



Bulk Tank Milk Grader Manual

For British Columbia

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Ministry of
Agriculture

Acknowledgments

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IMPORTANT

How to Use This Manual

This manual is intended for commercial Bulk Tank Milk Graders in BC and is based on the most recent recommendations and regulations at the time of writing. Each Bulk Tank Milk Grader and their hauling firm or dairy processor should be aware of changes to the Code and/or policies and be in contact with the BC Ministry of Agriculture to receive any updates in this material.

Table of Contents

Preface	2
Introduction	2
Legislation	3
BTMG License Requirements	3
Required Pick-up Procedures	5
Washing the Bulk Milk Truck Tank	5
Sanitizing the Bulk Milk Tank.....	7
Equipment on the Truck	7
Tools of the Trade	8
Appearance and Cleanliness	10
Farm Holding Tanks.....	11
Proper Procedures = Success	12
Changes in Schedule or Special Sampling Instructions	12
Appropriate Behavior on the Farm	12
Licenses	13
Load and Sample Security	13
Milk Pick-up Procedure	14
Odour Detection	14
Common Defects Guide	16
Milk Temperature	19
Rejection of Abnormal Milk	19
Sampling in Milk Silos	22
Reading the Calibration.....	23
Sampling Accurately	29
Sample Identification	31
Final Checks	38
Quick Guides	
Appendix A - BC Ministry of Agriculture Contacts	41
Appendix B - Cleaning and Trouble Shooting Guide	42
Appendix C - Bacteria that Affect Milk Quality and Safety	45
Appendix D - Farm Holding Tank Requirements	47
Appendix E - Thirteen Steps for Correct Milk Pick-Up	52
Appendix F - Farm Holding Tank Installation Check lists	55

Preface

The purpose of this manual is to acquaint the Bulk Tank Milk Grader (BTMG), supervisor and/or plant manager of all the policies and procedures concerning the collection of quality raw milk from a licensed dairy farm. Depending upon the extent of the BTMG's role, he or she may not need to assimilate the entire book for day to day activities. However, as pick-up procedures can impact the quality and safety of the end product and ultimately affect the producer, processor and consumer, the reader is advised to be familiar with all aspects of this book for the fulfillment of the BC Ministry of Agriculture (BCMA) BTMG license requirements.

Introduction

As a BTMG, you are the first person outside of the dairy producer to see the milk. It is your job to ensure the system starts with fresh, clean, high quality milk. The dairy farmer and the milk processor depend on you to do a good job of milk collection. Your judgment, actions and decisions in regard to the sampling and quality of the milk received has a direct impact on milk payment, raw product analysis, producer penalties and ultimately the quality of the finished product. In order to make a great product we must start with a great product – no end of processing or pasteurization will “fix” any problems on the farm.

It is very important the milk is measured accurately and the samples obtained for butterfat, bacteria, and other tests accurately represent the contents of the bulk tank. The quality of milk delivered to the plants (and that ultimately reaches the consumer) depends upon how well the milk is identified with all unsatisfactory milk eliminated at the time of collection. **The BTMG must be alert and must not pick up any milk which is too warm, has an off odour, shows any other significant defect, or is un-measurable.** Your actions must not contribute to the deterioration of milk quality in any way. Although you may not think of yourself as a food

handler and a representative of the dairy industry, you are both. By your appearance, your actions and your words, you represent the industry.

To be successful a BTMG must possess many varied attributes and skills in addition to being able to operate a truck. As a food handler your appearance and personal habits must reflect this role. A clean, neat appearance and good personal hygiene will portray a good image. A keen sense of smell and ability to identify abnormal milk odours is also an essential part of the job. An ability to communicate tactfully and clearly is an asset. As the link between the buyer and the seller your complete understanding of all aspects of farm milk collection, handling, and raw milk analysis will contribute to the team approach between the producer, dairy plant and quality assurance staff.

Legislation

All BTMG's must hold a valid license issued by the Ministry of Agriculture, Livestock Health Management and Regulatory Unit, located at the Abbotsford Agriculture Centre. This includes all drivers transporting milk. The license is renewed annually on January 1st, and is subject to:

- Receipt of payment
- Successful fulfillment of the duties
- The person is an active BTMG

BTMG License Requirements

In order to become a licensed BTMG the applicant must complete the following:

- Minimum fifty hours training on pick-up procedures, accompanied by a licensed BTMG.
- Successful completion (minimum 75%) of a written exam.
- Successful completion of a field exam after completion of the written exam. Eight demerit points on the field exam will result in failure of that exam.
- Successful completion (minimum 75%) of the milk odour grading exam within the first and every third year.

If either of the written or field exams receives a failing grade, another exam is permitted following another 50 hours of training. Inspections can occur at anytime throughout the year.

An inspection involves the following:

- Demonstration of proper required sampling, handling and storing procedures.
- Accurate reading and measuring of the dipstick and direct reading of the gauge.
- Correct conversion to litres of milk from the calibration chart and recording of those readings.
- Adherence to proper procedures for the picking-up of quality milk.
- Personal cleanliness.
- Cleanliness of the bulk milk truck and equipment.

During inspection, demerit points will be given for unsatisfactory items. At 10 – 14 demerit points a peer review will be held. At 15 demerit points or greater, a peer review will determine whether to suspend or cancel the license and under what circumstances the license may be reinstated. Peers may include: representatives from the hauling firm, processor, BCMA staff, and any other related or affected parties.

Licenses can be revoked if the BTMG does not follow the required procedures. In the event of a license cancellation, a peer review will be done and/or rewriting of the exam and field exams may be required.

The applicant must complete an application for license prior to completion of the exams and make payment of the license fee in the form of a cheque or money order made payable to the **Minister of Finance and Corporate Relations**.

Required Pick-Up Procedures

BULK TANK TRUCK – Who is responsible?
Quality milk starts with clean equipment and good hygiene.



A bright, clean tank truck, both inside and out, is essential for the sanitary handling of milk. It also sends a clear message to the public about the industry's commitment to quality.

The processor that receives the milk is responsible for providing facilities, equipment and supplies necessary to clean and sanitize the tanker, but the final responsibility lies with the BTMG. The sanitary condition of the bulk milk truck, milk contact equipment and other tools used by milk haulers are subject to inspection. The processor or receiver may on occasion provide plant workers to do the washing. Always check to be sure the tank is clean, both inside and out. Unsatisfactory conditions can jeopardize a BTMG's license, and more importantly, the quality and safety of the milk.

Washing the Bulk Milk Truck Tank

The following is the recommended procedure to ensure a complete and successful wash cycle:

- Immediately after unloading, clean the tank thoroughly, including all milk contact surfaces such as the pump, hose and fittings.
- Rinse (35° – 43°C) until the water runs clear.

- Wash with a good alkaline solution suitable for the water supply. Use the right amount of detergent and follow the recommendations on the label for time and temperature. If no recommendations are present, the general rule of thumb is 10 to 15 minutes at a start temperature of 74°C – 82°C.
- Rinse with an acid rinse following manufacturer’s recommendations. (Usually a pH of 3 and a temperature of 35° – 43°C.) See “Appendix B” for complete cleaning and trouble shooting guide.
- Automatic circulation cleaning systems are handy but never fool proof. Always check them periodically to ensure they are cleaning properly. Make sure the:
 - ✓ Ports are open on the spray head
 - ✓ Spray floods all surfaces
 - ✓ System cycles correctly every time
- Recommended amounts of water, detergent, wash and rinse times and temperatures are followed. If none are given, run the wash cycle for 10 minutes at 75°C and 5 minutes for the rinse cycle at 43°C. The plant is responsible for ensuring correct temperatures are used. BTMG’s should notify the plant and their supervisor if they observe these requirements are not being met.
- Tank must be adequately vented to prevent collapse (in the event of a sudden temperature change). To avoid a collapsed tank, the manhole must be open when pumping off and whenever washing the tank. In addition, never spray cold water into a tank immediately after the wash cycle. If either event occurs the tank will collapse due to the creation of a vacuum.
- Parts requiring hand wash are in fact washed.
- Exception to Washing: If additional loads are to be collected immediately after the first load is emptied and is within an 8 hour period, washing up can wait until the final load has been

emptied. However, the tank truck must be cleaned and sanitized at least once every 24 hours. Pumps and hoses must be rinsed after every delivery.

