

Bulk Milk Hauler Study Guide

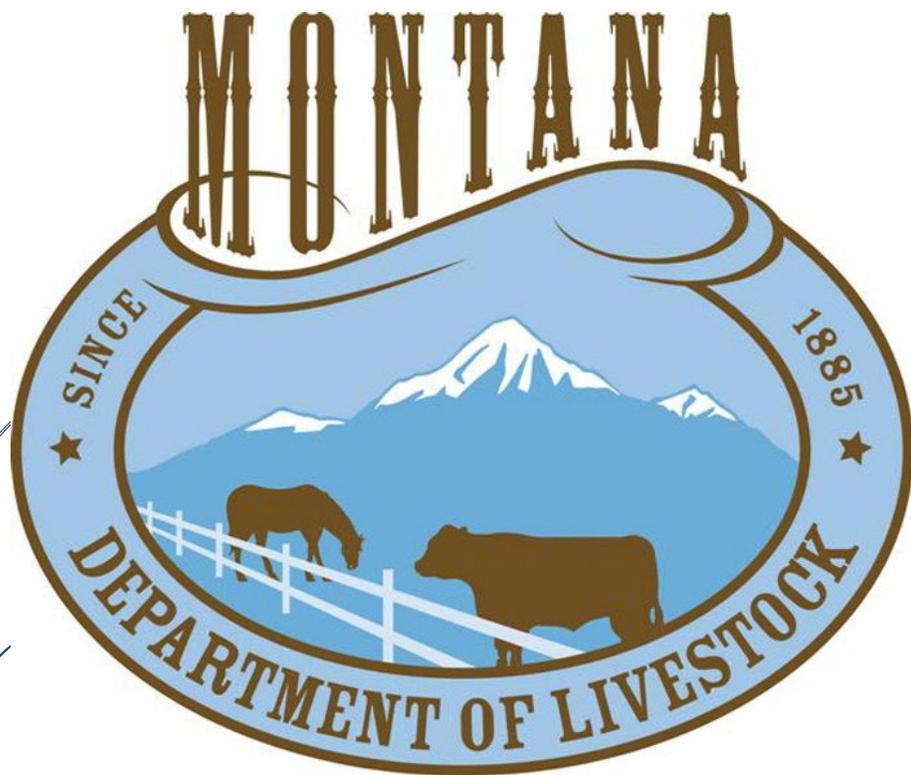


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INTRODUCTION

The quality of milk delivered to the plant depends on the hauler identifying and eliminating unsatisfactory milk and handling the milk in a sanitary manner.

A license will be issued when the hauler demonstrates the correct techniques and procedures for sampling and hauling milk. The bulk milk hauler is more than a truck driver. The hauler must accurately measure the amount of milk in the bulk tank, notice any spoilage or contaminants in the milk, measure the temperature, collect the official sample for laboratory analyses, then pump and haul the milk so quality is maintained. Samples must be taken under sanitary conditions so that the quality and composition tested can accurately represent the contents of the farm bulk tank.

The true value of the farm's bulk milk rests on the hauler strictly adhering to the correct techniques and procedures outlined in this manual.

PURPOSE

This manual provides the bulk milk hauler with the procedures and techniques needed for sampling and hauling milk in a sanitary and accurate manner. It also serves as a refresher course for experienced haulers.

Correct procedures and techniques must be used to maintain the milk quality from farm to plant. Milk value is based on quality, volume, protein and butterfat content of milk. Poor sampling and measuring techniques lead to an incorrect dollar value placed on the farm's bulk milk.

The hauler will, after studying this manual, be able to accurately measure, grade, sample and haul milk to ensure that milk is handled and transported under sanitary conditions and the true value of milk is maintained.

LICENSING

The grading, sampling, measuring and pumping of milk from a farm bulk tank and the delivery of the milk to a dairy plant, receiving station, or transfer station shall only be done by a licensed bulk milk hauler. All relief or part-time haulers must hold a current license.

Upon satisfactory completion of an industry training program, a minimum score of 70 % on the Hauler Exam and the milk inspector's approval, all prospective haulers must complete an application for a Bulk Milk Hauler License. Upon receipt of the application and required fees, the Department of Livestock will issue the license. The bulk milk hauler will receive a wallet size Hauler License. The card will be carried by the hauler at all times on the job, and be available upon the request of the milk inspector.

A license is valid on the date issued and expires on December 31 of that year unless suspended or revoked by the department. A license must be renewed by the first January 31 following the expiration date. A license renewal application form may be supplied by the department. The license renewal application form when returned to the department must be accompanied by the correct license fee. In order to maintain a hauler license, the milk inspector shall evaluate the hauler every two years.

