and turn off the refrigeration unit if it is a direct expansion-type tank.
- **Disconnect hose**: When the bulk tank is empty, turn off the milk pump, disconnect and cap the transfer hose, return it to the truck, and close the hose port.

17. **Observe, then rinse the empty tank**: Observe the inner walls and floor of the tank for signs of freezing, churning, sediment or other foreign matter. If any of these abnormalities are present, notify the plant, the plant's fieldman and contact the producer directly or leave a written notice for him in a conspicuous place. **Rinsing the empty bulk tank is required.** Continue to observe what may have been left in the bulk tank as it is being rinsed. Be careful to rinse off all the milk residue so it will not dry on the surfaces inside the tank and be difficult to wash away later. Close the bulk tank lids before leaving so that the tank remains moist until washed.
18. **Clean up**: Flush away any milk spilled on the floor or outside of the tank. Return the water hose to its rack and place all displaced items in their proper place in the milk house.
19. **Lights off**: Be sure the lights are off as you leave.
20. **Protect the milk** The milk is a public food supply and must be secured by the driver. If parked in an area, which is not secured, the covers must be locked or sealed in such a way as to reveal whether or not the supply may have been tampered with.

ENFORCEMENT POLICY

To ensure that the proper farm pickup procedures are followed, it is necessary to have an evaluation to identify and an enforcement policy to correct procedures. This policy should be

in conformity with state and federal regulations which require routine evaluations of the procedure being used by farm bulk pickup drivers. The policy should be designed to help identify improper procedures which may lead to mishandling or incorrect sampling of the milk product, or inaccuracies in recording any required facts, before they become a serious problem which can affect not only the producers' income but that of the receiving handler.

This policy includes routine evaluations of the procedures being used by the farm bulk pickup driver. The inspector will note deficiencies in these procedures. If warranted a follow-up inspection will be scheduled. If deficiencies are of a nature that compromise the potential safety of the milk supply, immediate action to suspend or revoke the Hauler/Sampler License may be taken by the Director. Numerous and/or repeated violations of a lesser nature are also grounds for enforcement action. In such cases a hearing will be afforded the licensee if it is desired.

As was stated in the introduction, the farm bulk milk pickup driver is one of the most important persons in the milk marketing system today. Many persons depend on their hauler. The hauler's samples and records are used to determine the amount of money paid to the producers for the amount and quality of their milk as well as paying the hauling company (the driver's employer), and guaranteeing quality food to the consumer.