Sanitizing the Bulk Milk Tank

It is required the bulk milk tank be sanitized before use.

- All milk contact surfaces must be exposed to the sanitizing solution. The easiest way to sanitize is by using a circulation cleaning system which sanitizes as the final treatment.
- Sanitizing immediately prior to departure to minimize corrosion and maximize effectiveness.
- Chlorine (sodium hypochlorite) is an example of a commonly used sanitizing agent. Chlorine concentration should be at 200 ppm. Follow label directions concerning concentration, but if in doubt, consult the dairy plant supervisor. Fogging the tank with a sanitizer is satisfactory if the pump and hose are sanitized also. To sanitize the pump and hose after fogging, add a few gallons of sanitizer solution through the manhole, pump it out of the tank, and drain the pump and hose. A simpler method is to spray an excess of sanitizer into the tank and drain through the pump and hose.

Equipment on the Truck

The sample box is used to carry the milk samples from the farm to the processor or lab. The sample box may be a sealed compartment built right into the truck pump compartment or frame, or it may be an ice cooler carried in the cab of the truck.

The sample box must:

- Be kept clean and in good repair to prevent any damage to the samples during transport.
- Be insulated and remain cool (1° – 4°C).
- Always have adequate ice in summer and winter. “Adequate ice” may include crushed ice, ice chips or small ice cubes. Do NOT use snow, ice chunks and block ice. Block ice has insufficient surface area to maintain required temperatures.

- Have a certain amount of water in the box to keep the vials in good contact with the ice and water. The tops of the vials must never go under the water otherwise contamination will result.

Tools of the Trade

To carry out the task, the following items must be taken with you into the milk house:

- ✓ hand held computer or milk receipt pad and pen
- ✓ thermometer in Celsius. (Do not use glass mercury thermometers)
- ✓ watch
- ✓ vials
- ✓ BTMG labels
- ✓ water proof marking pens
- ✓ paper towels
- ✓ flashlight

All utensils and equipment used in the production, cooling, handling, storing or conveying of milk must be of a type and material equivalent to 3A Standards. In BC, they must also conform to the British Columbia Standards for the Design, Fabrication and Installation of Milk Handling Equipment. Copies of both can be obtained through the BCMA, Livestock Health Management and Regulatory Unit (see Appendix A).

Other tools that should be kept on hand in the truck:

- ✓ container with fresh sterilizing solution (e.g. 200 ppm chlorine).
- ✓ sample dipper
- ✓ insulated sample container with lid, rack and crushed ice
- ✓ electrical cord or remote control for P.T.O.
- ✓ milk hose long enough to meet all milk house conditions
- ✓ hose inlet adapter to meet larger farm tank outlet sizes

- ✓ tools and wrenches

A tank truck permit must be kept either in the truck or at the trucking company office. Your BTMG license must be kept with you at all times.

Appearance and Cleanliness

As a BTMG, you are working for the food industry and handling a food product. You should drive a clean truck and wear clean clothes. You set a good example when you look clean and neat. More importantly, your cleanliness will reduce the risk of contamination. This helps to create a good image for the industry and establishes confidence in you as the type of person who is qualified to sample and collect perishable food products.

As a handler of food, your cleanliness is essential to avoid contamination of the milk and/or milk sample. Remember, pasteurization is not 100% and every precaution to ensure a clean product is critical. To reduce the risk of contamination:

- Wash and dry your hands prior to grading, measuring and sampling milk and after you have handled the milk hose.
- If the hand grips on the ladder, tank lid, or any area you have to touch is dirty, your hands will be contaminated no matter how often you wash. Notify the producer and/or supervisor about this condition.
- Every milk house must be equipped with hot and cold running water. Use it whenever necessary to maintain cleanliness.

Farm Holding Tanks

Immediately after unloading, always thoroughly rinse the bulk tank, including the lid gaskets, measuring stick and agitator paddle. Rinsing the tank will make it easier to clean especially if the dairy producer is delayed as he/she may well be on busy summer days.

Use the following procedure to rinse farm holding tanks:

- Use lukewarm water (43° – 45°C) for the most effective rinsing. This temperature melts the milk fat and will make it easier to rinse away.
- Avoid rinsing with very hot water as it can actually bake on milk components.
- When finished rinsing be sure to close the water faucets at the hose mixing valve. Do not shut the water off at the hose nozzle. If the mixing valve faucets are left open, hot water can move through into cold water lines thus wasting quantities of heated water and may result in improper cleaning of the milking equipment.
- If lukewarm water is not available use cold water, but notify the producer and/or supervisor.
- The dairy producer is entirely responsible for washing the farm holding tank. If he/she asks you to not turn on an automatic washer, it is suggested that you cooperate with them. It is strongly recommended you do not fill jars with cleaners or acids as mistakes can happen. Such mistakes can seriously impact personal safety, food safety and equipment. If an automatic washer is turned on immediately, rinsing the tank may not be necessary, unless requested to do so by the dairy producer.
- If a hose and nozzle are absent and/or water pressure is inadequate, notify the producer and/or supervisor.

Proper Procedures = Success

1. Changes in schedule or special sampling instructions

Although routines are common in this role, the following changes are examples of some things that may require the BTMG to change schedule or routine:

- Instructions from the office related to staff or route changes.
- Potential producer suspension or cancellations. ALWAYS check
 - ✓ with your supervisor for those on your route in this situation
 - ✓ for a valid Dairy Farm License posted in the milk house
- Milk not within the 1⁰ – 4⁰ C range. Due to a crisis on the farm or route changes the milk in the tank may not have had enough time to cool to the required temperature. Never pick up milk during milking or if it is not cooled within this range. Picking up milk during the milking will prevent the equipment from getting washing. Picking up warm milk can impair the quality of all the milk on the truck (see Appendix C).
- Changes in sampling instructions - the laboratory may need some extra samples or may alter the time when they need them.
- Drastic changes in volumes (on farm). As it is prohibited for a producer to move or alter milk always check whenever drastic changes in volume occur. Notify the producer and your supervisor.

2. Appropriate behavior on the farm

- Smoking or chewing gum is prohibited. Never smoke in the milk house. Milk is one food that readily absorbs odors, easily impairing its flavor. Smoking or chewing gum will impair your ability to grade the milk accurately.

- It is a bad practice to discuss other producers' personal or business problems with anyone. High bacteria counts, low butterfat tests, and the like should be kept confidential.
- Damage - If you break a piece of equipment or property belonging to a producer, report the incident to your supervisor. Notify the producer immediately, particularly in the case of any damage to dairy equipment. It may play an important function in the operation of the dairy and could delay milking.
- Do not enter the animal housing area.

3. Licenses

In BC, milk must not be removed from an unlicensed farm holding tank or dairy farm.

Before any milk is picked up, ensure the following are posted in the milk house:

- ✓ Dairy Farm License issued by the BCMA.
- ✓ Calibration chart or temporary farm holding tank installation check list.
- ✓ If chart or tank check list is not posted, a sign posted by the calibrator **'Calibration In Progress'** is mounted on tank.

Check with your supervisor if licenses or charts are absent, or you doubt their validity.

4. Load and sample security

Your BTMG license makes you responsible for the proper collection and care of all milk samples as well as the security of the load. Always be alert as to the security of your truck and ensure all security seals are installed.

Milk samples are the basis of producer payment and penalties. It is very important that the samples be taken properly, cared for correctly, and never altered. It is unlikely that

anyone would tamper with a sample but it has happened. Keep your eye on the samples and keep them locked up when they are not under your observation. Ensure the milk tanker, the contents, including samples, are protected against vandalism. This means the hatches, doors and outlets must be locked and have security seals installed.

5. Milk pick-up procedure

Milk Odour and Appearance (Milk Grading)

The ability to detect off-flavours and describe them will ensure only quality milk arrives at the processor. Milk grading involves both the senses of smell and sight.

BTMGs in BC are not required to taste milk, but are required to accurately detect any defective odours or appearances.

i. Odour Detection

The very first indicator of milk quality is how it smells. In order to be successful in detecting off odours the following precautions should be taken prior to grading milk:

- Avoid smoking.
- Avoid using odorous skin treatments.
- Avoid strong flavoured foods (e.g. candy, gum, spicy foods).
- Avoid grading immediately after a meal or when hungry.