BULK MILK HAULER

APPEARANCE

BULK MILK HAULER

The bulk milk hauler is a handler of human food and the hauler's appearance, and habits should reflect this job. A clean, neat appearance and good personal habits create an image vital to the dairy industry and establishes confidence in the ability of the hauler to do the job. The hauler must refrain from smoking or chewing tobacco while handling equipment and milk. Hands must be washed with soap and dried with a single service towel prior to taking bulk milk samples and at other times as needed.

Always remember that the product being handled is easily contaminated and highly perishable.

BULK TRUCK

The clean appearance of the bulk milk truck and cab also establishes confidence in the hauler's ability to handle a food product. The bulk tanks and all appurtenances shall meet the design and construction requirements of the Pasteurized Milk Ordinance (PMO). Where flexibility is required, the fluid transfer system shall be free draining and so supported to maintain uniform slope and alignment. All hoses, pumps, caps and fittings must be in good repair and free of leaks. All valves and milk line junctions must be protected from dust and contamination. Filters must be properly installed on air vents for tanks. When the truck is equipped with an air blow to remove milk from the transfer hose between stops, it is the hauler's responsibility to change air filters in the pump box. The hauler is responsible for notifying the hauling company if any of these items are defective.

CHECKLIST PRIOR TO STARTING ON THE ROUTE

Before starting out, check for the following:

- A. The bulk tank truck and the milk transfer equipment have been properly washed and sanitized. The milk tank truck and all its appurtenances shall be cleaned and sanitized prior to first use. It is allowable to pick up multiple loads continuously within a 24-hour period after first use provided that the milk tank truck is washed after each day used. When the time elapsed after cleaning and sanitizing before first use exceeds 96 hours, the tank must be re-sanitized. The responsibility normally lies with a plant employee; however, it is the bulk hauler's responsibility to check the tank and transfer equipment prior to leaving the plant.
- B. The most recent wash tag must be attached, and contain the following information:
 - 1. The location the tank was cleaned and sanitized
 - 2. The date and time
 - 3. The signature or initials of the employee who washed and sanitized the tank.
 - 4. The date and time of first usage if multiple loads are expected to approach 24-hours of continuous use before the bulk milk tank is to be washed.
- C. The cab must be kept clean and tidy.
- D. The following sampling equipment must be present on the truck:
 - 1. An adequate supply of sample containers, stored in a dust-proof container. Use only sterile containers with leak-proof lids.

2. A stainless-steel sample transfer instrument (dipper) with long handles silver soldered to the bowl and container; both must be in good repair. The container must be capped to protect instrument and sanitizer from contamination.
 3. A sanitizing solution of 200 ppm chlorine or its equivalent. Test strips should be used to avoid over- or under-strength solutions. Improper rinsing of the dipper will cause the sanitizer to lose strength. Sanitizer strength should be checked after each third stop or whenever the solution appears discolored or milky.
 4. Insulated sample carrying case with a dust-tight cover.
 5. Cracked ice or other refrigerant to maintain sample temperature at 32°-40° F. Provide a method, such as the use of racks or drainage holes in the sample case, to keep the sample free from contamination due to melting ice.
 6. A waterproof, indelible marker to identify samples.
- E. Non-breakable calibrated thermometer certified for accuracy every six (6) months with graduation intervals not exceeding 1° F.
- F. Single service paper towels. Producer may supply.
- G. Watch or other timing device.
- H. Adequate supply of milk weight tickets and a pen, for back up if using digital manifests.

PROCEDURES FOR GRADING, MEASURING, SAMPLING AND HAULING MILK

The following are the procedures to be followed by the bulk milk hauler. If there is more than one bulk tank located on a farm, each tank must be separately sampled, measured and checked for odor and appearance. The milk house doors must always be closed when picking up milk.

ODOR OF THE MILK

The most important factor in consumer acceptance of dairy products is flavor. Milk flavor control begins at the farm. The hauler can recognize an off-flavor usually by the presence of an off-odor.

Normal milk has virtually no odor. The hauler should have a firm impression as to what constitutes normal milk in order to detect with confidence off-odors in milk.

If the milk has a serious off-odor, follow the protocol set by the hauling company to determine if the milk should be rejected. In case a hauler is uncertain as to whether a tank has an off odor, consult your manager.

Any 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 the start of a problem.

SOME OF THE MORE COMMON OFF-ODORS AND THEIR POSSIBLE CAUSES

FEED - The feed a cow eats may impart certain odors to milk. Some stronger feeds will carry through more noticeably than others. Odors resembling green grass, silage, turnips, and alfalfa hay are outstanding examples. Feed odor can be minimized or eliminated by taking the cows off offending feeds at least four hours before milking. Certain feeds can be detected in milk if fed to the cow even 15 to 30 minutes before milking.

