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**NEW YORK STATE DEPARTMENT OF  
AGRICULTURE AND MARKETS  
DIVISION OF MILK CONTROL & DAIRY SERVICES  
ALBANY, NEW YORK 12235**

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# **SAMPLING PRODUCER MILK CIRCULAR 278**

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**SELECTIVE PROVISIONS OF THE  
AGRICULTURE & MARKETS LAW  
RULES AND REGULATIONS RELATING  
TO SAMPLING AND SUGGESTED  
PROCEDURES FOR SAMPLING  
REVISED 08/06**

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## **MEASURING MILK ACCURATELY**

### **Turn off agitator switch?**

The milk should be perfectly quiet when you use the measuring stick. If the agitator is operating at the time of arrival, it may be quickest to sample before shutting off the agitator switch. (Allow for 5 minutes of observed agitation before sampling.) Be sure the agitator switch is turned off before you read the stick; otherwise the agitator may start while you are taking your duplicate readings.

### **Milk perfectly still?**

The milk must be absolutely still at the time of the stick reading. Any slight undulation of the milk surface will give an abnormal, high reading on the stick.

### **No foam at stick?**

Be sure that there is no foam on the surface of the milk in the area of the stick. This will give a false, high reading.

### **Stick wiped dry?**

The stick must be wiped very thoroughly in the area to be read with a clean soft absorbent single-service paper towel. Unless the stick is absolutely clean, a false high reading is likely to result. Be sure that the towel is clean.

### **Stick properly seated?**

The measuring stick should be supported in a sturdy bracket. The stick should be seated fully in its support for about 10 seconds before raising. Unless the stick is seated completely, a false, low reading will result.

### **Milk line straight across the stick?**

If the stick is clean, the milk line should follow straight across the stick evenly. If you do not get a straight, even line, rinse the area of the stick where the milk reading is to be taken in hot water, redry and reread.

### **Milk reading taken twice?**

Always take a second reading. If it does not agree with the first, continue until you get two readings in sequence that are the same. The milk measure point of the stick should be held at eye-level at time of reading.

### **Agitator switched on?**

When you finish your reading, switch the agitator on immediately in order to minimize the waiting time before sampling.

## RECORD RESULTS PROMPTLY

### Results recorded immediately after reading stick?

To avoid error, be sure to record the results of the stick readings as soon as it is completed. Write this promptly on the receipt pad.

### Reading correct?

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

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 half way between two lines, read to the nearest even number.

Compare this reading with the previous days reading. If it differs by more than one inch, reread the stick.

### Ticket completed properly?

While the milk is being mixed, complete the weight slip from the receipt pad. Consult the conversion chart on the milkhouse wall, convert the stick reading to pounds of milk, and record. Also be sure that you record the temperature of the milk, the date and time of pickup, and any special information which is important. Don't forget to sign the slip.

## BACTERIA AND BACTERIAL CONTROL

### Bacteria: What are they?

1. Lowest form of life. Can be seen when magnified about 600 times.
2. Composed of a single cell.
3. Reproduced by splitting or division of the cell.
4. Capable of very rapid growth and reproduction under proper conditions.

### Characteristics of Bacteria:

1. Very small. Approximately 1/15,000 to 1/25,000 inch in length and width.
2. Shapes vary:
  - (a) round
  - (b) rod shaped
  - (c) spirals
3. Mobility: Capable of travelling about 1 inch in 30 minutes.
4. Other Characteristics:
  - (a) Some bacterial cells have a capsule or slimy film covering the cell. Ropy milk.
  - (b) Some cells have a sheath or tough capsule around them. These cells are generally the older cells associated with clean equipment. These cells are harder to destroy.

### **Types of Bacteria:**

Hundreds of different types of bacteria, each having its own characteristics:

- (a) Some ferment certain sugars.
- (b) Some produce gas.
- (c) Some putrefy food substances.
- (d) Some produce poisonous toxins.
- (e) Different types have different temperature growth requirements and different heat death points.

The bacteriologist is able to classify or identify bacteria on the basis of the above and other characteristics.

### **Use of Bacteria:**

Desirable Types:

- (a) Medical fields-vaccines, antitoxins for diseases such as small pox, tetanus and diphtheria.
- (b) Soil fertility - inoculation of grass seeds.
- (c) In the dairy industry - manufacture of various types of cheeses, fermented milk drinks, ripening cream for butter, etc.
- (d) For the production of certain foods such as sauerkraut and vinegar.
- (e) Aid in sewage disposal. Bacteria liquefy sludge in septic tanks.
- (f) Industries uses - alcohol production.

Undesirable Types:

- (a) Some produce disease. Some of the milk borne diseases are typhoid, septic sore throat, diphtheria, dysentery and undulant fever. All diseases producing bacteria are killed at pasteurizing temperatures. The main reason for pasteurization of milk is to destroy any disease producing bacteria if present.

### **Bacteria in Fluid Milk:**

Bacteria are not needed in fluid milk. If many are present, their action on milk sugar causes souring and off flavors. Toxins may be produced in the milk if the undesirable types are present in large numbers.

“Bacteria are very small single celled plants. They reproduce by splitting into two; at 100 degrees they generally reproduce in 20 minutes and at 50 degrees it takes approximately 12 hours. The number of bacteria is estimated by the Direct Microscopic or Agar Plate Method.”

### **Reproduction Rate of Bacteria:**

Very rapid under proper conditions. If one bacterial cell reproduced every hour, in 24 hours

there would be 16,000,000 cells.

### TEMPERATURE REQUIREMENTS FOR GROWTH

Temperature	Bacteria and Bacterial Control Generation Time
100 Degrees	20 Minutes
90	25
80	40
70	60
60	2 ½ Hours
50	12 Hours

#### **Sources of Bacteria in Milk:**

1. Utensils
2. Exterior of the cow
3. Interior of udder - infections
4. Air
5. Milker habits
6. Flies, etc.
7. Water supply if not pure
8. Improper sampling and hauling

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#### **Requirements for Bacterial Growth**

Temperature, Food and Moisture: Growth can be controlled by making one of these conditions unfavorable.

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#### **Bacterial Control by Milk Producers:**

Milk as it comes from the teat of a healthy cow is practically bacteria-free. The producer should prevent the introduction of or seeding of the milk with bacteria from milking equipment or utensils or from any of the sources mentioned above.

Prompt, rapid and adequate cooling or refrigeration of milk is essential to prevent bacterial growth.

Abnormal milk is that which contains milk from cows with mastitis, colostrum, or irritated quarters as evidenced by a high somatic cell count or positive reaction to the Wisconsin Mastitis Test. Somatic cells found in milk are mainly white cells from the cow's blood or lymph system and cells from the inner lining of the cow's udder.

## **CLEANING AND SANITIZING OF UTENSILS AND EQUIPMENT**

### **Basic Rules:**

1. Use only cleanable equipment and utensils, which are free of checks, dents or cracks which might harbor bacteria. This includes all rubber parts.
2. Consider all rubber or plastic vacuum hoses as part of the milking equipment.
3. Do not reuse any filtering material.

### **Cleaning Process:**

1. Thoroughly rinse equipment and utensils with warm water promptly after use.
2. Wash by scrubbing with a brush and a good dairy cleanser in warm water.
3. If milkstone has a tendency to build on, use an acid cleaner on a regular schedule.
4. Rinse thoroughly, hot water preferred.
5. Allow equipment to drain and dry.

### **Sanitizing:**

1. Sanitize all milk contact surfaces just prior to each milking to destroy the bacteria which grew in between cleaning time and milking time intervals.
2. Chemical sanitizers are preferred to hot water sanitization since enough hot water is not available at most farms for proper hot water sanitization. (Hot water sanitization requirement is 180 degrees F. for one minute.)
3. Surfaces of all milk contact parts must be clean. It is not possible to sanitize a dirty piece of equipment properly.

### **Chemical Sanitizers:**

1. Chlorine. Most effective when used with warm water, however, chlorine gas escapes and should be used promptly after preparation. 200 ppm.
2. Iodine compounds. 25 to 50 ppm. Use according to directions.
3. Quaternary ammonium compounds. Use according to directions.

## **MILK CONTACT SURFACES TAKING MILK SAMPLES FOR BACTERIAL AND ABNORMAL MILK ANALYSIS**

Section 57 of the Agriculture and Markets Law requires that persons taking these samples be licensed and that the license can be revoked for incompetence or inaccuracy.

Producers are sometimes paid a premium for milk having a low bacteria count or milk may be rejected or excluded if it has a high bacteria count or high somatic cell count.

