

NEBRASKA HAULER/SAMPLER MANUAL



NEBRASKA DEPARTMENT OF AGRICULTURE
FOOD SAFETY AND CONSUMER PROTECTION

(402) 471-3422

P.O. BOX 95064

LINCOLN, NE 68509-5064

www.nda.nebraska.gov

NEBRASKA HAULER/SAMPLER MANUAL

Revised 2009

**Nebraska Department of Agriculture
Food Safety and Consumer Protection
(402) 471-3422
www.nda.nebraska.gov**

**State Office Building
P.O. Box 95064
Lincoln, Nebraska 68509-5064**

**THE HAULER/
SAMPLER MANUAL
Table of Contents**

	Page
Contact Information	2
Introduction.....	3
Definitions.....	4
Licensing Requirements	4
Measuring of Milk	5
Sampling Equipment.....	7
Handwashing	9
Proper Sampling Techniques.....	9
Sanitizing the Milk Silo Sample Petcock and Sampling Milk	14
Labeling of Milk Samples.....	14
Farm Weight Tickets.....	16
Pumping the Milk	17
Checking Milk Temperature	18
Milk in Unapproved Containers.....	18
Sample Protection	18
Odor and Appearance of Milk	19
Milk Quality and Tests	21
Milk Truck Labeling.....	23
Cleaning and Sanitizing Requirements	23
Hauler/Sampler Surveillance	24
Bulk Milk Tank Inspections	25
Bulk Milk Tank Construction and Repair Requirements	26
Bills of Lading	26
Reciprocity.....	27
Biosecurity and Sanitation	27
Milk Transportation Companies	28
Appendix A	29
Direct Loading without an In-Line Sampler	29
Direct Loading with an In-Line Sampler	29
General Construction Requirements for In-Line Samplers.....	30
General Construction Recommendations for In-Line Samplers	31
In-Line Sampler Device Requirement.....	31
Thermometer Requirements.....	32
Refrigerator Requirements	34
Milk Sample Collection Requirements	34
Sub-Sampling and Representative Sample and Sample Handling Requirements.....	35
MDA Procedures for In-Line Samplers Sub-Sampling.....	36
Important Notes	38
Appendix B	39
24-Hour Clock and Fahrenheit/Celsius Conversion Charts.....	39
Sample Test Questions	41

CONTACT INFORMATION

Mike Backhuus
Phone: (402) 533-8392
Cell: (402) 416-8192

Randy Chloupek
Phone: (402) 772-8531
Cell: (402) 762-5497

Ted Kinnison
Phone: (402) 529-6695
Cell: (402) 416-8196

Nebraska Department of Agriculture
Phone: (402) 471-2536
Fax: (402) 471-2759

This manual is not intended to be complete rules and regulations, but a guide to assist the hauler/sampler. Specific questions regarding regulations should be addressed to the local inspector.

INTRODUCTION

The bulk milk hauler/sampler has become a vital link in the milk industry of today. Their performance as grader, sampler, and transporter of a food commodity has a direct affect on consumers, milk producers, milk plants, cooperatives, quality control personnel, and regulatory agencies.

The milk hauler/sampler carries a big responsibility and should be considered a professional at their duties. Their sense of smell and sight determine the acceptability of each farm bulk tank of milk. The hauler/sampler determines the amount of milk purchased and is the collector of official samples for laboratory examination and payment.

Because of its nutritional value, milk as a single food item is nature's most perfect food. It is also a perfect media for the growth of bacteria and other disease-causing organisms. In the days before pasteurization and inspection programs, milk and milk products were all too often the culprit in contributing to and spreading numerous foodborne diseases.

For these reasons, the milk industry has become a very complex and very regulated industry.

Uniform methods and procedures have evolved relative to milk handling and sampling, which every milk hauler/sampler should be aware of. The responsibilities and duties are discussed in brief form on the following pages.

DEFINITIONS

Bulk Milk Hauler/Sampler – a bulk milk hauler/sampler is any person who collects official samples and may transport raw milk from a farm and/or raw milk products to or from a milk plant, receiving station, or transfer station and has, in their possession, a permit from any state to sample such products.

Bulk Milk Pickup Tanker – a bulk milk pickup tanker is a vehicle, including the truck, tank, and those appurtenances necessary for its use by a bulk milk hauler/sampler to transport bulk raw milk for pasteurization from a dairy farm to a milk plant, receiving station, or transfer station.

Milk Tank Truck – milk tank truck is the term used to describe both a bulk milk pickup tanker and a milk transport tank.

Milk Tank Truck Cleaning Facility – any place, premises, or establishment separate from a milk plant, receiving station, or transfer station where a milk tank truck is cleaned and sanitized.

Milk Tank Truck Driver – a milk tank truck driver is any person who transports raw or pasteurized milk or milk products to or from a milk plant, receiving station, or transfer station. Any transportation of a direct farm pickup requires the milk tank truck driver to have responsibility for accompanying official samples.

Milk Transport Tank – a milk transport tank is a vehicle, including the truck and tank, used by a bulk milk hauler/sampler to transport bulk shipments of milk and milk products from a milk plant, receiving station, or transfer station, to another milk plant, receiving station, or transfer station.

Milk Transportation Company – a milk transportation company is a person responsible for a milk tank truck(s).

Receiving Station – a receiving station is any place, premises, or establishment where raw milk is received, collected, handled, stored, or cooled and prepared for further transporting.

Transfer Station – a transfer station is any place, premises, or establishment where milk or milk products are transferred directly from one milk tank truck to another.

LICENSING REQUIREMENTS UNDER THE NEBRASKA MILK LAW

The initial training of individuals as milk hauler/samplers is industry's responsibility. Training can be accomplished under the supervision of plant personnel or a hauler/sampler whose techniques are known to meet the requirements.

Periodically, milk hauler/sampler seminars are held to provide updated information on milk laws and regulations. Each milk hauler/sampler is required to attend the seminars to keep their current permit in good standing.

WHY SHOULD A MILK HAULER/SAMPLER BE LICENSED?

Milk, as a food commodity, requires special handling. The responsibility of sampling, weighing, and grading of milk is serious business and should not be taken lightly.

Licensing is a logical method of holding individuals accountable for their actions. A hauler/sampler is responsible for their actions and the samples they collect. A hauler/sampler may retain their permit only by following acceptable procedures.

WHO IS REQUIRED TO OBTAIN A LICENSE?

Every individual who samples and/or collects raw milk for sale shall obtain a license. The law does not provide for any exemptions to this rule; therefore, relief hauler/samplers and part-time hauler/samplers are in violation when they fail to obtain a license prior to beginning their duties. Any hauler/sampler found to be performing the duties of a hauler/sampler without a valid license, will be assessed a \$100 penalty in addition to the permit fee.

HOW DO I OBTAIN A HAULER/SAMPLER PERMIT?

After individuals complete the initial training by industry and review the Nebraska Hauler/Sampler Manual, they must contact the local dairy inspector to set up an appointment for an on-the-farm milk sampling evaluation and written exam. A minimum score of 85% is necessary to pass both examinations. After successfully completing both requirements and paying the \$25 permit fee, the individual may begin performing the duties of a licensed hauler/sampler. While performing these duties, the hauler/sampler must carry proof of having a permit in the form of the actual permit or a copy. The permit expires July 31st of each year. If a hauler/sampler has not been surveyed in the past two years, he will receive a notice that he must schedule an inspection prior to July 31st and pay the \$25 fee at that time.

MEASURING OF MILK WITH DIPSTICK

Milk must be measured in a sanitary manner. Besides the sanitation precautions, there are essential steps to assure accurate measurement of milk volume. These steps are:

1. The measuring stick must be clean, dry, and free of fat. For the most accurate reading, the stick must be warmed to room temperature (65-70°F) before the milk is measured. The measuring stick should be stored in the bulk tank and in its proper position between readings. To prepare the stick, rinse with cold water then warm to room temperature with warm water. Finally, wipe dry with a clean,

dry, single-service paper towel. The measuring stick prepared in this manner will give you a sanitary and accurate reading. If the measuring stick is stored outside the bulk tank, it must be cleaned and sanitized prior to use.