Below is the best method for checking odours:

- Check for milk odours first thing upon arrival into the milk house, before your nose becomes contaminated with other odours that may be present in the area.
- Lift the cover on a small strainer hole if possible. Opening big covers will dissipate the odours too quickly. Put your nose right down in the opening to get away from

the odours that may be in the milk house. This will allow you to concentrate on identifying any off odours in the milk. Odours gather under the tank lid, so the first sniff will usually be the strongest.

- Warming a small sample of milk under warm running water will usually bring out any odours. Place a small quantity in a sample vial and warm if necessary before smelling the milk. **NEVER PICK UP MILK IF IT SMELLS SOUR OR MALTY.** In milk silos odours can be checked by smelling the purged sample as soon as it is taken. Detecting odours may be troublesome, but it must be done every time without fail. Doing this task will greatly reduce the risk of rejected loads later.
- If in doubt about the odour but you think it is bad, do not pick up the milk – call your supervisor for advice.
- Always notify the producer and/or supervisor about any milk off odours (for example, barny or feedy). Doing so will ensure it can be corrected before it becomes serious.

ii. Types of Odours and Abnormal Physical Defects

There are many causes and possible causes of milk defects. Adequate lighting is important for good visual inspection. In large tanks it may be necessary to use a small flashlight to judge the appearance accurately. If lighting is not adequate and/or shatterproof light cover or shields are not installed, notify the producer and/or supervisor.

The following table outlines the common defects

Common Defects	Identify By	Possible Cause
Physical		
1. Floating butterfat particles. Particles may range in size from tiny fat globules on the surface of the milk with some clustering around the agitator shaft to the size of a pear	<ul style="list-style-type: none"> • Sight • Temperature 	<p>Slow cooling and/or too much agitation while the milk is warm (15° – 20°C)</p> <p>Milk with any yellow churned particles should not be sampled for butterfat. However a sample should be taken and the condition immediately reported to the producer. If butterballs have developed to the point they are noticeable on inspection of the surface of the milk, the tank is to be rejected.</p>
2. Curdled or coagulated milk – the milk has a mottled, rough appearance. It will always have a sour odour	<ul style="list-style-type: none"> • Sight • Smell • Temperature 	Unrefrigerated milk with a high bacteria count.
3. Color changes – e.g. pink milk. Pink milk is a very undesirable condition with the colour likely due to blood	<ul style="list-style-type: none"> • Sight 	Internal bleeding of the udder – not uncommon in the milk of cows and heifers immediately after freshening or because of an injury to teats or udder
4. Debris or foreign matter – dirt, hair, hay, vermin, flies, shavings, sawdust or other light air borne	<ul style="list-style-type: none"> • Sight 	Careless practices during milking or failing to keep tank lids closed

Proper Procedures – Sampling and Identification 17

material		
5. Frozen milk – the milk may appear slushy or areas of tank (walls and floors) may show ice build-up. Milk extensively frozen cannot be fairly sampled for fat content	<ul style="list-style-type: none"> • Sight • Temperature 	A thermostat or compressor problem. If ice crystals have developed to the point they are noticeable on inspection of the surface of the milk, the tank is to be rejected.
Chemical		
1. Rancidity – a sharp unclean flavor with lingering after taste (will smell/taste like rancid walnuts or blue cheese)	<ul style="list-style-type: none"> • Smell 	Over agitation or foaming in milk, milk from mastitic or late lactating cows
2. Oxidized – metallic or cardboard like smell/flavor	<ul style="list-style-type: none"> • Smell 	The interaction between fat and oxygen in the presence of metal ions (even worn stainless steel) or exposure to fluorescent light or sunlight. Can also be a nutrition problem
3. Malty, acid sour smell and taste	<ul style="list-style-type: none"> • Smell • Temperature 	Bacterial activity as in the case of curdled milk. Poor cooling or entire milkings left uncooled
Other defects		
1. Barney/Unclean	<ul style="list-style-type: none"> • Smell 	The cow's environment – dirty housing, silage, musty hay, manure, stagnant water, or dirty water bowls
2. Feedy	<ul style="list-style-type: none"> • Smell 	The cow's food – stink weed, turnips, spuds, leeks, alfalfa, silage. Flavours from feeds appear in the milk of cows, when fed within 2 ½ hours of milking time

3. Chemical	<ul style="list-style-type: none">• Smell• Sometimes appearance	Milk storage – chemicals, petroleum, paint, insecticides, pesticides and disinfectants, all of which must not be stored in the milk house or milking environment
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iii. Rejection of Abnormal Milk

The following steps should be taken after discussion with your supervisor, if it is decided the milk is to be rejected:

- Leave the milk in the farm holding tank, when in your opinion, the milk is abnormal in odour, contains objectionable matter or physical defects of any kind, is not consistent with good quality milk, has a temperature $>4^{\circ}\text{C}$ at 1 hour after completion of a milking, or is un-measurable. This is done to avoid any contamination of the milk in the tank truck or to subsequent transfers of other milk into the tank truck.
- A rejection slip is printed in duplicate from the handheld computer. Leave one copy for the producer, the second for the dispatcher. A *Producer Incident Report* is completed for the BCMMB. All copies must be kept for at least 3 months. If the handheld fails to print, use the paper forms supplied stating reasons for rejection.
- Take milk sample(s) identifying them as “REJ”, read and record milk volume as usual.

6. Milk Temperature

i. Thermometers

Temperature is the next indicator of milk quality after appearance and smell. Too high a temperature ($>4^{\circ}\text{C}$) and the load is very likely to be high in bacteria. Too low a temperature ($<0^{\circ}\text{C}$) and the quality, shelf-life and flavor of the milk can be effected through the freezing process. Always carry an accurate pocket thermometer and check the milk temperature at every pick-up.

- Use a digital thermometer or stainless steel thermometer with a dial. Keep clean and carry with you.
- Glass and mercury thermometers are not foodsafe and must not be used in farm holding tanks. Breakage is a food safety risk and will cause the load to be rejected.

- Calibrate thermometers regularly by immersing the probe in crushed ice with a little water. After 5 minutes adjust the temperature to read 0°C.
- Do not rely on farm holding tank dials or time temperature recorders (TTR's) as they may not be accurate.

Recording thermometers may be required (e.g. milk silos). Check with the regulatory authority.

ii. Milk between 0° and 4°C?

For best keeping quality, the milk should be kept between 0° and 4°C without freezing.

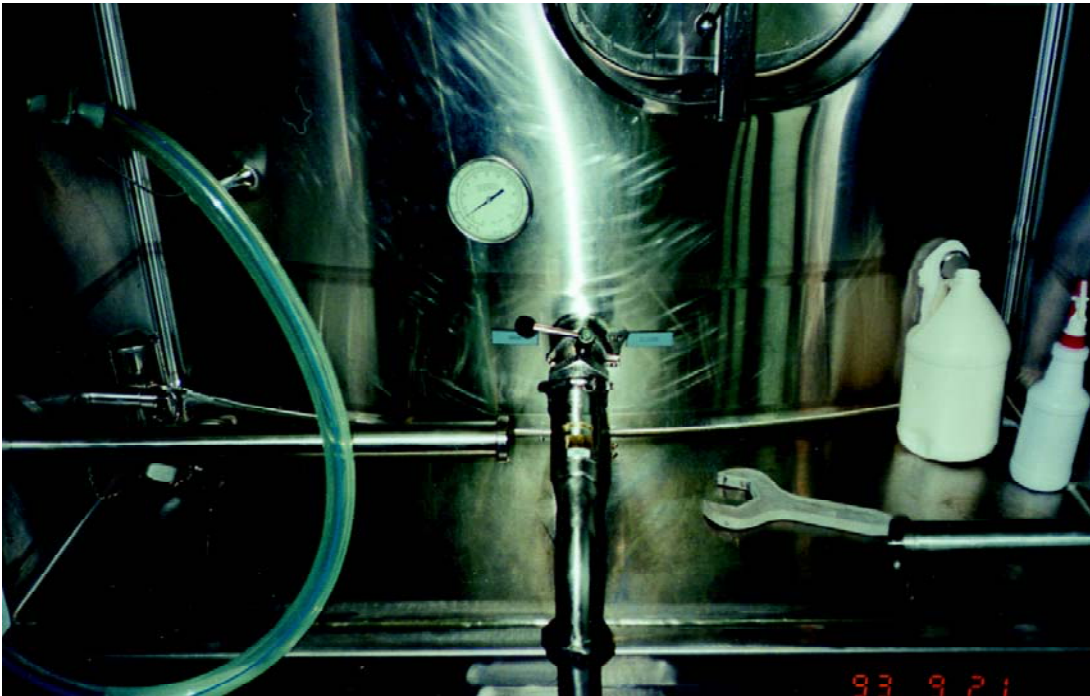
This temperature range permits delivery to the processor storage tank without impairing milk quality. To ensure a load is within this range do the following:

