

GENERAL INFORMATION

Licensing

Each farm bulk tank pickup driver, whether he is full-time, part-time or a relief driver, must be licensed in the state (Nevada) in which milk is picked up, or in the state in which milk is delivered.

A bulk milk hauler shall not collect milk from any dairy farm for delivery to a milk plant, receiving station or transfer station unless the farm holds a valid permit from the Nevada State Dairy Commission

A bulk milk hauler/sampler's license can be revoked or suspended for manipulating measurements or weights, falsifying samples, or having improper sampling technique.

Personal Appearance

Bulk milk pickup drivers shall maintain good hygiene, shall maintain a clean and neat appearance and not use any tobacco in the milk room. Driver must not walk around barn lot or any other farm areas prior to entering milk house.

Necessary Equipment

It is essential that the bulk milk pickup driver and the truck he operates have on hand or have access to THE NECESSARY EQUIPMENT to pickup milk. Since the universal sampling method is the only method used in the State of Nevada, only the equipment needed for universal sampling is listed below:

1. **Sampling instruments**: Several types may be used a) seamless stainless steel tube, b) seamless stainless steel dipper with a long handle and capacity of not less than 10 ml, c) single-service sample tubes, or d) any other means approved by the Health Division for removing the sample from the farm bulk tank in a sanitary manner.
2. **Sample containers**: Must be clean and dry. Sample containers must have leak proof caps and may be made of glass or molded rigid plastic. Approved plastic bags (whirlpacks) may also be used. For universal fresh milk sampling, the containers must meet the definition of sterile (not more than 1 organism per ml of capacity) and be large enough to hold the size of sample required and must have a place for identification. Before use, universal sample containers should be carried in the cab of the truck in a plastic bag or other closed container to ensure they are kept clean and dry. They must not be carried loose nor kept in the refrigerated sample case.
3. **Sanitizing solution**: The sanitizing solution must be of proper strength and should be discarded and replaced with a fresh solution daily or sooner if necessary. Two commonly used sanitizers and the strength in which they should be used are: Iodine, 25 parts per million; Chlorine, 100 parts per million.
4. **Sanitizer field test kit**: Used to measure the strength of the sanitizing solution.

5. **Dial or digital thermometer:** The thermometer must be checked every six months or more often if necessary and must be accurate to 2 degrees Fahrenheit. Bi-metal stem or electronic thermometers are recommended for haulers to determine the temperature of milk. Glass, mercury-type thermometer, although more accurate, are not recommended, because glass and mercury will fall into the milk if the thermometer is broken during use. The thermometer should be checked for accuracy every 6 months, if there is a reason to believe that it is inaccurate, or if it is dropped.

The accuracy of the thermometer can be checked by:

- a) Immersing the stem or probe 2 to 4 inches in a mixture of three parts crushed ice and one part water with constant agitation. When the reading stabilizes, 2 to 3 minutes, the thermometer should register 32°F (0°C).
- b) Compare the thermometer to an officially calibrated thermometer in a 32° to 40°F (0° to 4.4°C) liquid in the laboratory at least once every six months.

When necessary, the thermometer should be adjusted to the correct temperature. Most dial thermometers have an adjusting nut under the dial. The date the thermometer was checked along with the name of the person who did the calibrating should appear on a tag on the thermometer stem or case

6. **Waterproof indelible marker:** Waterproof, felt tip pen to use when it is necessary to write the producer's identification number on the sample and identify the temperature control sample. Preprinted producer I.D. labels are highly recommended.
7. **Sample case:** The sample case should be constructed of rigid metal or plastic, and insulated for safe transportation of the samples. The case must have ample space to hold samples as well as refrigerant which is needed to cool and maintain samples at 32°F- 40°F (0°- 4.4°C). A rack or float to keep the samples in an upright position is essential because the neck of the sample containers must be kept above the surface of the cooling medium. The level of the refrigerant should be kept at the level of the milk in the sample containers.
8. **Watch:** A watch to time the agitation of the milk in the bulk tank prior to sampling.

PICKUP PROCEDURES

The sequence of events involved in the collection of farm bulk tank milk after the driver arrives at the farm and properly positions the truck at the milk house is outlined below.