## **Milk Receiver Checklist:**

### Supplies and Vehicle

- 1) Is your tanker clean and are the openings sealed? Do you have a wash tag with the vehicle showing where it was last washed, if you do not return it to the same location each day?
- 2) Do you have an accurate thermometer, which was checked by a certified laboratory and was that information recorded on your milk receiver card each six months?
- 3) Do you have a clean dipper and correct sanitizer strength – 200 parts per million if it is chlorine, 25 to 50 parts per million for iodine sanitizer. You must have a test kit, so that you can check the sanitizer strength?
- 4) Are your sample vials kept clean and dry prior to sampling?
- 5) Is your sample storage case tight and does it have ice water at the level of the milk in your sample vials?
- 6) Are samples kept in a float, so as to keep them upright and protect them from contamination?

### **TAKING OF PRODUCER SAMPLES**

Are your hands washed and dried after handling the hose? Have you checked the milk for odor, floating material and temperature?

### **FOLLOW THESE STEPS WITHOUT EXCEPTION:**

- 1) Carry your sample dipper into the milkhouse in your sanitizing container.
- 2) Sanitize the outlet valve before connecting the hose.
- 3) Sanitize your test thermometer for at least one minute before taking the temperature of the milk in the bulk tank. Record this temperature on your weight slip.
- 4) Measure the milk in the tank when it is perfectly still and take at least two measurements. Be careful not to contaminate the milk. Always use a clean, dry paper towel to wipe the measuring stick. Be sure your clothing is clean. Immediately record the measurement on the producer weight slip.
- 5) Agitate the milk for at least five minutes of **observed** agitation (10 minutes for tanks more than 1500 gallons) no matter how long you think the milk was agitated prior to your arrival. Rinse the sample dipper at least two times in the milk prior to actually taking your sample.

- 6) Take the sample prior to opening the tank valve and be certain to take a control sample at your first pick-up. Be sure to record on the control sample the date, producer number, the word "control" or "T.C.", time of pick-up, the temperature of the milk in the bulk tank, and your initials on the vial, along with any other information required by the milk purchaser. Write clearly.
- 7) Do not hold the sample container over tank openings while sampling.
- 8) Fill the container to three-fourths full. Usually this is to the line provided on the vial.
- 9) Rinse the sample dipper in running water before putting it back in your dipper container.
- 10) Put the sample in your sample case immediately. Do not put it in the tank or your pocket.
- 11) Be certain that samples are kept at between 33 degrees and 40 degrees F.
- 12) Check the temperature of the control sample when you drop your samples off and record this information on the temperature control record provided at the refrigerator. Also record the bulk route identification (example: "T-1") and your name and the date.

**Remember to record your full name (not nickname) on the weigh slip.**

## CHAPTER 3

### SAMPLING DAIRY AND RELATED PRODUCTS

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(L. Maturin, Tech. Comm.)

#### 3.1 Fluid Milk and Cream Samples

The following has been reprinted from the 16th Edition of Standard Methods for the Examination of Dairy Products by permission of the American Public Health Association, 1015 Fifteenth Street, N.W., Washington, D.C. 20005.

The sample must be representative of the mass of material being examined. It must be collected in such a way that it is not contaminated microbiologically or chemically. Protection must be provided against change in the sample during the period between collection and analysis.

#### 3.2 Equipment

A. Thermometer:

1. Glass type, filled with mercury or a distinctively colored fluid: Must be checked for accuracy initially and at least biennially thereafter; graduation interval must not exceed 1°C.
2. Dial type or electronic: Must be checked initially and at least every 6 months thereafter. Recommended for use where glass thermometers are likely to be broken – for example, with farm bulk tanks and in processing plants. Graduation interval must not exceed 1°C or 2°F.
3. Tests of accuracy: Must be made against either a thermometer certified by the National Institute of Standards and Technology or one of equivalent accuracy [2.4U]. Thermometers must be accurate within  $\pm 1^\circ$ , and each thermometer must be tagged with the correction factor and the date last checked. Each thermometer must be checked at or near the temperature of use(s). Records of each thermometer's test of accuracy must be maintained.

B. Sample Transfer Instruments:

1. Tubes: Individually wrapped, sterile, single service or sanitized stainless steel.
2. Dippers: Stainless steel, with long handles silver soldered to the bowl; capacity 10 mL or greater.
3. Syringes: Sterile, with a 16-gauge or larger needle; capacity 20 mL or greater.
4. Triers: Sterile, stainless steel.
5. Spoons: Sterile, stainless steel.
6. Spatulas: Sterile, stainless steel.
7. Cork borers: Sterile, stainless steel.
8. Tongue depressors: Sterile.
9. Knives: Sterile, with pointed blade.
10. Auger, coring tube, or bit: Sterile.
11. Chisel: Sterile.
12. Hatchet: Sterile.
13. Scalpel or scissors: Sterile.
14. Forceps: Sterile.
15. Swabs: Sterile.
16. Screw-capped vials or tubes: Sterile.
17. Strainer: Sanitized.
18. Off-bottom sediment sampler: Sanitized.
19. High-speed drill: With sterilized auger.

## Conversion Factors

The following are provided to aid in converting data from one measurement system to another

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1.0 oz. (ounce) weight	=	28.3 g (grams)
1.5 oz.	=	42.5 g
4.0 oz.	=	113.4
1.0 lb. (pound)	=	453.6 g

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1.0 oz. (ounces) volume)	=	29.6 mL (milliliter)
1.0 pt. (pint)	=	473.2 mL (0.4732 L)
1.0 qt. (quart)	=	946.3 mL (0.9463 L)
1.0 gal. (gallon)	=	3785.0 mL (3.785 L)

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32 degrees F (Fahrenheit)	=	0.0 degrees C (Celsius)
40 degrees F	=	4.4 degrees C
45 degrees F	=	7.2 degrees C
104 degrees F	=	40.0 degrees C
180 degrees F	=	82.2 degrees C

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1.0" (inch)	=	2.54 cm (centimeters)
1.0' (foot)	=	30.48 cm

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### C. Sample Containers:

1. Multiple use: Sterile; made of glass or food-grade plastic with nontoxic [2.4E], leak-proof closures.
2. Single service:
  - a. Sterile; made of nontoxic food-grade plastic.
  - b. Nonsterile; made of nontoxic food-grade plastic-for raw milk and cream only, assuming the following conditions are met:
    - (1) Maximum viable bacterial counts in rinse tests of 60 containers per lot do not exceed 1 per milliliter of capacity. The lot is accepted only if all vials tested are in compliance.<sup>12</sup>
    - (2) Closure is designed so the container can be opened and closed easily without contaminating the lip of the vial or the inner surface of the closure.

- (3) Acceptable fabrication processes and materials are ensured because a state authority has inspected and certified the manufacturer as a source of single-service containers.<sup>13</sup>
  - (4) One of the two methods [3.2C3a,b] are used to verify that vials of a lot do not leak.
3. Sampling plans to verify that vials of a lot do not leak:
- a. Method I: Select 14 vials at random from the lot of vials to be tested. Fill each vial  $\frac{3}{4}$  full with powdered sugar or a color-indicating desiccant that has been dried. Cap the vials, making certain the closure is properly positioned. Secure the vials upright in racks using a wire cover or other means. Place the racks into a case containing ice water ( $0^{\circ}$  to  $1^{\circ}\text{C}$ ) and a dye or indicator solution, and submerge the vials for at least 6 hours or overnight. Place weight on top of the submerged vials to keep them under water. Remove racks from the ice water solution and examine the vials for leakage. Using paper towels or other absorbent material, carefully remove water on the outside of the vials-especially around the rim of the closure-to prevent water from accidentally entering the vials when opened. Carefully open the vials inspect their contents for signs of water entry, and record the number of vials that leaked. The lot will be accepted if no defective vials are observed.
  - b. Method II: Select 24 vials at random from the lot of vials to be tested. Fill each vial  $\frac{3}{4}$  full with raw milk. Cap the vials, making certain the closure is firmly and completely positioned. Invert vials in racks and refrigerate (at  $0^{\circ}$  to  $4.4^{\circ}\text{C}$ ) for at least 15 hours. Transfer inverted vials to an incubator, and warm the vials and their contents to  $40^{\circ}\text{C}$ . If any vials leak, the lot is rejected. If no vials leak, return the vials to the upright position and shake 25 times in 7 seconds with a 30-cm movement. If no vials leak, the lot is accepted.
  - c. Results: Results of all tests conducted on each lot must accompany that lot when marketed.
  - d. Defects: When frequencies of testing are 14 vials (Method I) or 24 vials (Method II) and the number of units in the lot is large (e.g.,  $N = 10,000$ ), there is 1 chance in 20 that a lot will be accepted with more than 21.4% or 12.5% defects, respectively. Conversely, the probability of accepting lots with more than 21.4% defects (Method I) or 12.5% defects (Method II) is less than .05.