- Sanitize the thermometer before using and rinse after.
- Check the temperature of the milk with your own pocket thermometer at every pick-up.
- Do not use tank thermometers or TTR's as an indication of accurate cooling. These can be out of calibration and as a consequence may not reflect actual conditions.
- Record the exact temperature. Not to do this is a disservice to the dairy producer and the processor. The dairy producer may not be aware his/her farm holding tank thermometer is not accurate and any delays could mean poor quality milk later.
- Notify dairy producer if there is a discrepancy of more than 2 °C between BTMG thermometer and tank thermometer.

iii. Taking the Temperature in Milk Silos

Location of recording thermometers may vary. Every silo must be equipped with a 7 day recording thermometer accurate to within +/- 1 degree Celsius.

- Record the reading at the time of pick-up.
- The temperature is verified using the milk taken from the spigot into the 1 litre container provided by the producer. This litre of milk is used for rinsing (purging) the spigot prior to taking the lab sample.
- Have a functional and legible recording chart.
- It is the responsibility of the producer to ensure recording charts are kept current and readable. The absence of a temperature recording chart or an unreadable chart will automatically result in the milk being rejected.
- Charts are to be dated and retained by the producer for one month for any referrals or trace backs in quality.



Sampling from Milk Silos

IV All silos must be picked up in daylight and must be loaded into an empty tanker.

To take samples from a silo complete the following steps:

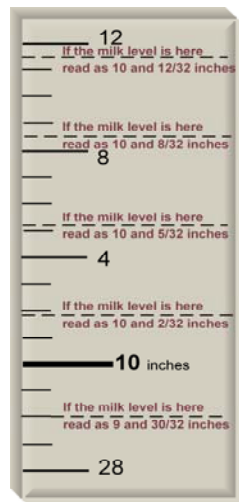
1. Agitate the milk for 10 minutes.
2. Sanitize the spigot and the measuring cup prior to sampling using the sanitizing spray bottle provided by the producer.
3. A full sanitizer spray bottle will be provided by the producer. If it is empty do not refill from producers chemical supplies and do not take a sample. Notify producer and supervisor.
4. Periodically check the concentration with a test strip to ensure adequate sanitizing strength (e.g. 200 ppm chlorine). Notify the producer if it is not.
5. The producer shall provide a measuring cup, at least one (1) litre in size, to be used for purging and sampling milk. To sample the milk use:
the first purged litre of milk for taking temperature and odour identification
second litre of milk for lab sample

7. Reading the Calibration

i. Reading the Stick Correctly

Reading the farm holding tank stick is critical for accurate payment. Reading it wrong can mean a shortfall to the producer and the BCMMB. If the calibration chart is missing, check:

- If the tank is licensed with a temporary farm holding tank installation check list, follow normal pick-up procedures except circle the measurement and any estimated volumes. Notify the BCMMB.



- If the tank is not licensed, **DO NOT** pick-up the milk.

Normally the lines on the measuring stick are so close together the milk will always appear to touch one of them. Read and record the line the milk touches. If the milk does not touch a line use the following guidelines established by the National Bureau of Standards (see examples on the illustration).

- When the milk line is close to, but not exactly on a line, read as if it were on the nearest line.
- When the milk line is exactly halfway between two lines, read to the nearest even number.

Compare this reading with the previous day's reading. If it differs by more than 1 inch or 2 cm, re-read the stick. A remark on the receipt that milk volume is up or down is useful. If the volume changes drastically from the previous pick-up, note it and inform your supervisor.

After a reading is taken, if instructed by the dairy producer, leave the stick out by resting it across the sink. Normally return the stick to its holder after confirming the measurements.

ii. Ensuring an Accurate Reading

To get an accurate and reliable reading note the following:

- No foam must be at or around the stick. If there is, move it way from the stick. Foam will give a false high reading.
- Always read with a 'hot' stick. The stick is heated with hot, running tap water and then wiped very thoroughly in the area to be read with a clean, soft, absorbent single service paper towel. Wipe the upper part of the stick to prevent water running onto the dried area. The stick is heated to melt the butterfat particles and to prevent the condensation of moisture onto the stick. Unless the stick is heated and dried carefully, a false high reading is likely to result.
- Ensure the stick is properly seated. The measuring stick should be supported in a sturdy bracket. The stick should be seated fully in its support before raising. Unless

it is seated completely, a false low reading will result. A very light tap before withdrawing is useful.

- Be alert to structural changes – anything unusual about the stick, its bracket and the placement or angle of the tank. Farm holding tanks for example, must be firmly fixed to a properly reinforced concrete floor to prevent any movement likely to interfere with the accuracy of measurement. Any indication any of these have been tampered with must be reported immediately to your supervisor.
- Check the serial number(s) on the stick and the farm holding tank match the serial number(s) on the dairy farm license and calibration chart.
- If you do not get a straight, even line, once again rinse the stick in hot water; dry and reread. If the stick is not clean, is cool, and/or the milk surface is moving, the milk line will not follow a straight line across the stick.
- Good lighting is vital for an accurate reading. You may need to hold the stick so the milk measuring point is at eye level as you read it. If there is not enough light, notify your supervisor.
- Record results immediately on the handheld computer or receipt pad after reading the stick. To avoid error by forgetting the numbers, be sure to record the results of the stick readings as soon as you are finished.



If ever in doubt about the quality of the reading, take a second reading. If it does not agree with the first, continue until you get two consecutive readings that are the same.

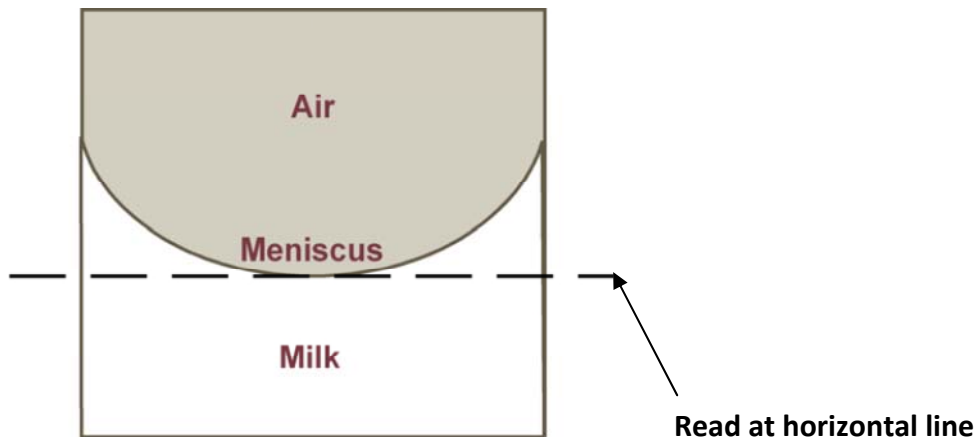
iii. Reading Glass Tube Calibrations

In BC, all glass tube calibrations are banned from farm holding tanks. Glass tube calibrators however are still used on milk silos.

Glass tube calibration units are designed in such a way the contents of the 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 following is the correct procedure:

- The top of the sight tube must be open to the atmosphere. If the sight tube is not open, line terminates in the milk, or if it contains water, it will form a lock, resulting in depressed milk readings.
- Ensure agitation is off and open the valve to the sight glass. Allow the milk to slowly flow in.
- There should be no foam in the tube. If a distinguishing line between the foam and milk is not visible, discard 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.
- Double check and record the reading immediately. There is no way to check later.
- Discard the contents of the tube.
- 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 side 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 it may be repaired. If it is not, notify your supervisor.