1) Universal Sample

Take the universal sample container along with the sanitizing solution and all other required equipment and supplies into the milk house.

2) Lights

Turn on the lights in the milk house and over the tank.

3) Make sure milking is complete and milking pipeline is disconnected

Measuring, sampling, and pumping out milk MUST NOT happen while milking into the bulk milk tank being picked up is still taking place and milking pipeline from the barn is still connected.

4) Check Temperature Using Recording Thermometer Chart On Wall

Using the recording thermometer chart check the temperature of the milk in the bulk milk tank. Milk should not be picked up if it is above 45 degrees Fahrenheit. Mark on the recording chart the date, time you arrived, temperature of the milk, and your initials. Recording charts need to be changed every 48 hours. When replacing recording charts you need to put the producer number and tank number on the new chart.

5) Wash and Dry Hands

Using the producer's hand washing facilities, wash your hands. This will eliminate any soil on your hands which may contaminate the milk in the bulk tank or milk sample. Hands need to be washed before handling any milk contact surfaces, before sampling, and anytime they become soiled.

6) Measuring Devices

You should be familiar with the types of measuring devices that are used for measuring the number of pounds of milk in the tank. The conventional stick-type gauge rod measures milk in inches and thirty seconds or sixteenths of an inch and is used with a conventional conversion chart. There are also metric gauge rods which measure milk in centimeters and millimeters and are used against a metric conversion chart. Another type of measuring device is called an external gauge assembly and may be calibrated to the conventional or metric system.

A. Measuring Milk Using Sight Glass

New tanks over 2,000 gallons must use an external scale plate (external gauge rod) and glass or plastic gauge tube on the outside of the tank to measure the milk volume. The outlet valve must be opened slowly to prevent foaming of the milk in the tube. The tube should be clean and dry prior to filling it with milk and taking the reading. If there is already milk in the gauge tube when you arrive at the farm, it must be drained and the tube refilled with cold milk, otherwise an inaccurate reading will result. This is because as the milk in the tube warms, it expands and gives a false reading.

With gauge tubes, the upper surface of the milk column in the tube is not flat. The milk column clings to the inner surface of the glass or plastic and appears higher on the edge than in the center giving a curved appearance as shown in the drawing below. This curved surface is called the meniscus.

The correct method of reading a gauge tube is to use the highest point of the center of the meniscus as the measuring point. As a precaution with external gauge tubes, you should be observant to verify that they are adequately vented at the top. Any restriction in this venting will create an air lock in the gauge tube

preventing milk in the tube from seeking the proper liquid level, and resulting in a false, low reading.

B. Measuring the Milk Using Measuring Rod

If the bulk tank is not running when you arrive in the milk room and the milk is absolutely motionless, do the following:

- a) Wash hands. Lift the measuring gauge rod from the tank and wipe clean with a clean paper towel. It may be necessary at times to remove the gauge rod from the tank and wash with warm water. This will remove any milk residue that cannot be removed by just wiping with a clean paper towel. This residue, if not removed, can cause the milk in the bulk tank to climb up the stick giving an inaccurate reading. After washing the stick, dry it thoroughly with a clean paper towel taking care not to contaminate the gauge rod while handling it.
- b) To ensure a straight line when measuring the milk, lower the gauge rod straight down until it reaches a point one-quarter inch from its base. Hold the gauge rod in this position for a few seconds and then ease it down slowly until it seats itself naturally in its base.
- c) Lift the gauge rod and read it in a well-lighted area at eye level. If you read the gauge rod and the milk level is between two graduations, read it as if it were on the closest graduation. If the milk level is exactly halfway between two graduations, read it to the next highest graduation. Always take at least two stick readings to check for consistency.