2. Now the stick is ready to be positioned in the tank. If there is any foam, gently move the foam away from the measuring area with the end of the measuring stick. Then, lower it slowly into the milk until it reaches a point approximately $\frac{1}{4}$ inch from its proper position. Wait a few seconds, then gently lower the rod until it seats itself naturally.
3. Remove the stick and read it at once. The markings should be read at eye level and in a well-lighted area. Take at least two readings to ensure the correct weight is obtained. The measuring stick is graduated into $\frac{1}{32}$ of an inch. Each graduation is equivalent to a determined number of pounds of milk posted on a conversion chart, specifically calibrated for each tank. The serial number of the bulk tank, measuring stick, and conversion chart must be the same. When the milk line is close to, but not exactly on a specific mark, it is read as if it were exactly on that mark. When the milk line falls exactly between two marks, always read to the nearest even number. It is important to always read the stick in this manner to avoid inaccurate results. Immediately record the reading on the weight ticket.
4. The farm bulk tank and its calibration is the responsibility of the producer under the supervision of milk plant personnel. However, there are conditions that the hauler/sampler should be aware of that could contribute to inaccurate weight problems.
 - a. The tank is not level.
 - b. Heaving, cracking, or settling of the milkhouse floor.
 - c. Improper footings under the tank leg.
 - d. A weaving or distortion of the measuring stick or bracket.
 - e. The measuring stick serial number and calibration chart do not match.
 - f. Shims.

If you notice any discrepancies, you should contact the plant or plant field representative and have them investigate the problem.

SIGHTGLASS TUBE MILK MEASUREMENT

Glass tube calibration units are designed in such a way that the contents of the glass tube shall not re-enter the milk storage unit. The same care must be observed in taking accurate readings, as is required on conventional tanks.

- The top of the sight tube must be open to the atmosphere. If the sight tube is not open, a top line terminates in the milk, or contains water, it forms a lock, resulting in depressed milk readings.
- When the milk in the tank is still, open the valve to the sight glass and allow the milk to flow in slowly.
- There should be no foam in the tube. If a distinguishing line between the foam and milk is not visible, drain the contents of the tube and begin again.
- When the milk level is clearly established in the tube, move the level finder to the milk line. (In bright light, a slightly curved-like line, called a meniscus, will be seen). The reading must be taken at the **bottom** of the meniscus. Read directly across to the calibration reading.
- Drain the contents of the tube to the floor.
- Good lighting is critical for an accurate reading. Notify the producer and/or supervisor if there is insufficient light.
- If the tube is full of milk when you arrive, close the valve and disconnect the sight glass, allowing the contents of the tube to drain away. The tube should then be rinsed from the top and allowed to drain.
- To ensure an accurate reading, the sight tube must be equipped with a positively attached pointer, mounted on the opposite of the plastic tube, from the graduated rod, in a manner which will not obscure the graduation marks on the calibration rod. The pointer must reach across the plastic tube and touch the “milled” increments on the calibration rod. All fittings on the sight tube shall be secured to prevent leaks. The sight tube must be welded to the unit and be reinforced so as to prevent “sagging” of the rod and sight tube holder. If any of this is not the case, notify your supervisor, as an inaccurate reading is possible.
- Precautions to be noted:
 - The measurement will be seriously affected if there is not a free flow of air to the top of the sight glass.
 - Never close the valve to the milk tank when taking a measurement, even if the tube or tank connection has a leak, as an inaccurate measurement will result. A poor connection should be reported to the producer so that it may be repaired. If it is not, notify your supervisor.

SAMPLING EQUIPMENT

1. Sample bottles or sterile bags that are free from cracks, have a leak-proof lid, and are made of food grade materials may be used. The sample containers must be protected from dust, dirt, and splash. They may be stored in a clean container with a lid, or in a clean plastic bag that is tied at the top. Do not carry sample bottles in pockets.

2. Sample case that is large enough to hold all samples collected, along with an ample supply of ice. The sample case must be of rigid construction, clean, in good repair, and insulated to maintain sample temperature between 32°F and 40°F. Sample racks (flotation racks) must be provided to prevent the sample bottle lids from being submerged in the water/ice mixture. This will help to protect the samples from possible contamination.
3. Sample dipper, sanitary single-service straw, or other sampling device which is of sanitary design; carried on the milk tank truck; clean, in good repair, and of proper construction (i.e., free of pits, cracks, and breaks); and stored in the sampling instrument container with an approved sanitizing solution of the proper strength or sanitized for at least one (1) minute before use.
4. Sanitizing agent and sample dipper container which is of approved construction (i.e., stainless steel); in good repair (smooth, nonporous, and cleanable surface, with no pits or cracks, and the top and bottom rubber stopper in good condition); kept clean; and freshly prepared sanitizing solution of 100 ppm or equivalent. Chlorine is recommended, as it is universally available.
5. Sanitizer test kit. An applicable test kit for checking sanitizer strength (100 ppm chlorine or equivalent) must be carried on the truck at all times. The test kit must match the sanitizing solution used in the sample dipper storage container.
NOTE: Extra sanitizer should be carried on the truck in case of spillage or other unexpected events.
6. Calibrated pocket thermometer. An approved type (metal stem or digital thermometer) with a range of 25-125°F is recommended. Glass mercury thermometers are not allowed. Check accuracy at least once every six (6) months against a thermometer certified by NIST (accuracy must be $\pm 1^\circ\text{F}$). The date the thermometer was checked and the initials of the individual who checked it must be recorded on the accompanying thermometer card.
7. Watch or other timing device to monitor tank agitation time.
8. Waterproof permanent marker to label and identify samples.
9. Farm bar code labels, if used.
10. Milk producer's tickets and a pen.
11. Spray bottle containing sanitizing solution to sanitize the bulk tank outlet valve if the valve is leaking or uncapped.
12. Bags for sanitizer solution, if sampling through a petcock.

HANDWASHING

The hauler's hands must be washed after connecting the milk transfer hose and the electrical cord. The hauler is required to use the hand wash facilities, including soap and single-service clean towels. The equipment wash vats are not to be used for handwashing. The hands shall be washed at each stop and at any time during the pickup and sampling procedure where hands become contaminated. The hands shall be washed and dried prior to measuring and sampling the milk or handling any other milk contact surfaces.

PROPER SAMPLING TECHNIQUES

Universal Sampling System – Nebraska law requires that, if milk hauler/samplers collect raw milk samples, the “Universal Sampling System” be employed, whereby milk samples are collected every time the milk is picked up at the farm. This system permits the enforcement agency, at its discretion, at any given time, and without notification to the industry, to analyze samples collected by the hauler/sampler. The use of the “Universal Sampling System” puts more validity and faith in samples collected by industry personnel.

Milk Pickup and Sampling (Agitator not running upon arrival)

Proper sequence:

1. Insert milk hose through hoseport and plug in pump cord.
2. Take all required equipment into milkroom. (Properly handle sample container. Do not carry containers in pockets.)
3. Take off valve cap on bulk tank and rinse and sanitize outlet. Place outlet cap in wash vat. Do NOT place in hand wash sink.
4. Hook up hose to bulk tank. Do not open bulk tank outlet valve. Place or hang truck hose cap in clean place.
5. Wash and dry hands with soap and water and single-service towels.
6. Examine milk for odor through port lid. Reject milk if odor is unsatisfactory.
7. Examine milk appearance by lifting tank lid. Reject milk if odor is unsatisfactory.
8. Prepare measuring stick and take two readings. (See section on Measuring of Milk.)
9. Record readings on farm weight ticket. (See section on Recording Results.)

10. Start agitator. Make sure the tank is properly agitated. It will normally take no less than five minutes of constant agitation for most tanks. On tanks of 1,000 gallons or more, it will normally take 10 minutes of constant agitation. When in doubt, check the 3-A Sanitary Symbol located on the tank, which should provide you with the proper agitation time. If not, you may contact your field representative, who should determine the proper agitation time.
11. During agitation, sanitize your thermometer and check milk temperature. Depending upon company policy, high temperature milk may be rejected. On a monthly basis, a comparison should be made between your pocket thermometer and the tank thermometer. If the tank thermometer is broken, sanitize your thermometer and check the temperature each pickup.
12. Properly label sample containers. (See section on Labeling of Milk Samples.)
13. Open the sample container, being careful not to contaminate the interior of the container and its cap. Contamination of the sample container will alter the laboratory results and possibly reduce the producer's payment. Do not dip the sample container in the milk.
14. Rinse the sampling device at least twice in the milk before taking the sample. Any water or sanitizer remaining on the sampling device will alter the laboratory results.

NOTE: Make sure the sampling device is clean and has been properly sanitized in 100 ppm chlorine solution or other equally suitable sanitizing solution. The sampling device should remain in the solution until it is removed to sample the milk. Do not remove the sampling device prior to entering the milkhouse.