8. Sampling Accurately

i. Agitating the Milk Ensures Accurate Samples

In order to achieve accurate and reliable samples the milk must first be adequately agitated for a minimum of 5 minutes for farm holding tanks and 10 minutes for milk silos. This time will seem long, therefore, use a watch and record the start time on the handheld or the receipt pad. Do not guess. Failure to do so can dramatically affect the outcome of both producer payment and penalties.

The following are two possible sequences of events upon entry into the dairy depending upon whether or not the agitator is on. Both scenarios are acceptable:

Agitator ON upon entry

In this situation, ensure the agitator stays on for a full 5 minutes (10 minutes for silos). Never assume it has been running any longer than that. While you are waiting, grade the milk, place the hose near the tank (do not connect), label sample vial and take the

temperature of the milk. Once the agitation time is complete take the sample(s). When the surface is calm, read the stick.

Agitator OFF upon entry

In this situation, to ensure maximum efficiency of your time, first grade the milk and read the stick. Once these tasks are done, switch on the agitator and note the time. While waiting, set up the hose but do not attach. Label the sample vial and take the temperature of the milk. Once the agitation time is complete take the sample(s).

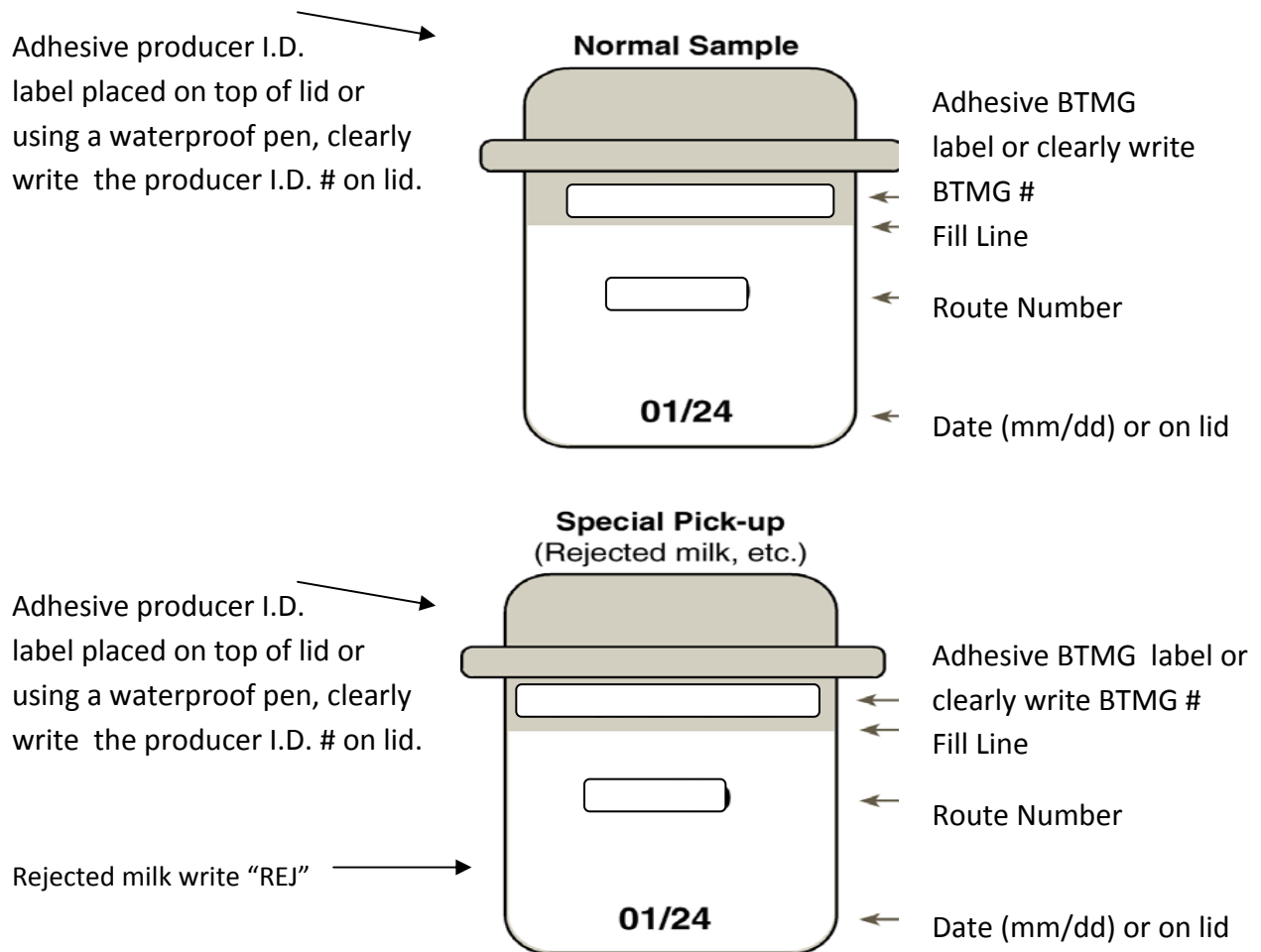
ii. Identify Samples Properly

It is important to properly identify the sample(s). It is used to identify producer payment and milk quality.

Never pre-label your sample vials as mix-ups will happen. Attach your adhesive BTMG personal license numbered label issued by the BCMA on the side of the vial above the fill line. On entering the milk house place the adhesive producer I.D. label, stored adjacent to the calibration chart, on the lid of the vial.

- If labels are temporarily unavailable, use a waterproof pen and printing that is very clear. Ensure letters and numbers are sharp and distinctive. Date all samples on the lid or side of the vial using a waterproof pen.
- All vial identification must be completed before the milk sample is taken. If labels are applied after the milk is in the vial, condensation may form and the labels will not stick.

SAMPLE IDENTIFICATION



For two or more bulk tanks ensure vials are also marked A, B, C or 1, 2, 3. Depending on milk pick-up time, also identify vial by adding A.M or P.M.

iii. The Universal Sample

A simplified method of sample collecting is the "universal sample". One sterile vial is used to hold a 50 ml sample. The sample is collected in a manner that ensures no bacteria are added. The sample is collected at each farm pick-up and used at the

laboratory for all analyses such as fat, bacteria, odour, flavor, antibiotics and others. To sample in this manner you will require:

- A 50 ml stainless steel dipper, provided at the farm or carried in a sanitizing solution on the truck,
- A 200 ppm chlorine sanitizing solution or equivalent to adequately sterilize the dipper,
- Test strips to check the strength of the sanitizing solution.

iv. Ten Steps for Proper Sampling

1. Identify the sample vial(s) with waterproof markings and/or apply computer labels. Apply any labels/markings before sampling as the addition of cold milk will result in condensation on the outside of the container. This will cause markings to smudge and labels to fall off.
2. Sanitize the sampling device (e.g. stainless steel dipper) if it has not already been sanitized.
3. Avoid contact with the rim or inside of the vial with your fingers, as this will contaminate the inside of the vial and alter the results.
4. Take the sample(s) only after milk has been agitated for 5 minutes for farm holdings tanks and 10 minutes for milk silos (or longer if cream streaks are visible).
5. Take the sample(s) from an area free from foam. Never sample through foam.
6. Rinse the sampling device in the milk 3 or 4 times prior to taking the sample, completely emptying the dipper after each rinse.
7. Fill the vial away from the tank opening. The vial could be dropped into the milk and the plastic vial tabs can cause plugging of the vents in the bulk tank, milk tanker and/or dairy plant wash systems.
8. Fill the vial two thirds full to the fill line. Never fill the vial completely – leave some space to permit mixing of the sample in the laboratory.
9. Securely close the sample vial lid also using the locking tab and put on ice immediately.
10. Thoroughly rinse the sampling device with warm water before replacing it in the sanitizer or return to a sanitary location. Milk left on the dipper will eventually

build up in the solution, rendering it ineffective and potentially a source of contamination.