7) Recording Results

- A. Record the gauge rod or external reading at once on the appropriate form.
- B. After you record the gauge rod or external reading on the bulk milk receipt you will be asked to convert the reading to gallons and pounds. To do this you use the chart provided by the farmer. Look on the chart and find your reading, the chart will then tell you what the reading corresponds to in gallons or pounds. To convert from pounds to gallons divide by 8.6. To convert from gallons to pounds multiply by 8.6.
- C. To avoid error, promptly record all results. The following information should be included on your bulk tank milk receipt:

Date of collection
Time of pick up
Producer's name or number
Milk quality—odor and appearance
Milk temperature
Measuring stick reading
Weight of milk
Name of plant or delivery point
Hauler identification (name **AND** license number)

8) **Mixing the Milk**

Start the agitator on the farm bulk tank and time it for the required period of agitation using a watch or other timing device. Sample the milk at the end of the agitation period with the agitator still running. The time required to agitate a tank of milk until it is homogenous is determined by the size and shape of the tank; volume of the product held; type, location, and number of agitators on the tank and force of the agitator. The milk in all farm bulk tanks must be agitated for a minimum of 5 minutes. For tanks larger than 1,000 gallons, a 10-minute agitation time is required, or follow the tank manufacturers recommendations. Agitate longer if you see streaks of cream.

Proper tank agitation cannot be overemphasized. Insufficient agitation time is the largest single contributing factor to butterfat variations. Since the bacteria present in milk tends to rise with the butterfat, the bacteria count can also be affected.

In the example shown below you can see how the raw milk bacteria count varied over 340,000 per ml between the milk near the surface of the tank and the milk near the bottom.

Bacteria Variation

Top of Tank (unagitated).....	350,000 per ml
Bottom of Tank (unagitated).....	10,000 per ml
Top of Tank (agitated five minutes).....	44,000 per ml

Proper agitation time in this case made the difference between a count that was within legal limits and one that was not.

Remember, the bacteria, somatic cells, and growth inhibitors tend to rise with the cream portion of the milk. It is necessary to sample the milk with the agitator running as the fat will begin to rise almost immediately after agitation has stopped.

Even if the tank agitator is running or if it is one that agitates the milk for five minutes every hour, the milk should still be agitated for the minimum time required for the size of tank you are collecting from.

While the milk is agitating or while it is coming to rest after agitation, complete the following steps:

- a) **Connect hose:** Connect the milk transfer hose to the farm bulk tank outlet. The hose coming from the center of the pump goes to the bulk tank. The hose coming from the outer edge of the pump goes to the tanker truck (see figure 1). When the cap from the end of the transfer hose is being removed, it shall be handled in a sanitary manner and stored so as to prevent it from being contaminated while the milk is being pumped from the farm bulk tank into the bulk milk tank truck.
- b) **Wash hands:** Wash hands using the producer's hand washing facilities.
- c) **Measure temperature:** Place the thermometer stem or probe in the sanitizing solution for at least one minute. Remove it from the sanitizing solution and check the temperature of the milk and

compare the reading with that of the bulk tank's thermometer.
Record the temperature reading on the weight slip.

9. Odor and Appearance

Before sampling carefully examine the odor and appearance of milk to determine if it is acceptable.

- a) **Off –odors:** Before agitation, smell the milk through the porthole or manhole of the tank to check for sour, malty, feed, unclean or any other off odors.
- b) **Appearance:** Visually inspect the milk for any apparent physical abnormalities—signs of churning, freezing, excessive foaming, poor cooling, excessive sediment or the agitator not touching the milk should be warning signs to you.

10. Sample Collection

The farm bulk milk pick up driver has the responsibility of obtaining a representative sample from the producer's farm bulk tank. This is extremely important for the universal fresh milk sample taken at each pickup on the route. It is imperative that the sample taken be representative of the lot from which it was selected and that it arrive at the laboratory with no changes in its chemical, physical, or biological character. It is used for a variety of quality tests including butterfat and solids-not fat content, bacteria count and presence of drugs. These tests are only reliable if the tank of milk has been properly agitated and sampled, and the sample properly handled thereafter.

11. Identify Sample

Mark the sample container clearly with a waterproof, felt tip pen or affix a pre-marked label. Sample should be labeled with producer number, date and time sample was take (military time or us a.m/p.m. after time), and temperature of milk.