D. Sample Case:

1. Case is of rigid metal or plastic construction, is insulated, and has a tight cover.
2. Ample space exists for ice or other refrigerant to cool and maintain samples at  $0^{\circ}$  to  $4.4^{\circ}\text{C}$  until transferred.
3. When a mixture of ice and water is used, the case shall be provided with racks, compartments, or baffles to 1) hold the sample containers vertically, 2) keep the necks of the containers above the surface of the cooling medium at all times, and 3) maintain the cooling medium at a level slightly above that of the liquid in the sample containers.
4. To protect samples from moisture, containers may be placed in a moisture-proof metal box or can or in a sealed plastic bag.

E. Shipping Case:

1. Primary case: When samples are transferred to the laboratory from a receiving station, plant, or other point of collection via a common carrier, the shipping case must be provided with a tamper-proof sealing and locking device and with handles. Attach “This Side Up” labels on top of the shipping case.
2. Secondary case: When inner shipping cases are needed to protect samples in small vials or containers, provide boxes just large enough to hold containers upright and to prevent container breakage when the box is placed in a larger shipping case. Boxes must have tightly fitted covers.

F. Agitators:

1. Mechanical agitators: The 3-A Sanitary Standards (3-A)<sup>8,9</sup> specify types of equipment or mechanical agitators acceptable for use in bulk milk operations, weigh tanks, vats, and storage tanks. Air systems used for agitation must comply with the applicable 3-A Sanitary Standards<sup>7</sup> for odor-free, oil-free, filtered air.

The following methods may be used to agitate milk in tankers or storage tanks:

- a. A mechanical agitator built into the tank.
  - b. A propeller or agitator placed through the manhole with the agitator suspended in the milk.
  - c. An oil-free, filtered, 3-A quality air supply<sup>7</sup> injected through a quick coupling device on the rear of the tanker or through a sanitary air hose inserted through the manhole of the tanker.
  - d. An approved sanitary tank washer/air agitator system, permanently installed in the tank, through which 3-A quality air<sup>7</sup> enters and agitates the milk. This method of agitation is not recommended unless an approved cleaned-in-place (CIP) system [3.7D1] has been installed at the receiving plant.
  - e. The milk transfer hose, which, when attached both to the tanker unloading pump and to the manhole, permits recirculation and mixing of the milk.
2. Manual agitators:
    - a. Stainless steel scoop (about 15 cm in diameter) on the end of a stainless steel rod long enough to reach the bottom of the container.
    - b. Bowl-type agitator-sampler consisting of a stainless steel handle welded to the outside of a bowl with a pouring spout. (Silver soldering of handle to bowl is acceptable).

G. Cleaning, sanitizing, and sterilizing equipment:

1. Cleaning: All multiple-use equipment must be cleaned and rinsed thoroughly before sanitization or sterilization.
2. Sanitizing:
  - a. Hot water sanitization: Use two stainless steel containers of approximately 40-L capacity (or two 37.85-L milk cans in good condition) equipped with threaded fittings to provide metal inlets for steam and water connections. (Do not substitute rubber hose.) The first container is for a cold-water rinse of the agitator and sampling instrument. The second container, with a bottom inlet for steam under pressure, is for hot-water treatment (at not less than 82°C) of instruments. Equip the second container with a thermometer immersed in the water. Minimal exposure time at 82°C is 1 minute. Minimize the risk of burns and excessive noise by installing a steam coil with a condensate trap on the exhaust side.

To ensure against possible back-siphonage into potable water lines, the cold-water lines should terminate not less than 2.54 cm above the lip of the can or equipped with an approved antisiphon device.

- b. Chemical sanitization: Use two containers as above. In the second container, however, replace the hot water with a solution of an approved germicide<sup>14</sup> that is at all times bactericidally equivalent to 200 mg/L (200 ppm) or more of available chlorine as hypochlorite. Submerge sampling equipment for at least 1 minute in the chemical sanitizer. Sampling dippers carried on bulk-tank milk trucks shall be stored in a tightly stoppered tube-type container of sanitizer solution.
3. Sterilizing:
    - a. Hot-air sterilization: Glassware and metal equipment may be sterilized by holding at a temperature not lower than 170°C for not less than 2 hours [4.10B].
    - b. Autoclave (steam) sterilization: Glassware and metal equipment may be steam sterilized by holding at 121°C for not less than 15 minutes [4.10A]. Equipment must be dry before use.

### 3.3 General Requirements

#### A. Records:

The following records should accompany all samples to the laboratory:

1. Time and date of sampling.
2. Product(s).
3. Temperature of product(s) sampled.
4. Location sampling took place.
5. Interim transfer point: Time, date, and temperature of each temperature control when sample was received or shipped.
6. Sampler's name or identifier.

#### B. Agitation:

Collection of representative samples usually requires agitation of the milk, especially when the milk is held in bulk storage tanks and transportation tanks. With inadequate agitation of bulk-tank milk (i.e., milk in farm tanks, tank trucks, or plant storage tanks), samples taken from the top of the tank contain more bacteria, somatic cells, and milkfat than samples taken low in the tank.<sup>2</sup> Higher numbers of cells are caused by the rising of fat globules, which "sweep" microorganisms and somatic cells toward the surface, thus concentrating them in the cream layer.

1. Raw milk:
  - a. Farm bulk tanks: Agitate milk stored in a farm holding cooling tank for at least 5 minutes immediately before sampling.<sup>8</sup> Agitate contents of farm storage tanks of more than 5,700 L (1,500 gal) for 10 minutes, or as required by the tank manufacturer<sup>9</sup>.
  - b. Mobile tank trucks (farm pickup and over-the-road tankers) and dairy plant storage tanks: Time required to agitate a tank of milk until it is homogeneous is determined by size and shape of the tank; volume of the product held; type, location, and number of agitators on the tank; force of the agitator and time allowed for creaming before starting agitation. Therefore, it is necessary to determine for an individual tank how much agitation time is needed to ensure homogeneity of its contents.

Agitation time for milk storage tanks and milk tank trucks may be determined by taking a series of milkfat samples at specified intervals (e.g., 3 minutes, 4 minutes, etc.) during mixing until at least five milkfat tests stabilize at a definite value. From a full tank, where possible, take samples from the top and bottom, and from points near to and far from the source of agitation. Where the construction of a tank does not permit direct removal of subsamples, draw samples through the outlet valve or sampling cock while the agitator is running.

Adequate agitation<sup>9</sup> is that degree of agitation which, at full tank, will result in the milkfat content of the product in the tank varying by not more than two standard deviations from the mean. For example, if the mean is 3.5%, differences between tests of individual samples should vary by no more than 0.08%. This is based on estimates of  $S_R$  from Chapter 1.

When the appropriate time of agitation has been determined for each stationary or mobile tank, record and use it as the guide for proper agitation time for samples from that specific tank.

- c. Milk cans and weigh tanks: Agitate the cans for about 7 seconds with at least seven pulls stirring from the bottom up.
  2. Pasteurized packaged fluid products: Mix the product in its container by completely inverting the container 25 times.
- C. Cooling:  
Cool samples to and maintain at 0° to 4.4°C by immediately placing the samples into ice or an ice-and-water mixture.
- D. Temperature control:  
A sample to serve as a temperature control. Must be collected at 1) the first sampling point on each farm route, 2) each sampling point for raw milk in dairy plants, 3) each over-the-road tanker (by sampling through the dome immediately after filling), and 4) each location of sampling pasteurized products. The size of the pasteurized product sample for temperature control must be at least one-half the size of the largest sample being collected; for example, use a half-gallon for temperature control when the largest sample size is one gallon.
- E. Storage and transportation:
1. Refrigerated samples:
    - a. Use ice or a mechanical refrigerant at all times to cool and hold samples at 0° to 4.4°C. Keep the ice and water level in the sample case slightly above the milk level. Do not freeze fluid samples before or during shipment to the laboratory. Do not rely on winter air temperatures to keep samples cold. Ice water is necessary to prevent freezing of samples in very cold weather and to prevent warming of samples in warm weather.
    - b. Protect samples from contamination. Contamination by ice water in the sample case may be prevented by using racks, compartments, or other means. Ice water shall be only slightly higher than the level of milk in sample containers. Do not bury the tops of containers in ice.
    - c. Promptly deliver samples to the laboratory. Tests for somatic cell counts in non preserved samples and for microbiological counts in all samples must be started within 36 hours after collection.