Samples Properly Stored

Immediately after sampling, all samples must be stored in the sample box/cooler in an ice and water mixture to ensure an accurate and reliable sample for payment and quality control. To be stored properly the samples must be:

- Placed on ice immediately after sampling.
- Held upright using racks so the tops are never allowed to be submerged below the water or ice level.
- Kept on ice to keep the samples maintained at or below 4° C (but never frozen).
- Kept in a durable, well insulated, water proof sample box/cooler to keep samples cool and clean.
- Preferably equipped with a water leveling device.
- Stored in chipped ice, crushed ice, or small cubes. Ice blocks and snow are not acceptable as they will not maintain temperature and can also damage and/or contaminate the vials.

9. Record All Information Promptly and Accurately

All the information on the receipt is important to both the producer and the BC Milk Marketing Board (BCMMB). It helps in the event of tracking back any residues, quality problems, farm holding tank rejections, producer payments and production problems. Copies of the receipt must be made available to the producer, BCMMB, and hauler; and must be kept for a minimum of 3 months. Always fully complete the receipt. To be complete the receipt should have on it the following:

1. Ticket Number.
2. IRMA number and farm owner.
3. Date and time of pick-up (specify am, pm).
4. Milk temperature taken at time of pick-up.
5. Volume both the stick reading and the conversion figure in litres of milk.
6. Number of milkings.
7. Status: Accepted or rejected. Tank 1 or 2.
8. Comments and any other important information like odours, lighting problems, temperature deficiencies, etc.
9. Route number and BTMG number.
10. Lab tests: The BTMG is not responsible for lab tests showing on the receipt.
However, the BTMG must ensure the unit is up-dated at the start of the shift for new data to be printed.

If the printer or handheld fails to print a receipt, a handwritten bulk milk pick up slip must be filled out and left in the milk house.

10. Moving the Milk from the Farm Holding Tank to the Truck

i) Connecting the Hose

The milk can be moved onto the truck once it has been graded, measured and sampled.

- Always use the hose port. Every milk house must be equipped with a hose port with a self closing door. Always use the hose port so the milk house door can remain closed, keeping vermin and pets out while you are in the milk house. This also avoids any crimping, bending and/or puncturing of the hose that will both damage the hose and cause it to not clean properly.
- Keep the hose cap clean. The interior of the hose cap is a milk contact surface. It must be protected when the cap is removed from the hose in the milk house. A good way to do this is to place it on the upturned outlet cap.
- Keep the outlet valve capped when not in use. After the farm tank is cleaned and sanitized it should be capped by the producer until the next time milk is pumped out. If the cap is missing or the valve is dirty, be sure to notify the producer and/or your supervisor.

ii) Valves Open, Pumps Primed?

The inlet valve on the tank truck and the outlet valve on the farm bulk tank must be open before starting the pump. This is particularly important if the truck is equipped with a positive displacement pump with no safety bypass. If this type of pump is started when the farm tank valve is closed and the tank truck valve is open, the hose may collapse. If the farm tank valve is open and the tank truck valve is closed when the pump is started, a gasket or other weak place may burst because of excessive milk pressure.

Positive displacement pumps can lift milk 3 meters or more, a necessity whenever the level of the milk house is below the road. Centrifugal pumps are more common, less expensive,

and easier to clean, but they do not have the lifting capability of positive displacement pumps. They are very satisfactory otherwise; however, they need to be primed with milk at the first stop. This means the first pick-up cannot be at a farm where the milk level in the farm tank is below the level of the pump on the truck.

During transit be sure all valves are closed and manholes securely fastened and sealed.

11. Final Checks

Mistakes in the last stages of pick-up can occur and can greatly damage the equipment and/or milk quality. To be certain nothing can go wrong, check all of the following before you leave the premise:

- Agitator and refrigeration turned off. When the tank is empty, shut off the refrigeration by turning off the compressor on a direct expansion tank or the water circulation pump on an ice bank tank. The shut off switch is on the tank or a toggle or knife switch is on the milk house wall. If you initiate the wash cycle of the tank, this will be taken care of. Do not turn off the compressor on an ice bank tank.
- Pump turned off. The milk pump should be turned off as soon as all the milk is removed from the tank. Operating the pump when there is no milk to move will incorporate excess air into the small quantity of milk remaining in the pump, thus increasing the likelihood of the development of a rancid flavor in the milk. At the same time, with electrical pumps, remember to turn the power off to the plug. It could prevent an accident from occurring.
- Milk hose disconnected. Be sure to disconnect the milk hose before rinsing the farm bulk tank. If not, you can contaminate the milk in the truck.
- Replace hose cap. Do not touch the milk contact surfaces within the cap with your fingers. Keep this part of the cap clean as you screw the cap onto the hose end.
- Keep outside of hose clean. If necessary, rinse it off after the hose cap has been securely fastened. Keep the hose cap end off the ground when you pull it back through the hose port and hang it up on its rack in the hose compartment. The pad in front of the milk house must be clean and well drained. If not, ask the producer to have it cleaned. If nothing is done contact your supervisor.
- Check for sediment in the farm holding tank. After the milk is removed from the tank and before you rinse it, examine the bottom of the tank, especially near the outlet. The presence of heavy foreign particles that have settled out of the milk and remain on the tank

bottom could be a serious cleaning or milking procedure problem (see Appendix C). Notify the dairy producer of your observations and alert your supervisor.

- Rinse farm holding tank thoroughly. Rinsing will make cleaning of the tank easier, especially if the dairy producer is delayed as he/she may well be on busy summer days. Refer to Farm Holding Tank information on page 7.
- The dairy producer is entirely responsible for the washing of the farm holding tank. If he/she asks you not to turn on an automatic washer, it is suggested that you cooperate with him/her. It is strongly recommended that you do not fill jars with cleaners or acids. The dairy producer should do this. If an automatic washer is turned on immediately, you do not need to rinse the tank, unless requested to do so by the dairy producer.

12. Excess Milk, Overflowing Tanks and Other Oddities

These situations are serious and may severely impact food quality and safety. For more information on farm holding tank requirements see Appendix D. Following are examples of some situations that will need reporting and may result in rejection of the milk:

- Inadequate farm holding tank capacity: It should be noted on the receipt and reported to your supervisor.
- Milk stored in cans: Any milk in cans must not be picked up.
- Unlicensed farm: Milk may only be stored and received from a licensed dairy farm. Contact your supervisor before picking up the milk.
- Transfers of milk: Transfers, either in reality or on paper, from one producer or farm to another are **STRICTLY PROHIBITED**.
- Excess milk at time of pick-up: If at the last pick-up the truck tank cannot receive all the milk from the farm, you or another hauler must return to pick the remaining milk up on the **SAME DAY**. A very small quantity of old milk can spoil a whole tank load.

13. Leave Milk House Tidy

How you leave the dairy is a reflection of you, your company and the quality of the product you accept. Always take great care to ensure the following steps are taken as you leave the producer's premises:

- Flush away any milk spills. While you have the hose in your hand to rinse the tank, also flush the milk rinsings down the drain. Milk remaining on the floor for a few hours will not only smell, but it will also sour and result in an etched groove in the concrete from just below the outlet valve of the bulk tank to the floor drains. Also, milk from a leaky valve or acid cleaner are frequently the cause of this groove.
- Hang up water hose when you are finished. The dairy producer should be neat. Set a good example for him/her by hanging up the hose when you are finished.
- Close milk house door and hose port. This action prevents the entrance of pests, vermin and animals and the potential contamination of the milk house and its contents. The outside hose port cover should be self closing. If it is not, close it after removing the milk hose. All openings to the milk house must be kept closed or be effectively screened to minimize the entrance of flies, vermin or animals.
- If used, wind up any electric cable, milk and water hoses. All of these routine operations soon become automatic. It is unlikely you will forget to hang up the milk hose, but drivers have pulled away from the milk house with the electric cable still connected. Check everything before you leave.
- Deliver any special messages.
- Shut off the lights.
- Remember dairy farms are family run businesses. Watch for children, pets or neglected toys in the driveway.