If a dipper is stored and maintained at the farm, make sure it is cleaned and properly sanitized before sampling the milk.

15. Sample the milk in the tank, making sure the sample container is not held over the milk supply while pouring the sample. The sample container should be filled $\frac{2}{3}$ full, or to the line of the sample container. This will enable the laboratory to properly mix the sample before testing.
16. Properly close the sample container, making sure it is sealed correctly so it does not leak or puncture the sample container. When using a whirl pack bag, make sure enough air is trapped inside the bag to properly agitate the sample.
17. Immediately place the sample in a refrigerated sample case and keep it at 33-40°F until delivery, providing methods, such as the use of racks or drainage holes in the sample case, to keep the samples free from contamination due to melting ice. (See Protection of Milk Sample.)

18. After you have sampled the milk, rinse the sample dipper with tap water and return it to the sanitizing solution.

NOTE: Always take a second sample of the milk at the first stop as a Temperature Control (TC) sample. (See section on Labeling of Milk Sample for proper labeling of the TC sample.) Also, upon returning to the plant, check and record the temperature of this sample when samples are delivered.

19. Open bulk tank valve and pump milk onto truck (See section on Pumping the Milk.) Continue to agitate the milk during pumping. Shut off when milk reaches agitator.)
20. When milk is pumped on the truck, disconnect hose and replace hose cap.
21. Rinse bulk tank with warm water. (See section on Disconnecting the Hose and Rinse the Farm Bulk Tank.)
22. Rinse floor and leave milkroom as you found it.
23. If milk is rejected, leave a note or contact the producer and field representative, and take a sample for industry analysis.

Milk Pickup and Sampling (Agitator running upon arrival)

Proper sequence:

1. Insert milk hose through hoseport and plug in pump cord.
2. Take all required equipment into milkroom. (Properly handle sample container. Do not carry containers in pockets.)
3. Take off valve cap on bulk tank and rinse, and sanitize outlet valve. Place outlet valve cap in wash vat, not in hand wash sink.
4. Hook up hose to bulk tank. Do not open bulk tank valve. Place or hang truck hose cap in a clean place.
5. Wash and dry hands with soap and water and dry with hand towels provided.
6. Examine milk for door through port lid. Reject milk if odor is unsatisfactory. (See section on Odor is unsatisfactory. (See section on Odor and Appearance of Milk.)
7. Continue agitation. Make sure the tank is properly agitated. It will normally take five minutes of constant agitation for most tanks. On tanks of 1,000 gallons or

more, it will normally take 10 minutes of constant agitation. When in doubt, check the 3-A Sanitary Symbol, which should provide you with the proper agitation time. If not, you may contact your field representative, who would determine the proper agitation time.

8. During agitation, sanitize your thermometer and check milk temperature. Depending upon company policy, high temperature milk may be rejected. On a monthly basis, a comparison should be made between your pocket thermometer and the tank thermometer. If the tank thermometer is broken, sanitize your thermometer and check the temperature each pickup.
9. Properly label sample containers. (See section on Labeling of Milk Samples.)
10. Open the sample container, being careful not to contaminate the interior of the container and its cap. Contamination of the sample container will alter the laboratory results and possibly reduce the producer's payment. Do not dip the sample container in the milk.
11. Rinse the sampling device at least twice in the milk before taking the sample. Any water or sanitizer remaining on the sampling device will alter the laboratory results.

NOTE: Make sure the sampling device is clean and has been properly sanitized in 100 ppm chlorine solution or other equally suitable sanitizing solution. The sampling device should remain in the solution until it is removed to sample the milk.
12. Do not remove the sampling device prior to entering the milkhouse.

If a dipper is stored and maintained at the farm, make sure it is cleaned and properly sanitized before sampling the milk.
13. Sample the milk in the tank, making sure the sample container is not held over the milk supply while pouring the sample. The sample container should be filled $\frac{2}{3}$ full, or to the line of the sample container. This will enable the laboratory to properly mix the sample before testing.
14. Properly close the sample container, making sure it is sealed correctly so it does not leak or puncture the sample container. When using a whirl pack bag, make sure enough air is trapped inside the bag to properly agitate the sample.
15. Immediately place the sample in a refrigerated sample case and keep it 30-40°F until delivery, providing methods, such as the use of racks or drainage holes in the sample case, to keep the samples free from contamination due to melting ice. (See Protection of Milk Sample.)

16. After you have sampled the milk, rinse the sample dipper with tap water and return it to the sanitizing solution.

NOTE: Always take a second sample of the milk at the first stop as a Temperature Control (CT) sample. (See section on Labeling of Milk Sample for proper labeling of the TC sample.) Also, upon returning to the plant, check and record the temperature of this sample when samples are delivered.
17. Turn off agitator and allow five minutes for milk to come to rest.
18. Examine milk appearance by lifting tank lid. Reject milk if appearance is unsatisfactory.
19. Prepare measuring stick and take two readings. (See section on Measuring of Milk.)
20. Record readings on farm weight ticket.
21. Open bulk tank valve and pump milk onto truck. (See section on Pumping the Milk.) Continue to agitate the milk during pumping. Shut off when milk reaches agitator.
22. When milk is pumped on, disconnect hose and replace hose cap.
23. Rinse bulk tank with warm water. (See section on Disconnecting the Hose and Rinse the Farm Bulk Tank.)
24. Rinse floor and leave milkroom as you found it.
25. If milk is rejected, leave a note or contact the producer and field representative, and take a sample for industry analysis.

Improper Agitation

Improper agitation prior to sampling will have a direct bearing on a butterfat readout. Bacteria and somatic cells tend to rise with the butterfat. Improperly agitated milk may give a false reading on bacteria counts, somatic cell counts, and antibiotic tests.

REQUIREMENTS FOR USING AN APPROVED IN-LINE SAMPLER (See Appendix A)

A protocol specific to each milk producer who direct loads milk tank trucks (through bypassing the use of farm bulk milk tanks or silos) while utilizing an approved in-line sampler, shall be developed by the regulatory agency, in cooperation with the sampling equipment manufacturer, the milk buyer, the milk producer, and FDA. As a minimum, the protocol should include the following:

1. A description of how the milk sample is to be collected, identified, handled, and stored.
2. A description of the means used to refrigerate the sample collection device and milk sample collection container throughout the milk sample collection period.
3. A means to monitor the sampler device temperature, milk sample temperature, and the milk temperature.
4. A description of how and when the sampler is to be cleaned and sanitized, if not of the single-use design.
5. A listing of the licensed bulk milk hauler/samplers who have been trained to maintain, operate, clean, and sanitize the sample collection device, as well as to collect, identify, handle, and store the milk sample.
6. A description of the method and means that will be used to determine weight of the milk on the milk tank truck.

SANITIZING THE MILK SILO SAMPLE PETCOCK AND SAMPLING MILK

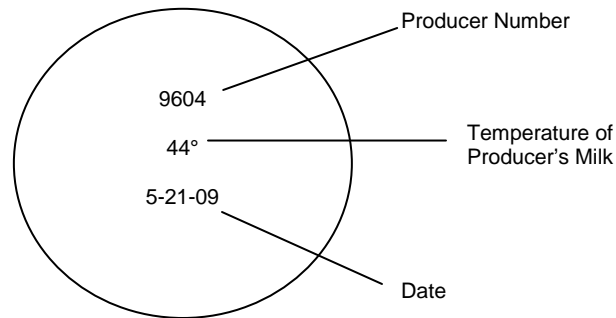
Prepare a chlorine sanitizing solution of 100 ppm or greater. Submerge the sample petcock by fitting a bag of the sanitizing solution, over and around it. While holding the top edge of the bag tightly around the sample valve, flush the sanitizer in and out of the petcock for at least one minute. Pour all remaining sanitizer over the sample valve. Purge approximately ½ gallon of milk out of the sample petcock to flush out any remaining sanitizer, then collect the milk sample.

In many instances, this type of silo tank cannot be easily observed or checked for odor prior to sampling due to inaccessibility to the manhole or other openings while milk is in the silo tank. In these situations, a sample of the milk should be taken after purging the sample petcock and after the official sample. This sample is then examined for any off odors or other abnormalities. After the milk has been pumped onto the tanker, the manhole can be opened and the inside of the silo tank checked for any odors and other abnormalities. If there is a problem with the milk, the proper industry official should be notified prior to unloading the milk. The overall cleanliness and cleaning of the sample petcock is the responsibility of the owner of the dairy farm. The hauler is responsible for properly sanitizing the sample petcock and correctly obtaining the milk sample.