BARNY - This odor is caused by cows breathing in foul air due to poor barn sanitation and/or ventilation. Proper ventilation, good sanitation, and proper milking procedures will correct this problem.

FOREIGN - Any serious objectionable odor foreign to milk, such as sanitizer, fly spray, paint, oil, kerosene, creosote, or a medicinal substance, will render the milk unacceptable or unfit for use. Such an odor may be caused by direct contamination of the milk or may be absorbed from the air. Sanitizers are included in this category because the residue of sanitizer, such as hypochlorite and iodophor, if left on dairy equipment, may be absorbed by milk and impart a foreign odor. Phenolic compounds used in udder ointments may combine with iodophor or hypochlorite sanitizers to form a highly objectionable foreign odor that is detectable in very low concentrations.

GARLIC/ONION - This obnoxious weed flavor, imparted to milk when the cow eats garlic, onions, or leeks, is not classified as one of the usual feed flavors described above. The garlic/onion flavor is recognized by distinctive odor suggestive of its name. It may be so objectionable as to render the milk undesirable for use.

MUSTY - This odor is suggestive of musty or moldy hay. It may be absorbed directly by the milk but is more likely to come from feed or stagnant water consumed by the cow.

RANCID – Oxidized rancidity gives off odors usually described as cardboardy, metallic, or tallowy. It is usually more noticeable during the winter months when cows are on dry feed. The most frequent cause of oxidative rancidity is the contamination of milk with small amount of copper or iron from milk contact surfaces. Hydrolytic rancidity found in milk will give off odor resembling spoiled nutmeats. It is more noticeable during winter, when cows are on dry feed, or during late lactation. Agitation of warm raw milk in the presence of air, causing foaming, will result in a rancid type of odor within a few hours.

SOUR - Sour milk will have a malty odor and will be found when bacteria grow in poorly cooled milk. It also may result from bacterial growth due to unsanitary milking practices and/or unsanitary equipment.

WEEDY - The weedy odor is not included among the usual feed odors. It may include obnoxious odors resembling such plants as ragweed, bitterweed, or peppergrass, and may become a very troublesome flavor defect. It can be eliminated or minimized by keeping cows away from weed infested pastures or by not offering feeds containing such weeds until after the cow is milked.

CHECKING FOR ODORS

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

1. Milk house 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.
5. Highly scented shaving lotion, soap, and other toiletries on the hauler

MILK APPEARANCE

Milk may be rejected when it contains foreign material or no longer has the texture of normal liquid milk. If there is evidence of any of the following, the hauler must contact their manager to determine if this is reason to reject the 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. Blood clots in milk can indicate that a cow with a damaged teat was milked.
2. FLAKY MILK - Milk from cows having mastitis may show light flakiness or pronounced stringy curd particles.
3. EXTRANEIOUS MATTER - Floating extraneous matter includes such things as insects, hair, chaff, and straw.
4. FROZEN OR PARTIALLY CHURNED MILKFAT - These problems, depending on their severity, may or may not be reasons for rejecting the milk.

CHECKING 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 milk sample, make sure the milk house light is on or the area is well lighted. Lift the lid and observe the complete, undisturbed milk surface. Evidence of partially churned milk fat, frozen milk, or other conditions that may alter the reliability of your sample, is reason for not taking the sample. Milk may not be collected unless a sample has been taken. Note any problems on the weight ticket.

MEASURING THE MILK

The milk must be completely motionless when measurements are made. The agitator switch must be turned to the off position, to make sure the agitator doesn't start while you are measuring. If the agitator is running when you arrive, it may be easier for you to sample after the required agitation time has been met, before shutting off the agitator.

I. MEASURING STICK

The essential steps to ensure an accurate measurement are:

1. Prior to measuring, the measuring stick must be clean, dry, and free of fat. Use a clean, dry, single service paper towel to dry the measuring stick. With long measuring sticks, it is acceptable to dry only the gauging sections.
2. If there is any foam, gently move the foam away from the measurement area with the end of the measuring stick. Then lower it slowly into the milk until it reaches a point approximately one quarter inch from its proper position. Wait a few seconds, and then gently lower the rod until it seats itself naturally.
3. Remove the stick and read at once. The markings should be read at eye level. 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.
4. Read the milk line to the closest graduation mark. If the milk line falls halfway between marks, always read to the nearest even number.
5. Repeat the above procedure until two identical measurements are taken. Immediately record the volume on the weight ticket. Store the measuring stick in the bulk tank in its proper position between readings.