12. Take Sample

After at least five minutes of agitation, and prior to opening the tank valve, take the sampling device and sanitize for a minimum of 1 minute, then proceed to obtain a sample of the agitated milk. Rinse the sanitized dipper at least twice with milk prior to obtaining the sample. Do not transfer the milk sample from the dipper to the sample container over the farm bulk tank opening. After the sample of milk has been transferred to the sterile sample container, close the container, making certain it is tightly sealed, and place it immediately in the refrigerated sample case. Do not delay—the sample must be placed in the mixture of ice and water quickly to keep it at a temperature between 32°-40°F. In this way the samples will arrive in good condition at its destination. Remember, until the samples are placed in the receiving bay or laboratory refrigerator, they are the bulk driver's responsibility. Rinse the dipper with warm water.

Note: The sample container should not be filled more than approximately two-thirds full or to the fill line on the vial. Filling the container to this level allows

ample head space to properly mix the sample at the lab before removing a sample for analysis.

A second milk sample must be taken at the first pick up of the day. This sample is used as a temperature control and is to be marked with a "TC" along with the date and time the sample was taken, temperature, and producer and hauler identification. A temperature control is necessary to prove that your samples have been held at the correct temperature between the milk farm and the processing plant.

If the agitator was running upon arrival, allow the milk to become absolutely motionless and measure the milk as described in 6.

13. Check Temperature

The thermometer used to test the temperature of the milk must be sanitized prior to immersion in the milk. The milk in the producer's farm bulk tank should not be over 45°F (7°C) when you pick it up. If you find a tank of milk that is too warm or if for any reason you feel that the milk in the producer's farm bulk tank might cause your load to be rejected do not pick up the milk and contact dispatch. Temperature of bluk milk tank on recording thermometer must be checked against your certified thermometer at least once every 30 days.

14. Hooking Up Pump and Hoses

- A. Wash and Sanitize the outlet valve if milk deposits or foreign matter are present. Remove hose cap from milk transfer hose, smell for sour odor, sanitize and connect to outlet valve. Remove cap from other end of hose, sanitize, and connect to appropriate port on pump.
- B. Remove cap from hose that connects to milk truck. Smell for sour odor. Sanitize end and attach to appropriate port on milk pump. USING THE HOSE PORT take the other end of the hose to the truck.
- C. Open cap on truck valve, remove large cap on reducer, sanitize both reducer and truck valve, connect. Remove cap on small end of reducer and on milk hose, sanitize both and connect.

Note: If openings to milk pump are not capped you must open the bellhouse and check for debris and sanitize prior to connecting milk transfer hose.

15. Wash and Dry Hands

Using the producer's hand washing facilities, wash your hands after connecting your truck hose to the farm bulk tank and before checking the milk temperature with your thermometer. This will eliminate any soil on your hands which may contaminate the milk in the bulk tank or milk sample.

16. Pump Out Milk

With the tank agitator still running, open the tank valve, start the milk pump, and transfer the milk to the tank truck. If the agitator is not allowed to run during pump out, milk fat can cling to the sides of the bulk tank and cause cleaning problems

and butterfat variations. Under no circumstances should the milk sample be taken while the milk is being pumped from the tank.

17. Stop Agitation

When the milk level in the farm bulk tank reaches the agitator blades, stop the agitator and turn off the refrigeration unit if it is a direct expansion tank.

18. Disconnect Hose

When the bulk tank is empty, turn off the milk pump, rinse milk transfer hose and follow that farms procedure as far as washing hose and pump.

19. Observe, Then Rinse Tank

Observe the inner walls and floor of the tank for signs of freezing, churning, foreign material, and sediment. If any of these abnormalities are present, notify the producer and the handler's field staff. Record the information on the weight ticket. Rinse the bulk tank with warm water 100°F water and/or attach and start the tank's automatic washer as per agreement with the producer. Close the lids of the tank.

20. Clean Up

Flush away all milk spilled on the floor. Return the water hose to its rack and place all loose items in their proper place in the milk house. Clean reducer. Rinse all parts with cold water, then hot water. Sanitize and recap with all gaskets.

21. Lights off

Turn off the lights as you leave.

PRECAUTIONS

Cleaning and Sanitizing Milk Tank Trucks

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

Other Precautions

Do not pick up any milk that is held outside the producers bulk tank. This includes milk stored in milk cans, pails, milking machines, etc. This milk is not refrigerated and may be very high in bacteria, or may contain growth inhibitors which may go undetected.