LABELING OF MILK SAMPLES

There are specific reasons for the required information on producer and temperature control (T/C) samples. Let's discuss each item:

Producer Sample

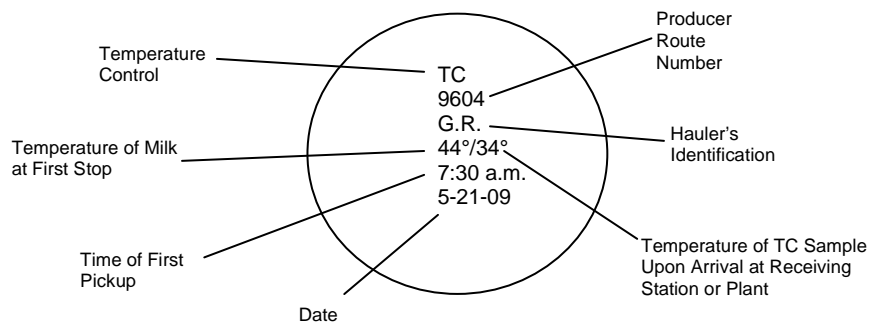


Producer Number

Producer number identifies the farm from which the sample was collected. The date identifies the date it was collected, and the temperature provides the temperature of the milk in the farm bulk tank from which it was collected.

Pre-labeling samples is not an acceptable practice. It is too easy to pick up the wrong sample container. In fairness to your producers, label samples only at the time you are collecting the sample.

Temperature Control Sample



T/C – This identifies the sample so as not to confuse it with producer samples.

Producer route number – This identifies the first producer on the route.

Hauler Identification – This identifies the collector of the sample.

First temperature – This is the temperature of the milk at the first producer's farm.

Second temperature – This is the temperature of the TC sample upon arrival at the receiving station or plant. This helps to put continuity into the samples, as the samples

may never rise above 40°F until they are set up in the laboratory. Take the temperature of the TC sample, not the load temperature or ice chest temperature. It is to be taken by the hauler.

Time – This is the time of the first pick-up on the route. This is used to determine that the samples upon arrival at the laboratory are not any older than 60 hours for bacteria testing and 72 hours for somatic cell testing.

Date – This is the date the sample was picked up. This date is also used to determine that the samples, when they arrive at the laboratory, are tested within the required amount of time.

Temperature Control Samples – They are just as important, if not more important, than the producer samples. The T/C samples provide the information that decides whether the entire group of samples is acceptable to use for lab analysis.

Example: If the second temperature on the T/C is above 40°F (let's say 60°F), everyone who needs to know will know that something unusual happened. These samples were warm when arriving at the plant or receiving station. The samples would then be unacceptable for use on certain lab tests.

The temperature of the milk in the TC vial should be taken immediately upon arrival at the receiving station or plant by the hauler while still in the sample case.

Remember: You may be asked to put additional information on the TC or sample label by your cooperative.

WEIGHT TICKETS

The maintenance of all pertinent information on weight tickets is the responsibility of the hauler/sampler and should include the following:

1. Delivery destination.
2. Pickup and delivery dates.
3. BTU number.
4. Producer name and number.
5. Stick reading and weight.
6. Time of pickup.
7. Temperature of milk at time of pickup.

8. Driver's name or signature.
9. Any unusual occurrences or information.

ON-THE-FARM BARN MILK WEIGHT RECORD CARD

The following information should be recorded on the farm barn milk weight record card each time milk is picked up:

1. Date of pickup;
2. Time of pickup;
3. Milk temperature;
4. Bulk milk hauler/sampler's name;
5. Bulk milk hauler/sampler's license or permit number; and
6. A monthly bulk tank thermometer/pocket thermometer comparison.

PUMPING THE MILK

To aid in the removal of butterfat that adheres to the sides of the tank and to help protect the plant against a fat loss due to this factor, it is a good practice to leave the agitator running until the tank is empty.

It is also important to shut off the pump as soon as possible after the tank is empty to avoid sucking air and milkhouse odors into the truck tank.

PARTIAL MILK PICKUPS

Do not pick up milk during milking. There shall be no partial removal of milk from milk storage/holding tanks by the milk hauler, except partial pickups may be permitted when the milk storage/holding tank is equipped with a seven-day recording device complying with the specifications of Appendix H of the Pasteurized Milk Ordinance, or other recording device acceptable to the state regulatory agency provided the milk storage/holding tank shall be clean and sanitized when empty and shall be emptied at least every 72 hours. In the absence of a temperature recording device, partial pickups may be permitted as long as the milk storage/holding tank is completely empty, clean, and sanitized prior to the next milking. In the event of an emergency situation, such as in inclement weather, natural disaster, etc., a variance may be permitted at the discretion of the state regulatory agency.

DISCONNECT THE HOSE AND RINSE THE FARM BULK TANK

After the milk is pumped from the tank and the pump shut off, remove the hose and cap immediately. Visually check the bottom of the bulk tank for sediment. If it is excessive, make note of it and notify the producer and plant field representative.

Be sure to detach the milk hose from the tank before rinsing the tank. As a help to the producer, rinse the interior of the bulk tank with warm water (about 110°F). This will make it easier for the producer to wash the tank. Close the tank covers after rinsing to prevent the tank from drying out and to keep out foreign material.

Rinse the floor and hose port to keep it clean and free of milk. Any milk remaining on the floor will sour and develop acid, which will eventually erode the concrete.

CHECKING MILK TEMPERATURE

On farms with bulk tanks that have properly working thermometers, the hauler/sampler should check the accuracy of these thermometers on a monthly basis against a pocket dial-type thermometer. A record should be kept at the farm when the thermometer is checked. The information should include date, initials, and if the thermometer is accurate. If the bulk tank thermometer is not in working condition, the hauler/sampler should check the milk temperature, prior to each pickup, with a pocket dial-type thermometer. Remember, the pocket dial-type thermometer should be sanitized for 30 seconds prior to use. Bulk tanks with recorder charts must also have a temperature comparison on a monthly basis.

COLLECTING MILK FROM UNAPPROVED CONTAINERS

Milk stored in any other container or vessel that is not a working milk bulk tank shall not be sampled or collected by the milk hauler/sampler. Those containers do not have means of cooling or agitation. Any hauler/sampler determined to have collected milk for sale from an unapproved container faces immediate permit suspension.

PROTECTION OF MILK SAMPLES

The procedure for sampling and the care of samples should be in substantial compliance with the "Standard Methods for Examination of Dairy Products." Samples and sample containers must not be contaminated by improper handling during or after sampled. Samples must be properly identified and refrigerated as soon as drawn.

Be sure you have adequate ice during both the hot summer and cold winter months. Ice water will keep your samples from freezing during the winter. If you are always conscious of your ice and water supply, your samples should arrive at the receiving station at approximately 33°F. Never allow your samples to float in water without a rack. Be sure the water level comes up to the milk level in your sample containers. Never place samples on top of ice. Samples should be immediately placed in the plant cooler

upon arrival at the receiving station after the second TC temperature is taken and not allowed to sit on the truck for any length of time at any location.

Samples may be discarded by state regulatory inspectors or lab personnel if:

- Samples more than $\frac{3}{4}$ full
- Sample temperature exceeds 40°F
- Samples freeze
- Samples are contaminated in any way
- Samples arrive at the receiving station without a TC sample

ODOR AND APPEARANCE OF MILK

If the milk has a serious off-odor or appearance, the hauler/sample shall reject it. In every case, the hauler/sampler should obtain a sample of the milk and an accurate measurement of the amount in the tank. A ticket should show time, date, measurement, and temperature; that a sample has been taken and marked “not picked up,” “quality questioned,” or a similar notation. The producer and plant should be contacted immediately so the cause can be determined and corrected.

Any slight change in quality should be immediately brought to the attention of the producer and the milk plant by making an appropriate comment on the producer’s milk weight ticket. This warning may often be the earliest indication of potential trouble.

The most important factor in consumer acceptance of dairy products is flavor. Milk flavor control must begin at the farm.

It is important that the hauler/sampler not taste the milk for off-flavors because of potential health problems caused by raw milk. Nevertheless, the hauler/sampler should realize that off-flavors in raw milk invariably show up as off-odors, and if off-odors are detected by the hauler/sampler, off-flavors are also present.