- d. Ensure that samples shipped to a laboratory by a common carrier are packed in a shipping case with a tamper-proof lock or seal.
  2. Frozen samples: Using dry ice as the refrigerant of choice, maintain samples in a frozen state until they are delivered to the laboratory. Maintain semi frozen products (mix, soft-serve) as described in section 3.3E1 above.
  3. Dry samples: May be stored and shipped without refrigeration.
- F. Preservatives:
- Preservatives may be added to samples provided such addition will not affect chemical or physical tests. Preservatives shall not be used in samples collected for microbiological analysis when the test involves microbial growth.
1. Formaldehyde: 40% by volume, 36% by weight. Add 0.1 mL to each 30 mL of sample.<sup>6</sup> Use this preservative *only* in samples preserved for tests of fat by chemical methods.
  2. 2-bromo-2-nitropropane-1, 3-diol (Bronopol<sup>®</sup>): Use one table (containing 10 mg of active ingredient) or 0.05 mL (containing 20% active ingredient) per 50-mL sample. Samples must be transported and stored at 0° to 4.4°C. Whereas the pure preservative does not interfere in analyses with infrared instruments, impurities or carrier materials may interfere. Therefore, Bronopol-type preservatives should be tested for absorption at the wavelengths used in infrared testing. Samples should be tested for fat within 5 days.
- G. Sanitizing sampling cocks and in-line sampling points:
1. Sampling cocks: Prepare a sanitizing solution containing 200 mg/L (200 ppm) available chlorine as hypochlorite. Submerge the sampling cock by fitting a bag of the chlorine solution over and around it. Holding the top of the bag of sanitizing solution tightly around the body of the sampling valve, flush the sanitizer in and out of the sampling cock for at least 1 minute. Prepare an adequately sized sanitized container to catch the flush milk. Then purge the sampling cock valve with at least 2 L of milk, which may be caught in a sanitized container and retained for reprocessing when handled aseptically.
  2. In-line points: Swab the gasket or rubber sampling nipple with 200 ppm available chlorine solution or equivalent, and expose the area for 1 minute before wiping away excess sanitizer with a single-service towel.<sup>5</sup>

### 3.4 Sampling Raw Milk

A. Precautions:

1. Protect sampling instruments from exposure to contamination before and during use.
2. When using a dipper, remove it from the sanitizing solution, drain it completely, and rinse it at least twice in milk before transferring the sample.
3. Handle sample container and caps aseptically. Do not drop, lay down, touch the inside of, or otherwise contaminate the containers or caps. If the container becomes contaminated, discard it and use another.
4. Do not carry presterilized plastic bags or plastic vials in pockets of clothing. Clipboards, covered containers, or boxes may be used to carry empty single-service sample containers.

5. Precool multi-use sterile containers in the sample case as needed. If moisture is present, rinse containers with milk twice.

B. Farm bulk tanks:

1. Prepare to measure and sample: Connect milk transfer hose, connect power supply, wash and dry hands, and observe milk for any abnormality. If abnormality is present, record on the report form and cease sampling.
2. Measure milk:
  - a. If measuring stick is in the tank, dry the stick at the milk level with a clean single-service paper towel, make the measurement and record the result.
  - b. If measuring stick is outside the tank, sanitize the stick with chemical sanitizing solution [3.2G2b] and dry it at the milk level with a clean single-service paper towel. Then make the measurement and record the result.
3. Agitate milk adequately: [3.3B1a].
4. Check temperature of milk:
  - a. Use a sanitized [3.2G2b] thermometer and record the result on a sampling form.
  - b. Compare accuracy of the bulk-tank thermometer with the test thermometer monthly and record the results.
5. Collect sample by hand:
  - a. Do not hold the sample container over the milk while transferring sample.
  - b. Fill the sample container not more than  $\frac{3}{4}$  full (after closure) to permit proper mixing of the sample at the laboratory. Do not expel air when folding or whirling plastic bags; instead, leave  $\frac{1}{4}$  of the volume of the bag as air space after the bag is closed and sealed.
  - c. Collect a representative sample of each producer's total milk supply. Sample all tanks individually and label each sample, identifying each tank.
  - d. Provide a temperature control [3.3D] by collecting two samples at the first collection point (one sample to be used as the temperature control).
  - e. Place the samples immediately in a sample case with a mixture of ice and water, and protect them from becoming submerged in water.
  - f. Rinse the dipper in tap water immediately after use, and return it to the sanitizing solution.
6. Collect sample with automated sampler (Class A2):
  - a. Principle: The automated device for sampling from bulk tanks is mounted on the intake line of the tank truck, preferable on the suction side. The electronically controlled peristaltic pump operates during the pumping cycle, removing a representative sample based on information set into the controller by the operator. This information consists of desired sample volume, volume of milk in the tank (in pounds), and speed of the truck's pump.
  - b. Equipment and supplies:
    - (1) Auto Sampler 2055 (Foss Food Technology Corp., Eden Prairie, MN) or equivalent.
    - (2) Single-service sterile silicon tube.
    - (3) Tube replacement tool.

- (4) Sample vial: [3.2C].
  - (5) Sanitizer: 200 to 300 mg/L of sodium hypochlorite.
  - (6) Pipe cleaners.
  - c. Procedure to install/replace the silicon tube:
    - (1) Open the upper cover.
    - (2) Sanitize the replacement tool in hypochlorite solution.
    - (3) Use the sanitized tool to remove a new tube from the aseptic packaging.
    - (4) Place the tube on the sample intake port and press into place.
    - (5) Use the same sanitized tool to pull the silicon tube down over the roller wheel and force the outlet end into the clip holder.
  - d. Collection of samples for microbiological analysis: The silicon sampling tube must be changed before collecting any sample that may be used for microbiological analysis.
  - e. Method when sample is to be used only for chemical/physical tests:
    - (1) Turn Auto Sampler switch on.
    - (2) Insert the sample vial into the holder and slide the holder upward until it locks into place.
    - (3) Set scale of Auto Sampler to the estimated volume of milk to be pumped from the tank.
    - (4) When pumping is finished, turn off Auto Sampler, remove the sample, and properly store it for transportation.
- B. Milk cans and weigh tanks:
- 1. Agitate milk adequately: [3.3B1c].
  - 2. Check temperature of milk: Use a sanitized [3.2G2b] thermometer and record the result on a sampling form.
  - 3. Collect sample:
    - a. Hold the sample container away from the can or tank opening while filling.
    - b. Fill the sample container not more than  $\frac{3}{4}$  full (after closure), and do not expel air from the plastic sample bags.
    - c. Collect the sample immediately after the cans are emptied into the weigh tank. If the weigh tank is not large enough for the producer's total volume of, collect proportionate amounts of milk from each filling into a single sample container.
    - d. Collect a temperature control: [3.3D].
    - e. Place the samples immediately into a mixture of ice and water, and protect them from contamination: [3.3E1b].
- D. Mobile tank trucks (farm pickup and over-the-road tankers):
- 1. Agitate milk adequately: [3.3B1b].
  - 2. Check temperature of milk: [3.4B4a].
  - 3. Collect sample: [3.4B5.6].
    - a. Collect a single sample from a farm pickup tanker.
    - b. Collect duplicate samples from an over-the-road tanker. The first sample is for the shipper; the second accompanies the tanker to its final destination. Collect two temperature controls, one each to accompany the two over-the-road tanker samples.