II. EXTERNAL SIGHT TUBES

The procedures for accurately measuring milk volume in a milk tank with external gauges are:

1. Check sight tube hoses (top and bottom) and clear them of water, milk, kinks or other obstructions.
2. Slowly allow milk to enter the sight tube, this will minimize foam formation. Open the tank valve partially until the milk has stabilized in the tube. Once the milk has stabilized, fully open the valve.
3. Align the gauge slide with the top of the milk in the sight tube.
4. Read the gauge to the closest graduation mark. When the milk line falls exactly between two marks read to the nearest even number.
5. Record the reading on the weight ticket then discard the milk in the sight tube. Close the tank valve before discarding sight tube milk.

Several factors can change the accuracy of the gauge.

☹ Discoloration of the tube which obscures the reading ☹ Foam in the tube ☹ Replacing the tube with a hose that has a smaller or larger interior diameter ☹ Water in gauge tube hoses ☹ A leaking connection on the hose between tank valve and gauge tube ☹ A dirty sight tube due to improper cleaning by CIP system and/or producer taking readings between milk pickups.

III. FACTORS AFFECTING BULK TANK MEASUREMENTS

The farm bulk tank and its calibration are the responsibility of the producer and plant they supply. However, there are conditions that the hauler should be aware of that could contribute to inaccurate weight problems

1. The tank is incorrectly calibrated
2. Errors in the weight conversion chart
3. Bulk tank is out of level
4. Heaving, cracking, or settling of milk house floor causing the bulk tank to shift
5. Improper footings under the tank legs
6. A weaving distortion of the measuring stick, bracket, or seat
7. Measuring rod gauge points don't line up properly

If you notice any discrepancies, contact the producer.

CORRECT AGITATION TIME

Proper agitation is essential in obtaining a sample that is representative of the milk in the tank. With inadequate agitation, samples taken from the top of the tank contain more bacteria, somatic cells, and milk fat than samples taken low in the tank.

As a general rule, agitate for five minutes. For tanks of 1500 gallons or larger, agitate for ten minutes. Silos may require additional agitation time for a proper sample. Check with the producer or find the tank plate with the Model number may have the proper agitation time. If the agitator is running when you arrive, start timing then.

TEMPERATURE

The temperature of the milk must be measured at each pickup. The recommended thermometer should have a stainless-steel stem, an unbreakable plastic window, an external adjustment for calibration and an accuracy of $\pm 1^{\circ}\text{C}$ ($\pm 2^{\circ}\text{F}$).

The accuracy of the thermometer should be calibrated initially and at least every six months thereafter against a thermometer certified by the National Institute of Standards (NIST). Each thermometer case must be tagged with the correction factor and the date last checked. A record of these calibrations must be maintained at the laboratory.

The thermometer stem must be sanitized in 200 ppm chlorine or its equivalent for one minute before checking the temperature of the milk. Sanitizing of the thermometer is necessary prior to each use.

Temperature measurements provide useful quality control information for both the producer and the receiving plant. If the temperature readings gradually increase, it will show the hauler that the tank is not cooling properly. Contact the producer so the problem can be fixed.

RECORDING RESULTS

To avoid error, promptly record all results. The following results must be included on the farm milk weight ticket:

- A. Producer name and number
- B. Date of collection, to include day, month, year if not on farm sheet
- C. Measuring stick reading
- D. Milk weight
- E. Milk temperature
- F. Time of pick up
- G. Hauler's signature - License #, First and Last name
- H. Milk quality - odor, appearance
- I. Name of buyer must be on farm sheet

The route load sheet must contain the following information:

- A. Route number
- B. Hauler's signature- License #, First and Last name
- C. Date
- D. Producer number
- E. Stick reading and milk weight
- F. Time of pick up
- G. Milk quality – odor, appearance
- H. BTU number
- I. Temperature

SAMPLING OF MILK

Sampling of a farm bulk milk tank is an important part of a hauler's responsibility. The sample must be representative and taken in a manner to prevent contamination of the sample. Samples collected by the hauler are referred to as "Universal Samples". This means that all tests and examinations may be conducted on any sample collected. These samples are used as the official samples for the producer.

This sampling procedure should be strictly followed:

- A. Wash hands with soap and dry with a single service towel.
- B. Mark each sample container with the producer's name, state license number, date, time, tank temperature, tank id if more than one tank, and hauler initials.