Milk Odor

Normal milk has virtually no odor. The hauler/sampler should have a firm impression as to what constitutes normal milk so they can judge the milk they collect with confidence.

Some of the more common off-odors and their possible causes are:

1. Feed – the feed or plants a cow eats may impart certain odors to milk.
2. Foreign – seriously objectionable odor such as a sanitizer, fly spray, paint, oil, kerosene, or medicinal substances.
3. Musty – suggestive of musty or moldy hay.

4. Rancid – more noticeable during winter months, usually described as metallic.
5. Sour – strong odor produced due to improper cooling or unsanitary milking equipment.
6. Weedy – obnoxious odor produced by cows grazing in weed-infested pastures.

Checking for Odors

The odors gather just below the cover of the bulk tank. To properly check for off-odor, remove a small port opening, put your nose down to the opening, and smell the milk. Never open the entire lid; this will let the odors escape into the air. The detection of off-odors can be affected by a number of external factors. The hauler should strive to eliminate these factors:

1. Milkhouse odors;
2. Gasoline fumes adhering to clothing;
3. Smoking immediately prior to checking for odors;
4. Eating or chewing aromatic candy, tobacco, medicine, beverages, foods, etc; and
5. Highly scented shaving lotion, soap, and other toiletries on the hauler.

Milk Appearance

Listed below are some milk quality problems which may become evident while checking for appearance. Any of these defects would be sufficient reason to reject the tank of milk.

1. Bloody Milk. The milk from mastitic cows may contain blood. A small amount of bloody milk can give a large quantity of normal milk a reddish tinge.
2. Flaky Milk. Milk from cows having mastitis may show light flakiness or pronounced stringy curd particles.
3. Extraneous Matter. Floating extraneous matter includes such things as insects, hair, chaff, and straw. The presence of extraneous matter may result from careless handling of milk, open doors, torn screens, dusty feeding conditions, and improper cleaning of the udder before milking.

Other problems that may become evident while checking for appearance include frozen and partially churned milkfat. Freezing or churning prevents accurate sampling of milk. These problems, depending on their severity, may be reasons for rejecting the milk.

Checking for Appearance

Normal milk color ranges from bluish white to golden yellow and is free from all foreign or clotted matter. When you are checking the appearance of a bulk tank of milk, be sure there is adequate light. After checking for odor, lift the entire lid and observe the complete, undisturbed milk surface. Any evidence of partially churned butterfat, frozen milk, blood, extraneous material, or other conditions that may alter the reliability of your sample should be indicated on the sample container or weight ticket. Bring this to the attention of the producer and notify the field representative to have this problem corrected.

MILK QUALITY

Dairy producers frequently ask the hauler/sampler about the quality tests performed by the laboratory. The following summary will help you explain the reasons for the tests and your responsibility as the official sampler:

1. Milkfat

The results of the fat tests are the basis for payment to the producer for their milk. It is important that the bulk milk hauler/sampler has a knowledge of the proper procedure to ensure that this test is accurate and representative of all the milk in the farm bulk tank.

The Babcock and Milk-O-Tester are the common tests used for determining milkfat.

2. Bacterial Count

Bacteria are microscopic one-celled organisms found on and in all living animals, in the soil, water, ponds, and even wells. Manure, flies, insects, rodents, utensils, and equipment are sources of many types of bacteria. Because of the widespread presence of bacteria, contamination of equipment which comes in contact with milk must be avoided.

The amount and kind of bacteria found in a sample of milk is an indication of the sanitary conditions and practices occurring on the farm and the extent of milk cooling.

Contamination can occur when measuring, sampling, and transferring milk. Therefore, extreme care must be taken by the hauler/sampler to prevent contamination.

3. Antibiotic Testing

Each load of milk is required to be analyzed for drug residue prior to processing. Whenever a load tests positive for drug residue, it is immediately reported to the

Department of Agriculture. When the load is positive, all the producer samples are checked to determine the responsible producer who then is subject to the penalties described in the Nebraska Milk Act.

4. Sediment Tests

This is a rapid method to determine whether the milk is being properly protected from contamination due to dust and improperly cleaned udders. The presence of sediment indicates unsanitary methods of milking and milk handling practices.

The test consists of filtering a sample of milk through a white cotton disc and checking the amount and kind of residue left. Seventy-five to ninety percent of foreign matter entering milk is soluble. Thus, a clean pad does not prove the milk is not highly contaminated.

5. Added Water

The temperature at which milk freezes is a relatively constant factor and can easily be determined by laboratory tests. If water is added either deliberately or by accident, the freezing point will then be closer to that of pure water. Adding water to milk is illegal.

The hauler/sampler must exercise care and make sure the transfer hose is disconnected before the bulk tank is rinsed in order to prevent adulteration with water.

6. Somatic Cell Count

Somatic cells are primarily white blood cells. Many factors influence the number of somatic cells in milk. The cow's age, production capacity, and stage of lactation influence the normal level of somatic cells in the milk. Irritation and infection of a cow's udder caused by poor milking practices, improper cattle housing, or improper operation of the milking machine will show up as increased somatic cell counts. High somatic cell counts signify that some cows in the herd are experiencing udder irritation, injury, or infection.

The test measures the level of white blood cells in the milk. A level of 500,000 or less indicates normal milk and a mastitic condition would not be expected. Somatic cell counts exceeding 500,000 - 750,000 per ml indicate that mastitis may be a herd or cow problem and samples from individual cows should be tested to identify problem cows. Somatic cell counts exceeding 750,000 per ml indicate that there is a mastitic problem and corrective action must be taken immediately.

Milk Quality Requirements

	Grade A	Manufacturing Grade
Bacteria	100,000	500,000
Somatic Cell	750,000	750,000
Added Water	None Allowed	None Allowed
Antibiotics	None Allowed	None Allowed

LABELING OF MILK TRUCKS

All vehicles and milk tank trucks containing milk or milk products shall be legibly marked with the name and address of the milk plant or hauler/sampler in possession of the contents.

The requirement will be satisfied when company logos and address are affixed to both sides of the vehicle or, in the case of a contract hauler/sampler who does not wish to use a company logo, identification may be affixed to the doors or to the tank itself and should be easily identifiable from a distance. A pup or trailer, while attached to a properly labeled truck or tractor, will be considered properly labeled. If the pup or trailer is detached from the truck and is standing alone without labeling, it will be considered in violation.

As a guideline, the lettering size should be a minimum of three inches in height with a color scheme with a distinct contrast to the background and should be easily identifiable and readable from a distance.

CLEANING AND SANITIZING REQUIREMENTS

The bulk milk pickup tanker and all of its appurtenances shall be cleaned and sanitized in accordance with the applicable requirements of the Nebraska Milk Act.

It is allowable to pick up multiple loads continuously within a 24-hour period, provided the bulk milk pickup tanker/pup is washed at a licensed receiving or wash station after each day used. If a hauler/sampler picks up a load of manufacturing milk, the tank, pump, and hose must be washed and sanitized prior to collecting any Grade A milk. If milk is held over on the farm bulk pickup truck, pup, or tanker, the milk pump and transfer hose must be washed and sanitized before continuing to pick up milk.

When time elapsed after cleaning and sanitizing of the bulk milk pickup tanker exceeds 96 hours, the tank must be re-sanitized before its next use.

The bulk milk hauler/sampler shall be responsible for assuring that the bulk milk pickup tanker has been properly cleaned and sanitized. A bulk milk pickup tanker without proper cleaning and sanitizing documentation may not be loaded or unloaded until previous cleaning and sanitizing can be verified.

A cleaning and sanitizing tag shall be affixed to the outlet valve of the bulk milk pickup tanker until the bulk milk pickup tanker is next washed. When the bulk milk pickup tanker is washed, the previous cleaning and sanitizing tag shall be removed and stored at the location where the bulk milk pickup tanker was washed for a period of no less than 15 days.

Wash tags should include the following information:

1. Identification of the bulk milk pickup tanker
2. Date and time of day the bulk milk pickup tanker was cleaned and sanitized
3. Location where the bulk milk pickup tanker was cleaned and sanitized
4. Signature or initials of person who cleaned and sanitized the bulk milk pickup tanker

The maintenance of all information on the cleaning and sanitizing tag shall be the responsibility of the bulk milk hauler/sampler or the bulk milk tank operator.

If a plant or receiving station requires your wash tag and you will not be washing there, have them make a photocopy of it and you should keep the original.