- c. Place the samples in a sample case [3.2D] with ice [3.3C] and transfer them to the laboratory [3.3E].
- E. Dairy plants:
  1. Agitate milk adequately: [3.3B1b.c].
  2. Check temperature of milk: [3.4C2].
  3. Collect tank samples:
    - a. Sanitize the sampling cock, if used [3.3G1].
    - b. Sample the tanks individually [3.4B5b], and collect a temperature control [3.3D] from each.
    - c. Place the samples in a sample case [3.2D] with ice [3.3C] and transfer them to the laboratory [3.3E].
  4. Collect in-line samples:
    - a. Sanitize the entry point: [3.3G2].
    - b. Insert the needle of the syringe [3.2B3] through the pipeline gasket or the rubber closure of a stainless steel nipple clamped onto the line.
    - c. Transfer the sample from the syringe to a sample container.
    - d. Place the sample in a sample case [3.2D] with ice [3.3C] immediately and transfer it to the laboratory [3.3E].
  5. Collect other commingled milk samples: These samples may be collected from the weigh tank [3.4C] or the balance tank in the same manner.
- F. Milk directly from the udder:
  1. Collect samples immediately before regular milking, working in a protected area.
  2. Remove loose soil from animals, and wash under the teats before cows enter the sample collection area.
  3. Sanitize teats and adjacent udder with warm disinfectant (e.g., 25 mg/L of iodophor).
  4. Dry with single-service towels.
  5. Disinfect teat canal end by opening it with pressure from two fingers and swabbing it with 70% alcohol. Alternatively, dip teats in an iodophor teat dip, wait 10 seconds, and swab off excess with a cotton ball. Treat teats farthest from the collector first.
  6. Collect samples from the closest teats, removing two streams of milk into a separate vessel before collecting samples in sterile containers. Then collect samples from the farthest teats.
  7. Place the samples immediately in a sample case [3.2D] maintained at 0° to 4.4°C.
  8. Deliver the samples to the laboratory within 12 hours.
- G. Sediment sampling:
  1. Mixed-sample method: For 18.92- to 37.85-L cans and bulk storage tanks, a 500-mL, 120-mL, 60-mL, or 30-mL sample will be needed, depending on the diameter of the filter disc being used. Before mixing the sample, take a small strainer and transfer any floating extraneous contaminants such as flies, hair, or debris to a separate disc and properly identify. Agitate contents of bulk storage tanks for at least 5 minutes or according to manufacturer's recommendation before removing test portions. Avoid contaminating the samples with foreign matter.
  2. Off-bottom method: For 18.92- to 37.85-L can, take a 500-mL sample with an off-bottom tester from an unstirred can of milk. Before withdrawing the sample, remove any floating extraneous matter with a small strainer as directed above.

### 3.5 Sampling Pasteurized Products

A. In-line samples:

Collect as stipulated in section 3.4E4.

B. Packaged retail fluid products:

1. Select representative samples of all products, regardless of age. On the form submitted to the laboratory, include the processing date (or the code date, in the case of store-purchased samples).
2. Collect a temperature control [3.3D].
3. Identify the samples, immediately place them in a sample case [3.2D] with ice and deliver them to the laboratory [3.3E].

C. Dispenser milk:

1. Collect a sample from the dispenser tube of a previously unopened container into a sample container [3.2C] without first flushing the milk through the tube. To determine the status of an in-use dispenser, collect a sample after drawing off about 0.5 L of milk.
2. Collect a temperature control [3.3D].
3. Identify the samples immediately place them in a sample case [3.2D] with ice and deliver them to the laboratory [3.3E].

D. Individual coffee creamers:

Because a single container usually provides an insufficient quantity for analytical procedures, randomly select 10 containers to satisfy testing requirements and be representative of a lot.

1. Pasteurized and ultra pasteurized creamers: Note codes, dates, or lot numbers on the laboratory worksheet. Place containers in a bag, seal the bag, and place it in the sample case [3.2D].
2. Dried creamers: Place packages of the dried product in a bag or box to avoid contamination; do not carry them in clothing. Hold and transport samples at room temperature.
3. Frozen creamers: Follow general sampling procedures for ice cream [3.6F]. Place samples in a plastic bag or container to avoid contamination, and keep them frozen until analyzed.

E. Pressurized containers:

1. Retail containers:
  - a. Select the necessary number of containers at random.
  - b. Identify the samples and immediately place them in a sample case [3.2D].
2. Commercial containers:
  - a. Select the necessary number of containers at random.
  - b. Agitate the containers by inverting them 25 times within 30 seconds.
  - c. Aseptically dispense the contents of the containers into sample containers [3.2C].
  - d. Identify the samples and immediately place them in a sample case [3.2D].

### 3.6 Sampling Other Products

A. Evaporated, concentrated, and condensed milk:

1. Hermetically sealed retail containers:
  - a. Select the required number of containers at random.
  - b. Identify all samples and transport them unrefrigerated.
2. Bulk-tank and industrial-size containers:

- a. Agitate the product in the container [3.2F].
- b. Aseptically transfer a representative portion (not less than 30 mL) to a sterile sample container [3.2C].
- c. Identify the samples and immediately place them in a sample case [3.2D].

B. Dry products:

1. Precautions:

- a. Because dry products absorb moisture rapidly, make transfers quickly after opening the container to be sampled and seal the container immediately after sampling is completed.
- b. Transport all dry samples unrefrigerated.

2. Retail containers:

- a. When possible, collect intact containers.
- b. If it is necessary to sample from the containers, transfer 30 g or more of the product to a sterile container [3.2C] with a sterile spoon or spatula.
- c. Identify the samples and transfer them unrefrigerated.

3. Bulk containers:

- a. With a sterile tube or trier, aseptically transfer at least three plugs or columns from each container to a sterile sample container [3.2C]. Total amount transferred should be at least 30 g.
- b. Identify the samples and transfer them unrefrigerated.

4. Stitched bags:

- a. Open bags carefully, avoiding contamination of their contents.
- b. Use a sterile tube, trier, spoon, or spatula, and aseptically transfer 30 g or more of the product to a sterile sample container.
- c. Identify the samples and transfer them unrefrigerated.
- d. Reseal the bag to maintain product integrity.

B. Butter, margarine, and related products:

Although butter is specifically mentioned in the following sections, the procedures also apply to margarine and related products.

1. Special equipment:

- a. Butter trier, sanitized: Under commercial conditions, when numerous samples must be taken daily, a single, polished, stainless steel trier may be used for each sample if it is wiped thoroughly after each sample with clean tissue paper, dipped in 70% alcohol, ignited to remove excess alcohol, and tempered by being inserted twice into the butter to be sampled before the sample is removed. For composition or chemical examination, clean and dry the trier between each sample.
- b. Sample jars or containers, sterilized: Size 240 mL or larger.

2. Procedure:

- a. Butter from churns: Using a sanitized stainless steel trier, remove three 120-g portions of finished butter from the center and end locations of a batch of butter or from successive sampling points in the stream of butter from continuous churns. Identify the samples and immediately place them in a sample case [3.2D].
- b. Butter in boxes or bulk packages: Remove at least 120 g of butter from three different corners of the container by inserting a stainless steel trier diagonally through the butter. Take plugs at least 75 mm long, including surface portions. With a sanitized spatula or spoon, transfer butter to a sterile sample container. Use a small portion of the sample plug to seal the hole from which the plug was removed. (NOTE: A sample from the corner of the butter box, which includes the outside surface on three sides, is more effective for

detecting surface mold contamination than is a subsurface sample.) Identify the samples and immediately place them in a sample case [3.2D].

- c. Print butter: Because of differences in the ratio between the surface area and weights of 113.5-g, 227-g, and 454-g quantities (prints), it is preferable to remove samples from the print with a trier to ensure uniformity in surface area per sample. Use a No. 8 sanitized cheese trier to take at least a 75-mm plug (approximately 120 g) from the end of the print and, with a sanitized spatula or spoon, transfer the plug (including the surface portion) to the sample container. To sample a 113.5-g print, send the entire print to the laboratory. Identify the samples and immediately place them in a sample case [3.2D].

C. Cottage cheese and similar cultured products:

1. Collect unopened containers unless container size makes this impractical.
2. Where necessary, aseptically transfer 30 g or more of the product with a sterile instrument to the sample container [3.2C].
3. Identify the samples and place them in a sample case [3.2D].
4. To determine the processing conditions in the manufacturing plant, the samples must be analyzed for coliform content within 24 hours of manufacture. In this case, the transport of the samples to the analyzing laboratory must be expedited.

D. Other cheese and cheese products:

As these products are mostly sampled for compositional measurements, the sample container should be just large enough to hold the sample so as to minimize compositional changes due to moisture migration.

1. Small cheeses and retail packaged cheeses: Collect the entire cheese or package of cheese.
2. Wheels: Using a knife [3.2B9], make two cuts radiating from the center of the cheese, removing a piece of at least 50 g after discarding the inedible surface layer.
3. Blocks: Using a knife [3.2B9], make two cuts parallel to the sides, removing a piece of at least 50 g after discarding the inedible surface layer.
4. Large blocks (up to 640 lb): The sampling method depends on the cheese and the method of production. Where possible, using a short trier [3.2B4], take one 5- to 10-cm sample plug from the end of the block; take a second from the center and a third from halfway between the first and the second. Break off 2 to 2.5 cm from the outside edge of each plug, return it to the plug hole, and seal the plug hole over with a suitable sealing compound (e.g. a mixture of molten paraffin, beeswax, and white petrolatum [1 + 1 + 2], or one of white petrolatum and paraffin [1 + 1]). The remainder of each plug constitutes the sample.  
Where only one plug can be taken, insert a long trier [3.2B4] through a side-center sample hole and carefully withdraw the full plug. Break off 2 to 2.5 cm from the outer edge of the plug, return it to the plug hole, and seal as above. The remainder of the plug constitutes the sample.
5. Barrel cheese: In a barrel container, the mass of cheese (225 to 250 kg) cools slowly from the outside toward the center. By the time cooling is complete, a moisture pattern in the cheese is fixed with the highest moisture on the outside, the lowest in the center, and the average somewhere in between. Studies were supervised by the National Cheese Institute (NCI) and the University of Wisconsin to determine the most representative sampling areas.<sup>1</sup> More than 9,000 moisture analyses were made on current, medium-cured, and aged cheese from

representative geographic regions. The results were statistically analyzed to identify a moisture profile in barrel cheese. The sampling procedure resulting from this study indicates that a trier with a 30.5-cm blade length should be inserted 7 cm from the edge of the cheese (near the periphery of the barrel), sloping toward the nearest outside edge of the barrel at 11° from vertical. A trier guide fixed at the 11° angle is available and may be used as an aid. (For information on the guide, contact NCI, 888 Sixteenth St., NW, Washington, DC 20006.)