Appendix A

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Appendix B

Deposits on bulk tanks can be a frustrating problem for the dairy farmer. Causes for films and deposits are all partly due to poor procedures (improper cleaning, rinsing, etc.) or incompatible products. In mechanical cleaning, problems may also be due to malfunction of the system or lack of proper solution control. When you encounter any cleaning problem on farm, the following are some potential sources and solutions:

Cleaning and Trouble Shooting Guide

Film or Deposit	Description or Identification	Cause	Removal	Prevention
Mineral Calcium, Magnesium	White (water-stone) chalky to gray	<ol style="list-style-type: none"> 1) Improper rinsing 2) Drop-out of minerals from water supply 3) No acidified rinse 	Acid wash with hot water (double up on label rate)	<ol style="list-style-type: none"> 1) Use acid rinse regularly 2) Make sure that alkaline product used has good water conditioning properties 3) Use water softener
Iron	Brown to red	<ol style="list-style-type: none"> 1) Water supply 2) Aggressive supply iron from system components 3) No acidified rinse 	Acid wash with hot water	<ol style="list-style-type: none"> 1) Regular effective acid rinse 2) Water treatment 3) Proper selection of sanitizers
Silica	White to gray glazed appearance	<ol style="list-style-type: none"> 1) Use of mechanical cleaner for manual cleaning 2) Poor rinsing 3) Water supply 4) Failure to manually clean outside surface of equipment cleaned inside mechanically 5) Poorly formulated product 	Special acid wash (This is a very dangerous procedure and should only be attempted by thoroughly trained individuals)	<ol style="list-style-type: none"> 1) Complete post-rinse 2) Regular effective acid rinse 3) Water treatment 4) Manually clean outside surface of equipment cleaned inside mechanically 5) Change to different product
Inking	Black rubber	Reaction between	Acid wash with	<ol style="list-style-type: none"> 1) Acid rinse

(blackening)	parts	chlorine or chlorinated compound and rubber	hot water, if not removed, replace	2) Proper dry storage
Film or Deposit	Description or Identification	Cause	Removal	Prevention
Black	Black residue deposit	1) Rubber migration 2) Contact of dissimilar materials	Acid wash with hot water. If not removed, replace	1) Acid rinse 2) Proper dry storage 3) Proper installation
Wetting Agent	Blue	Poor, inadequate rinsing	Normal cleanup procedures	1) Use proper product 2) Proper rinsing
Protein	Blue – rainbow hue, varnish like “apple sauce”	1) Using non-chlorinated cleaner 2) Inadequate pre-rinse 3) Improper (sporadic or periodic) cleaning 4) Too hot pre-rinse	Initial cleanup with equal parts of chlorine and a chlorinated alkaline detergent with hot water. (Double up on label usage rate)	1) Use a chlorinated alkaline detergent 2) Proper cleaning with proper use dilution during each cleaning cycle 3) Adequate pre-rinse with warm (35° -43 °C) water 4) Rinse before milk film dries on equipment surfaces
Milkstone or waterstone	White to yellow	1) Mineral from milk 2) Mineral from water 3) No acidified rinse	1) Initial clean-up with a chlorinated alkaline detergent with hot water. (Double-up on label usage rate) 2) Acid wash	1) Regular and proper cleaning procedures coupled with acidifier rinse 2) Periodic acid wash in addition to the normal cleaning cycle
Fat/Grease	Hanging water droplets with greasy (white) appearance Oil	1) Improper pre-rinse (cold water) temperatures 2) Low final temperature during cleaning cycle 3) Improper detergent concentration 4) Regular use of acids during washing cycle 5) Pulsator oil on equipment surface	Initial clean-up with a chlorinated alkaline detergent with hot water. (Double up on label usage rate)	1) Regular and proper cleaning procedures coupled with acidified rinse 2) Use warm (35° – 43° C) pre-rinse water 3) Proper cleaning with proper use dilution during each cleaning cycle 4) Do not let wash water drop below 49 °C
Factory soil	Grease, factory dirt-black deposit, rusting	Improper or no initial clean-up	Initial clean-up with equal parts of chlorine and a chlorinated	Thorough cleaning before equipment is used initially

			alkaline detergent & hot water. (Double up on label rate)	
Film or Deposit	Description or Identification	Cause	Removal	Prevention
Corrosion	Rust, pitting	Iron, tramp metal particles, improper chemical usage	<ol style="list-style-type: none"> 1. Acid wash and abrasive action 2. Re-polishing (buffing) if advanced corrosion 	Proper cleaning procedures and passivating rinse
Etching	Pitted and white discoloration “imbedded” in stainless steel surface	Improper use of chemicals or wrong chemicals used	Re-polish	Proper cleaning procedures and passivating acid rinse
Plastics (in addition to above)				
Opaque	“Foggy”, white, not clear	Improper draining, moisture absorption	Exposure to heat and/or sunlight	<ol style="list-style-type: none"> 1. Blower or dryer 2. Good drainage
Yellow	Yellow color	Old age, improper use of iodophors, hand soil stain	None	Proper product application
Brown, black	Brown discoloration	Rubber migration, carbon from dryer motors	Acid wash; if not removed, replace	<ol style="list-style-type: none"> 1. Use acid rinse regularly 2. Proper filtration 3. Segregation of plastics and rubber
Red	Red color, stain	<i>Serratia marcescens</i>	None	Use proper cleaning procedures on regular basis
Pink, purple	Pink to purple color	<i>Streptococcus rubriticuli</i>	Strong alkaline wash	Use proper cleaning procedures on regular basis

Source: *The Professional’s Approach to Quality Milk Production*
 Dr. David Reid and Dr. Andy Johnson, 1993

Appendix C

Bacteria that Affect Milk Quality and Safety

Bacteria are small microscopic one celled plants or animals found in abundance on earth. A few can move very short distances on their own but by far the majority are carried from place to place by birds, animals, humans, moving liquids and air currents. They can be both beneficial and destructive.

Different bacteria prefer different foods or food components. Since milk is an excellent food, the activities of certain types of bacteria both at the farm dairy and the processing plant are of great concern to all dairy producers. The milk receiver will hear names like:

- Psychrotrophs: Bacteria which are able to cope with and grow under cold conditions (0° – 20°C).
- Thermophiles: Organisms that grow and thrive in heat (37° – 90°C).
- Thermodurics (mesophilic): Organisms which can withstand heat but prefer middling temperatures (25° – 40°C). Milkstone build up on and in equipment provides an excellent haven for thermodurics.

All of these organisms are present in dirt, unclean equipment, **unwashed hands**, untreated water supplies, filth, manure, bedding, feed and hair. Cleanliness is essential in preventing bacterial contamination of milk. In British Columbia, the maximum individual bacterial count a producer is allowed in raw milk is 121,000 IBC/ml or 50,000 colonies/ml. Continued violations of the maximum of 121,000 IBC/ml or 50,000 colonies/ml results in cash penalties and may eventually lead to suspension or cancellation of the dairy farm license. ***The BTMG must not be responsible for high bacteria counts. By adopting good sanitary practices, when taking***

samples, this can be prevented from occurring. Samples must be properly marked, sealed and stored to prevent leakage, contamination or incubation.

Bacterial growth rate is determined by a time temperature relationship. At low temperatures (0° – 4° C) growth is extremely slow. Cold temperatures do not destroy micro-organisms but inhibit their normal development. As temperature increases the time required for multiplication decreases until at 30° C it only requires 15 – 20 minutes for the total bacterial population to double. For example, E. coli doubles every 12 minutes in milk, i.e. 1 bacterium splitting 5 per hour results in 4,096 bacteria in 24 hours. The following table illustrates how temperature can effect bacterial growth:

Temperature Affects Bacterial Growth

Temperature (°C)	0 Hour	3 hours	9 hours	24 hours
15°	9,000	10,000	46,000	5,000,000
25°	9,000	18,000	1,000,000	57,000,000
35°	9,000	30,000	35,000,000	8,000,000,000

Contamination of raw milk is both internal and external. Good raw milk has 500 to 8,000 total micro-organisms per ml and less than 1 coliform per ml.

Appendix D

Farm Holding Tank Requirements

1. Temporary License

- a. Farm Holding Tank – Installation Check List prior to tank calibration.
- b. Post calibration, but construction of premises (relating to a farm holding tank installation) incomplete (original copy – posted in milk house).
- c. Until permanent license can be laminated and posted.

2. Permanent License

The dairy farm license is issued on completion of tank calibration and construction requirements (laminated and posted in milk house).