All bulk milk pickup tankers which unload and wash at the same receiving station each day would not be required to carry a wash tag. The CIP wash chart at the plant would be adequate proof, provided it has been signed by the hauler/sampler or plant personnel.

The location of the last cleaning will be verified by the regulatory inspector during any bulk milk pickup tanker inspection and recorded.

HAULER/SAMPLER SURVEILLANCE

Periodically, the hauler/sampler can expect to be surveyed by a local state dairy inspector. The Bureau of Dairies and Foods is required to inspect each licensed hauler/sampler every 24 months.

The inspection of the hauler/sampler will be based on their ability to follow the "Universal Sampling System" procedures when sampling milk. (See section on Sample Procedure.)

The inspection may include surveillance of the hauler/sampler without his knowledge in order to determine adequate agitation times, use of the dairy hoseport, washing of hands, and sampling techniques. While this type of inspection may not allow for the inspector to view all sampling procedures, it is a way to concentrate on the more important aspects of collecting a representative sample.

A hauler/sampler scoring below 85% will be resurveyed within 60 days. Flagrant violations of the law may result in immediate suspension of a hauler/sampler permit.

Lesser violations will result in a warning letter with a deadline for compliance and a later follow-up inspection.

BULK MILK PICKUP TANK INSPECTIONS

Once each 12 months, inspection of bulk milk pickup tanks licensed in Nebraska will be conducted at plants, receiving and transfer stations, or other facilities. The inspector will check for the following:

1. Interior and exterior construction and repair of tank
2. Construction and repair of tank appurtenances such as pumps, hoses, fittings, etc.
3. Cabinet portion of tank, if applicable
4. Dome lid assembly, vent and dust cover
5. Hauler permit tank registration and proof of inspection
6. Producer, TC sample labeling, and storage
7. Pocket thermometer accuracy
8. Wash tags or plant CIP tank wash charts
9. Weight tickets
10. Construction and repair of sampling equipment
11. Storage of sample vial or bags and sanitizer test strips
12. Truck properly labeled with owner name and address

All bulk milk pickup tanks licensed in Nebraska must have a Nebraska Department of Agriculture registration sticker prominently displayed on it and must carry the previous tank inspection report.

Some states and/or plants may require a current inspection of the truck done in the past year before allowing the truck to unload. Be sure to contact your local inspector to schedule an inspection if your deadline is near. If the truck is sold, the permit number should be removed.

BULK MILK TANK CONSTRUCTION AND REPAIR REQUIREMENTS

1. The bulk milk pickup tanker and all appurtenances shall meet applicable requirements of the Nebraska Milk Act. Equipment manufactured in conformity with current 3-A Sanitary Standards complies with the sanitary design and construction of the ordinances.
2. The interior of the bulk milk pickup tanker shall be constructed of smooth, non-absorbent, corrosion-resistant, non-toxic material, and it shall be maintained in good repair.
3. The appurtenances of the bulk milk pickup tanker include hoses, pumps, and fittings, and shall be constructed of smooth, non-toxic cleanable material and shall be maintained in good repair. Where flexibility is required, the fluid transfer systems shall be free draining and so supported to maintain uniform slope and alignment. They shall be easily disassembled and accessible for inspection.
4. The cabinet portion(s) of the tank, where applicable, used for storage of the appurtenances and sampling equipment shall be constructed to preclude contamination by dust, dirt, and be clean and in good repair.
5. The bulk milk pickup tanker dome lid assembly, vent and dust cover shall be designed to protect the tank and milk from contamination.

BILLS OF LADING

The maintenance of all pertinent information on all bills of lading is the responsibility of the bulk milk hauler/sampler. A bulk milk pickup tanker transporting raw, heat treated, or pasteurized milk and milk products to a milk plant from another milk plant, transfer or receiving station is required to be marked with the name and address of the milk plant, or documents must contain the following information:

1. Shipper's name, address, and permit number. Each bulk milk pickup tanker load of milk shall include the BTU number or IMS listed Plant Number on the weight ticket or manifest.
2. Permit identification of hauler, if not an employee of the shipper
3. Point of origin of the shipment
4. Tanker registration number
5. Name of product
6. Weight of product

7. Temperature of product when loaded
8. Date of shipment
9. Name of supervising regulatory agency at the point of origin of shipment
10. Whether the contents are raw, pasteurized, or in the case of cream, lowfat or skim milk, whether it has been heat treated
11. Seal number on inlet, outlet, wash connections, and vents
12. Grade of product

RECIPROCITY

Nebraska observes reciprocity with other states regarding Hauler/Sampler licensing, Sampling Surveillance, and Milk Tank Truck inspection. If you hold a current license from another state, you should carry it on your person in case you are asked for it during a Nebraska inspection. If your sampling procedures are checked or if your milk tank truck is inspected in another state, please ask that a copy of the report be sent to the Nebraska Bureau of Dairies and Foods, so your record file can be kept current.

BIOSECURITY AND SANITATION

Licensed hauler/samplers have an obligation to producers, processors, and consumers to practice biosecurity procedures and to minimize the risk of the spread of disease or malicious, criminal, or terrorist acts. The following items are important to remember.

1. Be familiar with and follow each producer's biosecurity policies.
2. Sanitize footwear or wear disposable foot coverings, when appropriate.
3. Limit foot travel to areas between the truck and milkhouse.
4. Do not take food or tobacco into the milkhouse.
5. Wash and dry hands before handling the measuring stick or taking samples.
6. Maintain a clean milk truck, including the truck interior and floor mats.
7. Restrict on-farm driving to areas necessary to pick up the milk.
8. Seal and/or lock door openings when the truck is left unattended.
9. Paperwork, wash tags, and seals should be in a secure area.

10. When the tanker arrives at the first farm pickup, the driver should check all seals to be sure that none are broken. The driver can then break and remove the seals on the rear door and outlet valve. The numbers on the broken seals should be recorded.
11. At the first farm pickup, the driver should attach a numbered seal to the inlet/outlet valve, the rear door, and any other point of access that has been opened on the milk tanker. Record the seal numbers.
12. Be alert for any signs of tampering or other malicious, criminal, or terrorist acts.
13. Report any suspicious activities or threats to the proper authorities.

MILK TRANSPORTATION COMPANIES

Any individual or company conducting a business transporting milk or milk products in the State of Nebraska is required to be licensed as a milk transportation company on a yearly basis. The licensing fee is based on the number of trucks licensed and used by that entity. Renewal notices are sent out prior to July 31 of each year.

APPENDIX A DIRECT LOADING WITHOUT AN IN-LINE SAMPLER

On farms that plan on not utilizing a farm bulk milk tank or milk silo to cool and store the milk, special consideration must be given to some added PMO requirements.

- The cooling capacity must be adequate to cool the milk to 45°F or less prior to storage on a milk tank truck.
- A separate structure meeting milkhouse construction requirements is required for the storage of the milk tank truck during filling.

The shelter for the milk tank truck shall be adjacent to the milkhouse, but not part of the milkhouse. A wall and door would be adequate separation from the milkhouse. The milk tank truck room shall be constructed and finished like a milkhouse with light colored walls and ceiling that have washable surfaces, impervious floor sloped to drain, adequate lighting, insect and rodent control, and maintained clean.

If the milk tank truck manhole cover is open during filling, a filter must protect the opening. If the manhole is propped up by the locking lugs and the milk tank truck room door(s) are closed, a filter is not needed.

If the milk tank truck is cleaned and sanitized at the dairy farm, adequate, licensed facilities for washing must be present. A wash tag must also be filled out with the appropriate information.

Proper milk sampling procedures must be met, which include milk agitation. If the truck only contains one producer's milk, it is allowable for the producer's sample to be collected at the dairy plant, receiving station or transfer station after proper agitation.

DIRECT LOADING WITH AN IN-LINE SAMPLER

When an in-line sampler is installed at a dairy farm facility, a separate structure to house the bulk milk tank trucks is not required. FDA describes the application and standard operating procedures (SOP) for the installation and use of approved in-line samplers for the collection of dairy farm raw milk samples from direct load tankers as required in Section 6 of the Grade A Pasteurized Milk Ordinance.

In-line milk sampling is used when the dairy facility is set up to direct load bulk milk tankers bypassing the use of conventional bulk milk tanks for cooling and storage. The milk flows from the receiver through a chiller or plate cooler that cools the milk to +/-45°F. In the case of the Anderson Instruments sampler, the milk then goes through a flow meter to the in-line sampler where a small amount of milk drips into a sample container positioned inside a refrigerator. No flow meter is used in the QMI and ISOLOK samplers. After the sampler, the milk flow continues to the bulk milk tanker.