If the cheese barrel is full—that is, if there is no more than 2 to 3 cm headspace—it is possible to draw a reliable sample through a bung or sample port in the cover, which permits insertion of the trier at the 7-cm point. If the headspace is more than 3 cm, the cover should be removed; otherwise, the point of trier insertion will be distorted. In no instance should a barrel containing cheese from more than one vat be selected as a sample for moisture analysis.

For sample reliability, it is desirable that the trier be inserted to draw a full 27.9- to 30.5-cm (11- to 12-in) plug from a full container. If a plug breaks short of 25.5 cm (10 in), draw another plug from a different location 7 cm from the edge. From a plug 25.5 to 30.5 cm long, remove the top 11.4 cm (4.5 in) for sealing the plug hole. Transfer the next 10.2-cm (4-in) portion to the sample container. The remaining, bottom portion of the plug should be discarded.

6. Crumbled, grated, dehydrated cheeses: These types of cheese are sampled by transferring at least five portions from a single lot of cheese to the sample container. Total amount to be transferred is not less than 50 g.
  7. Surface samples: Surface layers of cheese should be sampled only as required to establish the presence or absence of surface contaminants or to fulfill other special purposes. Therefore, specific sampling requirements depend on the analysis to be undertaken and should thus be determined in consultation with the analyzing laboratory.
- E. Ice cream and related frozen and semifrozen products and ingredients:
1. Shipment and storage: Frozen product samples must be kept frozen during sampling and shipment to the analyzing laboratory. Dry ice is the refrigerant of choice. Samples of semifrozen products (mix, soft-serve) should be maintained at 0° to 4.4°C during sampling and shipment. Semifrozen samples must arrive at the laboratory so the microbiological analyses can begin with 36 hours of collection. Samples of dry materials may be transported without refrigeration.
  2. Frozen products:
    - a. Packaged: Collect and submit samples in their original containers.
    - b. Bulk: Aseptically transfer representative portions of at least 50 g to sterile sample containers [3.2C] for bacteriological examination. If the bulk container has been opened previously, use sterile instruments to remove and discard the surface portion to a depth of 2 cm around the area from which the sample is to be taken. With a second sterile instrument, aseptically transfer at least 50 g from the newly exposed surface to the sample container. If the objective is to determine the care used by the retailer in vending operations, sample surface portions to a depth of 1 cm, collecting not less than 50 g.

Sample individual servings of frozen dairy products as dipped by the retailer by taking representative portions of at least 50 g with a service dipper or other dispensing device, and treat such samples as regular bulk samples. If high bacterial counts have been previously observed on samples from the retailer's cabinet, take additional samples from unopened packages to determine whether responsibility for the high counts rests with the supplier or the retailer.

3. Process samples: When a particular part of the processing operation is being evaluated, take samples of unfrozen or partially frozen mixes either by passing a sterile sample bottle or dipper under properly sanitized orifices at certain intervals or by withdrawing samples with sterilized sampling instruments. Thoroughly agitate the contents of cans or vats before aseptically removing 50-g portions to sterile containers.
4. Coloring and flavoring materials: Mix individual solutions of coloring materials, extracts, flavors, etc., until they are homogeneous, and pour them directly and aseptically into a sample container [3.2C]; or transfer with a sterile sampling tube, syringe, or pipet not less than 30 g from the original container into a sterile sample container. With a sterile spoon, aseptically transfer at least 30 g of well-mixed coloring powders, fruits, fruit preparations, nuts or nut preparations, cakes, pastries, or confections to a sample container. If cold-pack or frozen fruits are not thawed, use a high-speed electric drill with a sanitized auger, a hollow coring tube, or another suitably sharp sanitized instrument to obtain enough material for the sample. Ensure a representative cross section of material from the outer edge to the center of the block.
5. Stabilizers and emulsifiers: With a sterile or sanitized trier, transfer at least three plugs or columns (total not less than 120 g) from each container, or with a sterile or sanitized spoon or spatula, remove not less than 120 g of powder from various places, and transfer the samples to a sterile sample container [3.2C]. Make the transfers as rapidly as possible after opening the container, and immediately seal the sample container after the transfer is completed. If some portions of the package contents are believed to be significantly different from others, sample such portions separately.
6. Sweetening agents: Aseptically transfer at least 30 g of solid sweetener or 150 g of liquid sweetener to a sterile sample container [3.2C].
7. Eggs and egg products<sup>6</sup>: Take samples from a representative number of containers in the lot. Determine odor by smelling the sample after removing the bacteriological sample.
  - a. Liquid eggs: With a sterile tube or dipper, mix the contents of the container until homogeneous. With a sterile, long-handled dipper or ladle, aseptically transfer about 400 mL to a sterile sample container [3.2C].
  - b. Frozen eggs: Remove the top layer of the egg with a sterilized hatchet or chisel. Using a sterile auger or corer, take three cores from the top to the bottom of the container: first core in the center, second core midway between the center and the periphery, and third core near the edge. With a sterile spoon, transfer the cores to a sterile sample container [3.2C].
  - c. Dried eggs: For small packages, take the entire package as the sample. For boxes and barrels, remove the top layer with a sterile spoon or other sterile instrument, and with a sterile trier, remove at least three cores as described in

section 3.6F7b above. The sample should consist of about 400 g. Aseptically transfer the core to a sample container [3.2C] with a sterile spoon or other suitable instrument.

F. Aseptically processed and packaged milk and milk products:

The routine sampling and testing of aseptically (ultrahigh temperature) processed and packaged milk and milk products are generally done at the processing location to meet low-acid, canned-food regulations described in the Code of Federal Regulations, Title 21, Part 113. If samples are to be shipped to a laboratory, collect them in their original, unopened, hermetically sealed containers.

### **3.7 Sampling Product Containers, Closures, Packaging Materials, Equipment, Water, and Air**

A. Paper stock<sup>12</sup>:

Paper stock shall be sampled before it enters into any converting operation. Partially converted items may also be sampled in intermediate stages of conversion. Sampling methods for these latter items shall, in general, comply with sampling methods for paper stock or finished products. Items fabricated from plastic or plastic-laminated paper or paperboard, dry- or wet-waxed paper, metal, or combinations of these materials are usually not sampled before conversion; therefore, sampling methods for only finished products are described below.

1. Roll-stock sampling. Either of the following two methods is acceptable:
  - a. Sample the roll stock as a butt roll with a minimum radial thickness of 2.54 cm of paper on the core and a minimum roll width of 30.48 cm. With a lesser mill roll width, the full width of the roll would constitute the sample. If the width of the roll is more than 30.48 cm, the butt roll may be cut for convenience to a minimum of 30.48 cm by using either a handsaw or a power band saw, taking care to minimize contamination. The cut web shall be firmly taped before the butt roll is removed from the roll stand. Wrap the roll-stock sample carefully in wrapping paper and seal it with tape.
  - b. Cut samples from the roll of paper with a clean, sharp knife. Cut into the roll two laps deep and discard these first two layers. Then cut into the roll six laps deep to a size of approximately 20 x 25 cm, grasp the sample by the top and bottom sheets near the corners, remove, and tape in three or four places to keep the sheets aligned. This process thereby protects the inner sheets for testing.

When samples are being cut from the roll of paper, three sides of the sample may be cut first, thus forming a flap. Staple or tape this flap to prevent undue exposure and riffing. Finally, cut the hinge side of the sample. Remove the assembled sample and place it in a clean paper envelope. Seal the envelope, and insert it into a stout manila or brown kraft envelope. For sample protection, envelopes should be of a type that can be sealed, preferably with a pressure-sensitive adhesive rather than with one that must be moistened.
2. Sheeted-stock sampling: Final samples shall consist of a minimum of six sheets, each approximately 20 x 25 cm. Take sheeted paper selected for sampling from any portion of the stock except the bottom or top 5.1 cm.