- C. Agitate milk for the required time.
- D. The sampling dipper must be clean and properly sanitized in a 200-ppm chlorine solution or its equivalent prior to sampling milk. The dipper must be in contact with the sanitizing solution for at least one minute prior to use. Follow directions on sanitizer label for proper concentration and contact time. The dipper should remain in the sanitizing solution until it is removed to sample the milk.
- E. If the dipper is stored and maintained at the farm, make sure it is clean and properly sanitized before sampling the milk
- F. Do not carry pre-sterilized plastic bags or containers in pockets of clothing. Open the sample container, being careful not to contaminate the interior of the container and lid. Contamination of the sample container will alter the laboratory results and possibly reduce the producer's payment. If the container becomes contaminated, discard it. If you are using pre-sterilized straws, do not touch any surface with the straw prior to sampling.
- G. Drain sanitizer out of the dipper and rinse the dipper at least twice in the milk before taking the sample, being careful not to put your hands into the milk. Extend the dipper six to eight inches into the milk.
- H. Sample the milk in the tank, with the sample container held away from the exposed milk and not over the open tank lid. The container should not be filled more than three-quarters full. This will enable the laboratory to properly mix the sample before testing
- I. Close the sample container, making sure it is tightly closed to prevent contamination and does not leak. When using a whirl-pak bag, make sure it is sealed so that it does not leak or puncture the sample container. Ensure enough air is trapped inside the bag to allow the sample to be properly agitated.
- J. Immediately place the sample in the refrigerated sample case, keeping samples at 32-40° F. Do not freeze samples. Maintain the cooling medium at a level slightly above the milk level in the containers. Do not submerge the lid of the container under the cooling medium. Do not rely on winter air temperatures to keep samples cold.
- K. After you have sampled the milk, rinse the dipper with tap water and return it to the sanitizing solution.
- L. For farms with more than one tank being picked up, sample each tank separately and label samples so each tank can be identified.

TEMPERATURE CONTROL SAMPLE

Always take a second sample for temperature control (TC) at the first stop for each tanker load. Mark the container with "temperature control" or "TC", date, time, temperature, producer number, and hauler identification.

SAMPLING AND GRADING MILK IN TANKS WITHOUT TOP ACCESS

Milk from large farm tanks (silo and horizontal types) without top lids or manholes cannot be sampled and graded in the conventional manner.

CHECKING FOR ODOR

- A. Agitate milk for required time
- B. Using the sample valve, fill a clean sample container three-quarters full
- C. Close the sample container and let it sit for several minutes
- D. While slowly opening the sample container check for odor. If there is some doubt repeat the process, warming the milk before checking the odor

SAMPLING MILK

- A. Agitate milk for the required time.
- B. Sanitize the sample valve and port with a 200-ppm chlorine solution or equivalent for a minimum of one minute. This can be accomplished by using a squeeze bottle or whirl-pak bag full of sanitized solution.

- C. Run several ounces of milk through the sample valve to remove the sanitizer. Discard this milk.
- D. Draw off a milk sample into the container, filling the container only three-quarters full.

CONNECTION OF THE HOSE

The transfer hose must be brought into the milk room through the hose port. Remove tank outlet cover, sanitize the tank outlet valve opening and connect the hose to the bulk tank outlet. Be careful not to place the product contact surface for the hose cap on a dirty surface. Store the cap in the wash vat or basket, not the hand sink.

The transfer hose must be capped at all times, except during loading, unloading or cleaning. If there is evidence of the bulk tank valve leaking, notify the producer and field person.

PUMPING THE MILK

After measuring and sampling the milk, close the lid.

To aid in the removal of butterfat that may have clung to the side of the tank and to help protect the plant against fat loss due to this factor, leave the agitator running until the tank is at least half empty. Make sure the agitator is shut off before foaming or splashing begins to prevent product loss due to foam.

When the tank is empty, shut off the pump as soon as possible to avoid sucking air and possible milk house odors into the tanker milk. Then switch off the refrigeration compressor on a direct expansion tank or the water circulation pump on an ice bank tank. Remove the hose and cap immediately.

Visually check the bottom of the bulk tank for sediment. If it is excessive, make note of it on the load sheet and notify the producer and field person.

Rinse the interior of the bulk tank with warm water (about 110° F). This will make it easier for the producer to clean up. Close the tank lid to prevent the inside from drying out and to keep out any foreign material. Rinse off milk spillage on the floor, especially under the tank(s), as this will sour and develop acid which will eventually erode the concrete.

FINAL FARM CHECK

Before you leave the milk house, make note of any abnormalities to report to the producer and field person. Note any conditions within the milk house that may cause contamination of the milk or cause results to be incorrect. Make sure the milk room is in as good or better shape than when you arrived. Check the floor for milk residue, hang up the hose, turn out the lights, close the hose port and milk house door.