Some direct load farms also install bulk tanks for use as a back up or in emergency situations. It is important to meet with the producer, installer and field person during the planning and construction phases of the project.

- An application to install and a written construction plan must be submitted to MDA for review by the inspector.
- The dairy producer must submit a signed MDA in-line sampler protocol prior to use of the system.

General Construction Requirements for In-line Samplers

1. The bulk milk tankers must be parked on an impervious surface that is sloped to drain and maintained clean in all weather conditions.
2. The tanker load out connections must be made through tight fitting doors in the milkhouse wall that have padded bumpers on the outside ensuring the tanker fits tight against the milkhouse wall.
3. If an air blow is installed on the system, it must be installed to be accessible for daily manual cleaning and daily replacement of the single-service filters used on the air blow line.
4. A check valve must be installed downstream from the in-line sampler.
5. A check valve must be installed in close proximity to the connection point of each tanker.
6. A clean, well-lit, impervious work surface of adequate size must be provided in the milkhouse for the sub-sampling of milk samples.
7. Sweetwater, well water and/or Glycol systems are used to cool the milk going through the chiller. Propylene glycol, USP or food grade, is the approved type of glycol to be used. Industrial propylene glycol is not approved. The producer must have a letter from the manufacturer of the glycol, posted in the milkhouse, stating it is the approved type meeting the requirements of 21 CFR 184.1666. Sweetwater and glycol storage tanks must be of proper construction and have tight fitting, overlapping lids.
8. Below are some areas to pay particular attention to concerning water systems:
 - a. Plate cooler water/fresh water add lines to plate cooler water storage tanks/fresh water feed lines downstream from storage tanks.
 - b. CIP chemical addition/water connections to the wash vat.
 - c. Calf milk pasteurizers/water connections for CIP and to cool the coils.

- d. Boiler systems - some are closed systems and some have fresh water add lines.
 - e. Grey water recaptured for parlor wash down.
9. The interior lid and exterior dome lid of the bulk milk tanker must remain closed and sealed during the loading process. Proper vents on the tanker lid are to be installed to assure the needed airflow.
 10. Milk transfer lines must be hard-piped to the tanker access doors using short jumper hoses to attach to the bulk milk tanker.

General Construction Recommendations for In-Line Samplers

Experience has shown the following items to be very helpful in making the direct load facility easier to maintain and meet the requirements of the dairy laws. MDA recommends the following:

1. Provide a heated surface and overhead protection for tanker parking to prevent build up of ice or snow.
2. Provide a channel drain at the rear of the tankers along the milkhouse wall. This will facilitate cleaning between the milkhouse and the tanker where the loading connections are made.
3. Install a CIP position switch on the milk pipeline system to prevent contamination of the milk with CIP solution.
4. Maintain an alternative sampler system in case problems develop with the primary sampler.
5. Keep replacement silicone diaphragms on hand (Anderson Instruments in-line sampler).
6. Construct the milkhouse and the trailer parking area on the same grade level to facilitate ease of making the tanker connections.
7. Install the recording and indicating thermometers together in one thermometer well at an elbow for better milk contact and cleaning.

In-Line Sampler Device Requirement

1. An approved in-line sampling device must be installed inside a refrigerator that can maintain 32-40°F (0.0-4.4°C) in an appropriate and easily accessible location in the milk line to ensure accurate sampling and proper cleaning. The in-line sampler must be installed in the milkhouse.

2. The in-line sampler attachment must allow a single-service sample collection bottle to be attached directly on the sampler. The sample goes directly from the sampler into the attached sample collection bottle on the Anderson Instruments and the ISOLOK samplers. The QMI sampler collects the sample in a single-service transfer hose that is connected to a single-service sample collection bag.
3. The in-line sampler must be cleaned and sanitized via the pipeline CIP system and/or manually cleaned if needed.
4. Size of the milk sample needs to be determined with the cooperation of the installer and MDA to ensure the sample collection container size is of an adequate volume to prevent overflow. In general, for the Anderson Instruments sample, bulk milk tankers with a capacity of <50,000 lbs. will require a 500-ml single-service sample collection bottle and tankers with a capacity of >50,000 lbs. will require a one-liter sample bottle. The sample collection rate must be manually adjusted on the ISOLOK sampler. The QMI sampler rate is changed by changing the sample collection needle size. In all cases, the sample container must not exceed $\frac{3}{4}$ full.

Thermometer Requirements

1. A Recording Thermometer (seven-day chart) is required with the temperature probe to be installed in the milk line downstream from the cooling device prior to the in-line sampler device. This recording temperature probe should be installed in a thermometer well as close as practical to the required indicating thermometer, which is also in a thermometer well in the milk line (see Indicating Thermometer below).
 - a. The owner or hauler/sampler shall document on the recording chart the date, farm permit number, regulatory agency tanker identification number and initials of the person who changed the chart.
 - b. The owner or hauler/sampler shall document on the recording chart the identification number of each additional bulk milk tanker being loaded.
 - c. The owner or hauler/sampler shall make a weekly temperature check of the recording thermometer against the indicating thermometer at chart change. Document the temperature check on the recording chart and adjust the recording thermometer to match the indicating thermometer, if needed.
 - d. During an inspection by MDA, the inspector will compare the temperature readings of the recording and indicating thermometers. The comparison will be documented on the recording chart and the inspection sheet.

- e. Temperature recording charts are retained for six months and stored in a clean, dry place.
2. An Indicating Thermometer (digital display or dial) is required to be installed in the milk line in a thermometer well downstream from the cooling device prior to the in-line sampler device.
- a. This thermometer shall be installed in a thermometer well as close as practical to the required recording thermometer.
 - b. Indicating thermometer must have a minimum scale of 2°F (1°C).
 - c. During an inspection by MDA, the inspector will conduct an annual accuracy check at ice point of the indicating thermometer and document on the farm inspection sheet.
3. Refrigerator Thermometers (digital or liquid filled in glass type stored in glycol)
- a. A thermometer is required in both the in-line sampler refrigerator and the sample storage refrigerator.
 - b. Refrigerator temperature must be recorded AM and PM from the thermometers and documented on the monthly temperature-recording log. If a recording thermometer is installed with each refrigerator, no log is necessary and the temperature checks are documented on the recording chart.
 - c. The refrigerator temperature logs and/or temperature recording charts shall be stored in a clean, dry area available for review and retained for six months.
 - d. During an inspection, the MDA inspector will conduct an annual accuracy check at ice point of the refrigerator thermometers and will tag the thermometer. This accuracy check will be documented on the farm inspection sheet.
 - e. Test thermometers have a minimum scale of 2°F (1°C).
 - f. Check temperature just prior to collection of the sample to assure the temperature is in regulatory compliance between 32-40°F (0.0-4.4°C).

Refrigerator Requirements

Two refrigerators are required, one for the in-line sampler and one for the storage of samples.

1. The refrigerator must be of an appropriate size to hold the sample container and the in-line sampler.
2. Refrigerator must be able to maintain the sample between 32-40°F (0.0-4.4°C).
3. Refrigerators are only used to collect and store samples. No food, beverage or any other items not related to the samples or sampling procedures are to be stored in the unit.
4. Refrigerator must be maintained in good working condition, repaired and clean inside and out at all times.
5. The sample storage refrigerator must be in the same room as the sub-sampling area.

MILK SAMPLE COLLECTION REQUIREMENTS

1. Person(s) performing the sample handling must possess a valid bulk milk hauler/sampler license with an in-line sampler endorsement.
2. Person(s) performing the sample handling must wash their hands before handling the equipment used to collect the milk sample.
3. Verify refrigerator temperature is between 32-40°F (0.0-4.4°C). Corrective action(s) must be taken if there is a temperature problem. Document corrective action(s) on the log or recording chart and retain records for six months.
4. Record the regulatory agency tanker identification number for each load on the recording chart.
5. At the end of milking, remove the sample container from the in-line sampler or the sampling tube from the sample port and immediately cap the container using the approved cap that had been stored in a sanitary manner. Record the milk temperature on the sample container. Place the sample in the approved refrigerator.
6. Prepare the in-line sampler for the CIP wash cycle or disassemble and manually clean and sanitize the sampler.
7. The exterior of the in-line sampler shall be hand-cleaned and sanitized before the start of the next milking. Sanitizer must be 200-ppm or equivalent with a test kit to

check the solution. A spray bottle with sanitizer is required to sanitize the bottle attachment area on the in-line sampler.