Pick up all milk from every farm at least every other day. Milk that is more than two days old is lower in quality.

If there is more than one farm tank located in a dairy farm, each tank is to be separately sampled, measured, and checked for odor and appearance.

Always pick up all the milk in the producer's bulk tank. Partial pickups are not generally allowed, or allowed only if the balance of the milk is picked up the same day or the tank totally cleaned out every day or every other day. No partial pickups left until the next day. If all the milk in the tank is not picked up the producer cannot wash the farm bulk tank thus increasing the possibility of a rejected load of milk.

STEPS IN ACCEPTING FARM BULK MILK

The decision to accept or reject milk is one of the most difficult decisions that the farm bulk pickup driver has to make. However, this decision is critical because defective milk from a single producer will spoil the quality and flavor of the entire truckload. If the quality of the producer's milk is suspected or considered unacceptable, the farm bulk pickup driver should leave the milk in the bulk tank, take a sample, and immediately notify dispatch who in turn will bring the matter to the attention of the producer, field person, and the dairy plant. The dairy plant lab should test the sample for acidity, bacteria, added water, and drugs.

Normal milk is odorless, mildly sweet in taste, and ranges in color from bluish white to golden yellow. A change in this normal odor and color of milk may result from bacterial growth caused by improper cooling, feeding, milking, and handling practices or unhealthy cows. To aid the farm bulk pickup driver in making his decision whether to accept or reject milk, he should be familiar with the following problems.

1. **Bloody milk:** Milk from cows having mastitis may contain blood. A small amount of bloody milk can give a large quantity of normal milk a reddish tinge.
2. **Flakey milk:** Flakes or curd particles may occur in milk as a result of mastitis or souring or destabilized protein. Milk from mastitic cows may show light flakiness or pronounced stringy curd particles. Flakiness due to souring of the milk is usually accompanied by a disagreeable sour milk odor.
3. **Extraneous matter:** Floating extraneous matter such as insects, hair, chaff, and straw is cause for rejection of milk. The presence of extraneous matter may result from careless handling of the milk, open doors, torn screens, dusty conditions, improper cleaning of the udder before milking, or improper filtering of the milk.
4. **Churned milk:** Visible fat globules sticking to the side of the tank or floating in the milk are due to excessive agitation at warm temperatures either within the farm bulk tank or milk transfer system.
5. **Frozen milk:** Presence of ice in the milk is an indication that the farm bulk tank is malfunctioning and is cooling the milk to below freezing. The particles will be noted floating on top of the milk or seen frozen to the cooling coils when the milk is removed from the tank.
6. **Excessive foaming:** Excess foam is caused by the agitator running too fast, when the drop pipe leading into the farm bulk tank is insufficient in length or there is an air leak in the pipeline system.

UNIVERSAL SAMPLING METHOD

The sampling method known as the universal fresh milk sampling has become recognized as the best and most economical method of collecting samples for regulatory and industry testing of producer milk.

When using the universal fresh milk sampling method, a sample must be collected at each milk pick up in such a manner that the sample can be tested for: a) butterfat, protein and solids-not-fat testing for milk payment, b) all routine and special tests as required in modern milk quality programs, and c) testing for presence of drugs. Different tests are performed on random samples and neither the milk producer nor the farm bulk pickup driver knows which tests are to be made on the samples taken on any given day. Thus, the universal fresh milk sampling method discourages the use of improper, unethical, and illegal practices of sampling milk.

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

1. If the tank of milk is rejected by the hauler, the sample provides evidence of the problem.
2. When a tank truckload of milk is rejected at the plant, a sample of milk from every producer picked up on that load will permit tracing of the problem to the source.

There are several conditions and practices which could result in inaccurate samples for component testing purposes. These include: 1) frozen milk, 2) churned or partially churned milk, 3) curdled milk, 4) excessive foaming, 5) samples taken while the milk is being transferred from the farm bulk tank to the tank truck, 6) sampling milk stored outside the farm bulk tank, 7) improper agitation, and 8) delay in sampling after agitation has been completed.