The dairy license and tank license are one in the same. In the case where a license has been canceled, it may be removed from the milk house and destroyed. The BCMMB and the hauling company are notified by the Livestock Health Management and Regulatory Unit.

3. Tank Requirements – Capacity

- a. Size and Outlet Valve
 - i. Tanks must conform to 3A Standards and the *BC Standards for the Design, Fabrication, and Installation of Milk Handling Equipment* in material, fabrication and operation.
 - ii. Tank capacity and capability should be such as to meet future demands, and of holding six (6) milkings when installed.

- iii. Prior to installation and licensing, a tank having a rated capacity greater than 4000 litres must have a 50 mm outlet fitted with 50 mm valve. All tanks new to the province must have a 50 mm outlet fitted with a 50 mm valve.

4. Refrigeration Capacity

The cooling system shall be capable of preventing the blend temperature of the milk in the tank from rising above 10°C at anytime during the second or subsequent milkings, and of attaining and holding the temperature between 0°C and 4°C within one hour of milking.

5. Dipsticks

Tanks must be equipped with dipsticks graduated in thirty-seconds of inches or millimeters clearly milled or stamped. Dipsticks with etched graduations and figures which are faint must be replaced or renewed. The serial number should correspond to that of the tank. If different, it should be noted on the dairy farm license.

The dipstick shall be fixed in the dipstick holder or socket at the gauge point of the tank so that it hangs vertically.

6. Sight Glass Calibration

Only milk silos may have an exterior sight glass calibration. The measuring rod and sight glass must be immediately adjacent and the measuring rod must be vertical and attached to the tank in such a manner that it cannot be depressed or raised in relation to the tank position. The slide must move freely for the entire length of the measuring rod and be provided with a means to hold it firmly in place at the gauge reading.

7. Tank Drainage

All farm holding tanks must have a minimum slope of 2.75 cm per meter (2.75%) slope to the outlet. Manufacturers may require a greater slope, in which case, the manufacturer's requirements will be met.

8. Licensing Farm Holding Tanks for Other Than Normal Use

E.D. (Every Day) and E.O.D. (Every Other Day) Use

Farm holding tanks are manufactured to meet standards of cooling capacity for:

- Every other day (E.O.D.) pick-up or 25% of capacity per milking, or,
- Every day (E.D.) pick-up or 50% of capacity per milking.

Farm holding tanks must meet the appropriate cooling capacities as determined in the 3A Sanitary Standards.

Special circumstances as detailed below requiring other than E.D. or E.O.D. pick up must be agreed to by the producer, the BCMMB and approved by the Manager or the Provincial Dairy Technologist of the Livestock Health Management Unit.

A farm holding tank utilized in this way must still function at a minimum of an E.O.D. capacity. No tank should be emptied less frequently than every fourth (4) day or twice per week (a 3-4 day split).

Special circumstances could include the following:

- Isolated dairy farms more than 300 km from the receiving plant.
- Insufficient supply of milk in tank to be measured at 4 milkings (this should be a short term measure only, maximum months).

- To accommodate plant processing weekend schedules, a 6-4-4 (Monday, Wednesday, Friday) pick-up schedule may be an alternative.

9. Requirements for Two Farm Holding Tanks Per Milk House

Approval for more than one farm holding tank can only occur when the smallest volume tank has the capacity to accommodate a minimum of 24 hours of production.

10. Multiple Bulk Milk Holding Tanks

- a. All relevant requirements of the *Milk Industry Act* and pursuant regulations shall be adhered to.
- b. All bulk tanks must conform to 3A standards with their identification details listed on the Dairy Farm License.
- c. Bulk tanks must be clearly identified Tank 1, 2, 3 or Tank A, B, C, etc by affixing a large waterproof decal on the tank and must correspond to the calibration chart designated to that tank and the dairy farm license.
- d. All tanks must meet minimum cooling requirements for every day milk collection as defined in 3A Sanitary Standards for Farm Milk Cooling and Holding Tanks.
- e. A wall mounted board, clearly identified, shall be provided in the milk house for each tank. They shall be situated at least two meters apart and shall be in close proximity to the corresponding tank. On each of these boards shall be a calibration chart and a clip for milk receipt slips.
- f. To ensure an accurate sample, each bulk tank must have capacity for all milk produced in 24 hours, and volumes of milk directed to a tank must at all times be sufficient to permit proper tank function.

- g. Volume measurements will be performed on each tank and recorded separately. The BTMG must not attempt to add volumes. Receipt slips for each tank will be identified by prefixing the producer number with 1, 2, 3 or A, B, C etc.
- h. Samples will be collected from each tank and identified by prefixing the producer number with 1, 2, 3 or A, B, C, etc.
- i. The BCMMB will record milk volumes separately for each tank.
- j. Butterfat analysis will be conducted on the separate representative samples with the test results applied to the actual volumes of milk collected from the corresponding tanks.
- k. Milk grading analysis will be conducted on a sample from each tank and where an infraction occurs from one or a combination of both tanks, the applicable penalty (IBC, Inhibitor, SCC and Water) will apply to all milk produced that month.

11. Robotic Dairy Operations

Read all written instructions mounted on the milk house wall and complete the required procedures. If instructions are missing notify the producer and your supervisor.


Appendix E

Thirteen Steps for Correct Milk Pick-Up

Prepared by Roger Pannett
Provincial Dairy Technologist, BCMA

Agitation IN Progress

1. Wash and dry hands. Check milk for odour, appearance (**closely observe agitator shafts to ensure no entry of oil/grease into milk**), and temperature (must be below 4⁰C). Sanitize thermometer probe prior to and after taking milk temperature. Closely read operational instructions at Robotic installations, including light indicator sequencing relating to milk sampling and volume recording.
2. Continue agitation for 5 minutes. Label sample vial with shipper number, BTMG personal license number, correct route number, and date. (If milk is rejected also write REJ on the vial).
3. Using a waterproof marker, for two plus bulk tanks ensure vials are also marked A, B, C ... or 1, 2, 3... Identify the route number and a.m. or p.m.
4. After 5 minutes agitation, remove dipper from sanitizing solution or sanitary location, carry dipper well in upside down position and then rinse at least three times in milk. Take a sample holding the vial away from the open milk surface, **filling to vial fill line**. Ensure vial lid is securely closed and immediately place milk sample(s) in a rack submerged in plenty of ice inside a cooler. Rinse dipper under tap and return to sanitizing solution or sanitary location.
5. Shut off agitation. While milk is settling down, rinse measuring rod under hot water tap and, once heated, wipe dry.
6. Take measurement after motion has stopped. Ensure there is no foam where rod enters milk. Tap rod lightly to make sure it is fully seated. Record measurement to nearest 32nd on hand held computer or in receipt book and compare with previous

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- measurement. Recheck and record any large volume change. For two plus bulk tanks also identify on hand held computer, or in receipt book, A, B, C or 1, 2, 3.
7. Once all is in order, connect hose and protect hose cap. Open valve and turn on pump.
 8. Tank empty – remove hose, replace hose cap and shut off pump. Return hose, (and electrical cord to truck) check for sediment & foreign particles then rinse out tank and hose down floor. Automatic tank washers may be used in place of rinsing out tanks. However, rinsing inside of tank with cool/warm water is an excellent routine. BTMG's ARE NOT RESPONSIBLE FOR ADDING CLEANSERS. Ensure automatic tank washers are operating correctly before leaving milk house.
 9. Turn off lights and close doors.

Agitation NOT in Progress

10. Upon entry to milk house, shut off agitator. Wash and dry hands. Check milk for odour, appearance(**see note 1**), and temperature (must be below 4⁰C). Sanitize thermometer probe prior to and after taking milk temperature (**see note 1 concerning Robotic installations**).
11. Remove, rinse, heat and dry measuring rod as in steps 5 & 6.
12. Proceed with 5 minutes agitation (gently touch agitation sensor pads and allow for a +5 second operational delay) and steps 2, 3,4,7,8 and 9.
13. When opening plastic vials, keep away from opened bulk tank lid i.e. plastic tabs have been causing plugging of vents in bulk tank, milk tanker and/or dairy plant wash systems. *Dated load samples taken at dairy processing plants.*