Reduce large sheets to a final sample size by using a guillotine-type cutter or equivalent tool that does not involve the direct handling of any sample sheets. Tape and package the stacks of cut sample sheets as in section 3.7A1 above. Top and bottom sheets constitute protective covers during sampling and shipping; discard them before testing.

3. Analytical procedure: [13.3B].

B. Cups, lids, hoods, etc.<sup>12</sup>:

Containers or closures to be examined for sanitary status shall be taken from lots consisting of at least 50 individual items. Containers or closures shall be taken from stock produced under normal operating procedures. Firm- and flexible-walled containers must be obtained after sanitization of the forming equipment but before the product is introduced to the package. A sample set from each filling or manufacturing line shall consist of a minimum of four containers or closures when the rinse test is used, or a minimum of four 50 cm<sup>2</sup> areas of surface when the swab test is used.

Single samples are defined as follows:

1. Swab test: Product-contact area of 50 cm<sup>2</sup>. If a single item has less than 50 cm<sup>2</sup> of contact surface, take sufficient individual items to provide at least 50 cm<sup>2</sup> (as in the case of containers of 100-mL or less capacity).
2. Rinse test: One container with greater than 100-mL capacity.

C. Fluid product packaging:

1. Firm-walled uncapped items: After sanitization but before the product to be packaged is introduced, obtain from the line four paper, laminate, or plastic containers that are to be formed, filled, and sealed in a single device. Proceed as in section 13.3A.
2. Firm-walled capped items: Remove from the conveyor line four paper, laminate, or plastic containers that are formed, filled, and sealed in separate devices. Containers must be removed without their lips or interiors being touched before they reach the filler valves. Add the required amount of rinse solution [13.3A2] to each container. Insert the containers to be capped mechanically into the conveyor lines beyond the filler valves. Should inspection show that mechanical cappers are unsanitary, apply laboratory-sterilized closures to four other containers that are taken from the conveyor before reaching the filler valves. Proceed as in section 13.3A.
3. Flexible-walled items: Collect four bags used for dispensing or other, larger-volume applications. Proceed as in section 13.3A.

D. Equipment cleanliness sampling:

1. CIP equipment: The rinse solution method may be used on individual items of equipment or on systems designed for cleaning-in-place (CIP). This method is not practical for other equipment because the volume of rinse solution required would be equivalent to the capacity of the entire unit, and adequate agitation to flush surfaces thoroughly might not be possible.

The minimum amount of solution needed to flush the product-contact surface of CIP items thoroughly is much greater than the amount that can be autoclaved conveniently. Instead, determine the volume of water needed to fill the CIP system completely,<sup>14</sup> sanitize the rinse solution by superchlorination (25 mg of chlorine per liter), and hold for 10 minutes. Then neutralize the hypochlorite by adding an excess of sterile 10% sodium thiosulfate solution (2 mL/L of rinse

solution) [13.3A1g]. Tap water may also be sterilized by membrane filtration (pore size 0.45  $\mu\text{m}$ ), followed by the addition of sodium thiosulfate (1 mL of 10% solution per liter of water) to inactivate any residual disinfectant.<sup>11</sup>

Introduce neutralized chlorine-treated water into the “ready-for-use” CIP unit. Start circulation and continue for 20 times the period required to move the same volume of water with the pump. Stop the pump and open the outlet valve at the lowest point in the system. Fill separate sterile sample containers at the beginning, middle, and end of the unit-emptying step.

Use a sterile wide mouthed container of sufficient size (at least 1 L) made of suitable plastic. Keep 1 L of the chlorine-treated water that has been neutralized for use as a control sample.

For large volumes of neutralized chlorine-treated rinses, the membrane filter procedure may be used to analyze both rinse and control samples.

2. Ice cream freezers: The sanitary condition of scrapers and of the interior surfaces of “batch” freezers may be determined by a modified rinse method. Prepare a sterile rinse solution [13.3A1e] in 100-mL quantities per 9.46-L capacity of batch freezer barrels to be tested. With the outlet valve of the barrel closed, pour sterile rinse into the inlet. Operate the scraper for 2 minutes and collect a sample through the outlet valve into a sterile bottle.
3. Swab test procedure: [13.3C]. Use the swab test method to determine the sanitary condition of equipment and of large containers that cannot be tested by the rinse method. Open a sterile swab container, grasp the end of the stick (being careful not to touch any portion that might be inserted into the vial), and remove the stick aseptically. Open a vial of buffered rinse solution [13.3A1e], moisten the swab head, and press out excess solution against the interior of the vial with a rotational motion. Hold onto the swab handle to make a 30° angle with the surface. Rub the swab head slowly and thoroughly three times over approximately 50-cm<sup>2</sup> areas of surface of the item, as above; rinse the swab in solution after each swabbing and remove excess moisture. After the fifth area has been swabbed, position the swab head in the vial and break or cut the stick with sterile scissors or another device, leaving the head in the vial. Replace the screw cap, put the vial in a waterproof container, cool to 0° to 4.4°C, and deliver to the laboratory. With calcium alginate swabs, after swabbing the fifth area and depositing the swab head in the rinse vial, add 0.5 mL of sterile solubilizing solution [13.3C1a(4)]. Begin tests with 36 hours of collection.

E. Water supply sampling:

Procedures and equipment for sampling water supplies are detailed in the current edition of *Standard Methods for the Examination of Water and Wastewater*<sup>3</sup> [see 13.4].

F. Air supply sampling:

Sampling for airborne microorganisms in dairy plants involves collection samples in air pathways by which organisms may be introduced onto the product or equipment.

Samples may be taken 1) at openings in the equipment subject to potential contamination from organisms transported by air currents, 2) at selected points for testing the quality of room air (e.g., where the product is filled into containers), and 3) in areas where employees are concentrated. Because of air turbulence during operating hours, sampling by volumetric methods will be more effective and dependable than use of the sedimentation technique. See section 13.5 for details.

Sampling time for all methods of collection usually is standardized at 15, 30, and 60 minutes, with duration determined by experience or estimation. Samples may be taken monthly to detect specific microorganisms unless more frequent samples are necessitated by emergency conditions or suspected contamination.

### 3.8 Radionuclides in Milk and Dairy Products (Class O)

See section 15.17.

Collect at least 3.78 L of milk (raw or pasteurized), preserve with formaldehyde (10 mL of 40% formaldehyde per 3.78 L), and ship to the laboratory for analysis. Formaldehyde does not interfere with analysis of iodine  $[^{131}\text{I}]$ , barium 140, or cesium 137 by gamma spectroscopy, or of strontium 89 by ion-exchange and/or by chemical methods. Addition of formaldehyde to raw milk does, however, cause transformation of  $[^{131}\text{I}]$  to protein-bound  $[^{131}\text{I}]$  to  $[^{131}\text{I}]_2$ , which binds to protein. In pasteurized or dried milk, xanthine oxidase is inactive; consequently, addition of formaldehyde to processed milk has no effect on analyses of  $[^{131}\text{I}]$  is the only radionuclide of concern, no preservative should be added to the milk. Analysis can be simplified by passing milk through a column containing anion-exchange resin at the sampling station and then shipping the column to the laboratory for further processing. This presupposes that all the  $[^{131}\text{I}]$  in the milk is in the inorganic form as iodide.

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**PROVISIONS OF AGRICULTURE AND MARKETS LAW  
FOR DETERMINING THE FAT CONTENT  
OF MILK AND CREAM.**

**Section 56. DETERMINATION OF THE CONTENT OF MILK AND/OR CREAM WHERE PURCHASE OR SETTLEMENT THEREFOR IS MADE ON THE BASIS OF SUCH CONTENT. [Effective July 13, 1999]**

1. The commissioner shall, after public hearing, prescribe, by rules and regulations, the methods, equipment, and procedures, including the calibration and use of electronic equipment, which shall be used in determining the percentage of the components of milk and/or cream where the result of such determination is to be used wholly, or in part, as a basis for payment or settlement for such milk and/or cream, or where the proceeds of co-operative creameries or such milk-receiving or manufacturing plants are allotted on the basis of the determination of a component or components of milk, or where the result of such test is used for the purpose of official inspection or for public record.
2. Whenever the amount of a milk component or components contained in milk and/or cream is used wholly or in part as a basis for payment or settlement for such milk and/or cream, or whenever such component, or components, of milk and/or cream are made a matter of public record or official inspection, no person or persons shall report or record a greater or lesser percentage or average percentage of such milk component than is actually contained in such milk and/or cream. The commissioner or persons employed by him for that purpose may at any time inspect the equipment and assist in making tests of milk and/or cream received at any milk-receiving or manufacturing plant or other place of testing for the purpose of determining the accuracy of tests so made.