8. At the start of the next milking, make sure the sample collection container is properly identified with the date, time, regulatory agency tanker identification number, permit number and initials of the person installing the container on the sampler. Position it properly to collect the milk sample.
9. Attach the milk line to the milk tanker. Sanitize the tanker valve and milk line fittings prior to attaching the line to the tanker.
10. Repeat steps 2-10 until the bulk milk tanker is full.
11. Documented milk weights must be provided on the farm. Some farms use scale weight and, in the case of the Anderson Instruments sampler, a printout strip is available to document the milk weight.

Sub-Sampling and Representative Sample and Sample Handling Requirements

1. Person(s) performing the sample handling and sub-sampling must possess a valid bulk milk hauler/sampler license with an in-line sampler endorsement.
2. Person(s) performing the sample handling and sub-sampling must wash their hands before carrying out the following steps three through six.
3. Remove the sample container from the refrigerator. Check and record the temperature of the sample storage refrigerator. Corrective actions must be taken if the temperature was out of the 32-40°F (0.0-4.4°C) range.
4. Observe the sample for off odors, visual defects, extraneous material and ice. Frozen samples cannot be used for official testing.
5. Agitate the sample container sufficiently to obtain a representative sample by rapidly inverting the sample container completely 25 times.
6. Transfer (sub-sample) a portion of the original sample into properly identified sample vials (3/4 full), including a temperature control (TC) sample, within three minutes of agitation.
7. Sub-sample vial shall be labeled with the following:
 - a. Date of sampling
 - b. Time of sampling (time of sample split)
 - c. Producer Permit Number

- d. Regulatory agency tanker identification number
 - e. Sample Temperature (Using the temperature of the refrigerator thermometer in the sample storage or sample collection refrigerator depending where the sample container was removed from.)
 - f. Initials of the person performing the sub-sampling.
8. A temperature control (TC) sample is required for each bulk milk tanker and it shall be identified with the following:
- a. TC
 - b. Date of sampling
 - c. Time of sampling (time of sample split)
 - d. Producer Permit Number
 - e. Regulatory agency tanker identification number
 - f. Sample Temperature (Using the temperature of the refrigerator thermometer in the sample storage or sample collection refrigerator depending where the sample container was removed from.)
 - g. Hauler/sampler identification (initials, ID number or name)
9. Store the samples in the sample storage refrigerator until the bulk milk tanker is taken to the dairy plant. The samples must accompany the load to the dairy plant.
10. Sub-sampling provides the additional samples needed for the temperature control, the producer's milk company or the regulatory agency.

**NDA PROCEDURES FOR IN-LINE SAMPLERS
SUB-SAMPLING**

- 1. Wash your hands.
- 2. Obtain sterile, smaller sample vials to be used for sub-sampling.
- 3. Each sub-sample vial shall be identified with:
 - a. Date
 - b. Time (time of sample split)

- c. Producer Permit Number
 - d. Regulatory agency tanker identification number
 - e. Sample temperature
 - f. Hauler/sampler identification (initials, ID number or name)
4. A temperature control (TC) sample is required and it shall be identified with:
 - a. TC
 - b. Date
 - c. Time (time of sample split)
 - d. Producer Permit Number
 - e. Regulatory agency tanker identification number
 - f. Sample temperature
 - g. Hauler/sampler identification (initials, ID number or name)
 5. Remove the sample container from the sampler or sample storage refrigerator.
 6. Observe sample for off odors, visual defects, extraneous material and ice. Cap the sample container if taken from the in-line sampler.
 7. Shake or rapidly invert the sample container 25 times. If undesirable foam is created, the sample may sit for up to three minutes to allow the foam to disperse.
 8. Transfer a portion of the sample into smaller, sterile vials filling each only $\frac{3}{4}$ full.
 9. Immediately transfer all sample vials into a rack which fits into a cooler with ice/water mix up to the milk level in the vials or samples can be kept in the sample refrigerator until transported.
 10. Manually clean and sanitize the sampler/sample bottle connection after each CIP cycle and prior to installing a sample bottle. Disassemble and manually clean and sanitize the sampler body if needed.

IMPORTANT NOTES

1. Keep all sample containers protected from contamination.
2. Protect in-line sample container caps from contamination while being stored during sampling. Caps can be stored in 200-ppm chlorine or equivalent.
3. Perform sub-sampling on a clean, well-lit, impervious work surface of adequate size.
4. Clean the in-line sampler per manufacturer's instructions.
5. Provide a brush to manually clean and sanitize the exterior of the sampler/bottle connection.
6. Sample containers must be disconnected during Clean in Place (CIP) pipeline wash.
7. Partially filled sample containers may be reconnected after CIP.
8. Provide and maintain a sanitizer spray bottle for sanitizing tanker connections and in-line sampler connections.
9. Provide and use sanitizer test kits or strips (200-ppm chlorine or equivalent).
10. Maintain in-line sampler refrigeration and sample storage refrigerator between 32-40°F (0.0-4.4°C).
11. Provide thermometers in glycol for each refrigerator and record an AM and PM check of the thermometer on the temperature recording log. If a recording thermometer is used with each refrigerator, the temperature check can be documented on the recording chart. Corrections are made by adjusting the temperature-recording chart to match the refrigerator thermometer.
12. Provide an indicating and recording thermometer with the temperature probes to be installed as close as possible in the milk line downstream from the cooling device prior to the in-line sampler device. A weekly check of the indicating thermometer against the temperature-recording thermometer must be made and recorded on the temperature-recording chart. Corrections are made by adjusting the temperature-recording chart to match the indicating thermometer.
13. Maintain refrigerator temperature log sheets for a minimum of six months.

APPENDIX B

24-HOUR CLOCK CONVERSION SHEET (MILITARY TIME)

STANDARD	24-HOUR	STANDARD	24-HOUR
12 MIDNIGHT	2400	12 NOON	1200
12:01 a.m.	0001	12:01 p.m.	1201
12:15 a.m.	0015	12:15 p.m.	1215
12:30 a.m.	0030	12:30 p.m.	1230
12:45 a.m.	0045	12:45 p.m.	1245
1 a.m.	0100	1 p.m.	1300
2 a.m.	0200	2 p.m.	1400
3 a.m.	0300	3 p.m.	1500
4 a.m.	0400	4 p.m.	1600
5 a.m.	0500	5 p.m.	1700
6 a.m.	0600	6 p.m.	1800
7 a.m.	0700	7 p.m.	1900
8 a.m.	0800	8 p.m.	2000
9 a.m.	0900	9 p.m.	2100
10 a.m.	1000	10 p.m.	2200
11 a.m.	1100	11 p.m.	2300

When using the 24-hour clock, you must remember to insert the leading "0" or "00."

Fahrenheit to Celsius Conversion	
0°C = 32°F	4°C = 39.2°F
0.5 = 32.9F	5°C = 41.0°F
1°C = 33.8°F	6°C = 42.8°F
2°C = 35.6°F	7°C = 44.6°F
3°C = 37.4°F	8°C = 46.4°F

Sanitizer Test Strips

Precision Laboratories
P.O. Box 788
West Chester, OH 45071
800-733-0266
www.precisionlabs.co.uk

EXAMPLES OF QUESTIONS THAT CAN BE FOUND ON MILK HAULER/SAMPLER'S TEST

Please answer each question by marking an "X" by True or False.

1. A relief of part-time bulk milk hauler does not need to apply for a license. True ____ False ____
2. A hauler should wash and dry their hands prior to hooking up the milk hose. True ____ False ____
3. The milk hauler's permit expires September 31 every year. True ____ False ____
4. When reading the measuring stick and the milk line falls exactly between two marks, always read to the nearest even number. True ____ False ____

Please fill in the blank with the appropriate word or words.

1. The producer sample container should contain the following information: _____, _____, and _____.
2. As a general rule of thumb, proper agitation time on a 100- to 900-gallon tank is _____ minutes.

Please indicate the correct answer.

1. The sample container should be filled to:
 - a. $\frac{2}{3}$ full
 - b. complete full
 - c. $\frac{1}{2}$ fullAnswer ____
2. Before hooking up the hose, you should:
 - a. rinse the outlet with water
 - b. rinse the outlet with hot water
 - c. rinse and sanitize outletAnswer ____