3. Any person or persons using other than the method, equipment and procedures prescribed by the commissioner pursuant to this section, or crediting any patron delivering milk and/or cream with a greater or lesser percentage or average percentage of a milk component than is actually contained in such milk and/or cream so delivered and as determined by such prescribed method or methods shall be deemed to have violated the provisions of this chapter.
4. For the purposes of this article, components of milk or cream shall include non-fat solids, milk fat, protein, lactose and total solids contained in milk or cream.

(Section 56 amended by Chapter 596, Laws of 1987).

**Section 56-a. TAKING OF COMPOSITE SAMPLE; RECORD OF TESTS**  
**[Effective Jan. 1, 1987]**

Corporations, associations or persons buying milk and/or cream from producers of milk and/or cream to be paid for on the basis of the percentage of a component or components of such milk or cream and taking samples therefrom to form a composite sample to be tested periodically to determine its value on such basis, shall, at the request of the producer, or of his agent designated in writing, take such samples in duplicate and subject them to the same treatment. At the end of the period for which the composite samples were taken, such corporation, association or person shall tender same to the producer thereof, or to his authorized agent, the choice of one of the two composite samples so taken. Such producer, or his authorized agent, may send such duplicate composite sample, properly marked for identification of the component or components upon which payment or settlement for the milk is based and with the producer's name and post office address, to the New York State food laboratory of the department within three days from the receipt thereof. Such laboratory shall cause such sample to be tested for the per centum of such component or components contained therein, and shall cause a report of such test to be sent to the producer or to his authorized agent, from whom it was received within ten days thereof, or as soon thereafter as possible. Persons testing composite samples of milk and/or cream taken from milk or cream bought or received from producers, where the value thereof is determined by the percentage of a component or components contained in such milk or cream, shall preserve intact the remaining portion of the sample from which the test was made, and in the case of milk keep the same for at least ten days in the case of cream keep the same for at least one day after the making of such test, for the purpose of permitting the commissioner or his duly authorized representative to examine and test the same. Whenever a producer shall designate in writing his authorized agent, the period for which such authorization shall be in effect shall be stated and the time or times when such duplicate composite sample or samples shall be tendered to the authorized agent. The corporation, association or person buying such milk and/or cream shall permit the authorized agent to collect the samples so chosen.

Persons making such tests of samples of milk and/or cream so purchased or received shall, immediately after such tests are completed, prepare a list containing the names or numbers of the producers whose milk and/or cream was so tested, and place opposite each such producer's name or number the percentage of each component or components, upon which payment or settlement is based, found to have been contained in the sample of milk and/or cream representing the milk

and/or cream delivered by each such producer. Such lists so prepared shall be made with indelible pencil or permanent ink and shall be filed in the plant or place where such milk and/or cream is bought or received, and each such list shall be duly signed by the person making such tests and preparing such lists, and such person shall place beneath his signature the number of the state license under which he is testing.

All such lists shall be kept as a record for at least one year and shall be open to examination at all times by the commissioner or his duly authorized representative. At any time, upon request of any producer, or his authorized agent, the purchaser or receiver of such milk and/or cream shall permit such producer to examine such part of said record as contains information concerning the samples of milk and/or cream representing the milk and/or cream delivered by such producer. Every such purchaser or receiver of milk and/or cream from the producer thereof shall, on written request therefor, made by the producer or by his authorized agent, mail or deliver to the producer or his authorized agent, at each time thereafter when such list is made a written statement of the percentage of the component or components, upon which payment or settlement was based, found to have been contained in the sample or samples representing the milk and/or cream delivered by such producer.

Without the written permission of the commissioner, no sample of milk and/or cream so tested by the purchaser or his representative shall be tested at a plant or place other than the one where received, nor without such permission shall any such sample of milk be removed from any such plant or place where tested within ten days from the date of testing, nor shall any such sample of cream be removed therefrom within one day from such date of testing.

(Section 56-a amended by Chapter 596, Laws of 1986)

**Section 56-b. DETERMINATION OF BACTERIA IN MILK AND/OR CREAM WHERE PURCHASE OR SETTLEMENT IS MADE THEREFORE ON THE BASIS OF BACTERIAL COUNT.**

In milk-receiving or manufacturing plants and other places using methods approved by the commissioner for determining the bacterial count in milk and/or cream, where the result of such determination is to be used wholly or in part as a basis for payment or settlement for such milk or cream, or where the proceeds of co-operative creameries or such milk-receiving or manufacturing plants are allotted on the basis of the bacterial count, no pipette or syringe shall be used in such determination unless the same has been legibly and indelibly marked with the letters "N. Y." by the commissioner or by his duly authorized representative. No such pipette or syringe shall be so marked unless it has been found upon examination to be so constructed and graduated as to deliver accurately the amount of liquid required for the determination. The provisions of this article, however, shall not preclude the use of a pipette already marked "S. B." or "N. Y.", by the director of the New York state agricultural experiment station. Whenever the bacterial count of such milk and/or cream is used wholly or in part as a basis for payment or settlement for such milk and/or cream, or whenever the bacterial count affects the classification of the milk and/or cream as received from the producer, or the acceptance or rejection of such milk and/or cream by the operator of a milk-receiving or manufacturing plant, no person or persons shall report or record a larger or smaller bacterial count than that obtained by the actual examination of the milk and/or cream so delivered by the producer. The commissioner or persons employed by him for that purpose may at any time inspect the equipment and assist in making bacterial counts of milk

and/or cream received at any milk-receiving or manufacturing plant or other place where counts are made for the purpose of determining the accuracy of the counts so made. Any person or persons using other than the properly marked pipettes or syringes or crediting any patron delivering milk and/or cream with a larger or smaller bacterial count than that obtained by the actual count of the bacteria in the milk and/or cream so delivered and as determined by the method or methods approved by the commissioner shall be deemed to have violated the provisions of the agriculture and markets law.

**Section 57. LICENSING OF PERSONS IN CHARGE OF MILK-GATHERING STATIONS, MANUFACTORIES OR PLANTS; LICENSING OF PERSONS SAMPLING MILK AND/OR CREAM AND/OR DETERMINING WEIGHT OR VOLUME OF MILK AND/OR CREAM; AND OF PERSONS MAKING MILK COMPONENT TESTS.**

1. No person shall take charge, either as superintendent, manager or otherwise, of any milk-gathering station, manufactory or plant where milk and/or cream is received from producers for sale or resale or for manufacture, unless licensed by the commissioner.
2. No person shall measure, weigh, or otherwise determine the volume or weight of milk and/or cream received from or offered for sale by the producer thereof or sample such milk and/or cream, or handle, or prepare such milk and/or cream samples when such samples are to be used for the purpose of determining the amount of a milk component or components contained therein, and/or to determine the bacterial count thereof, or for any other purpose where the result of such test or examination is used as a basis for payment for such milk and/or cream, for the classification of such milk and/or cream, for the rejection or acceptance of such milk and/or cream, or for official inspection, or for public record, unless licensed by the commissioner provided, however, that the provisions of this section shall not be deemed to apply to any person employed by the state department of health or any municipal department of health in New York state when performing his official duties for such health agency. Such license shall be designated as a "milk receiver's license."
3. No person shall prepare or test milk and/or cream samples by any method, for the purpose of determining the amount of any milk component contained therein, where the result of such test is used as a basis for payment for such milk and/or cream, or for official inspection or for public record, unless licensed by the commissioner.
4. Application for a license, or licenses shall be made upon a form prescribed by the commissioner. The applicant shall furnish satisfactory evidence of good moral character, and shall give proof of his ability to perform the functions for which a license is applied, to the satisfaction of the commissioner. The applicant shall pay a license fee of five dollars to the commissioner for remittance to the state treasury. The commissioner, in his discretion, may combine in one license authority to perform any of the functions for which a license is required pursuant to the provisions of subdivisions one, two and three of this section. A license shall be for a period not exceeding five years, and may be renewed, in the discretion of the commissioner, for successive periods of not exceeding five years each upon payment of a license fee of two dollars to the commissioner for remittance to the state treasury. Each license shall be kept at the place where the licensee is employed and shall be open to inspection. A license may be revoked by the commissioner, after a hearing upon due notice

to the licensee, for false statement in the application, dishonesty, incompetence, inaccuracy or a violation of the provisions of this article, and a license to take charge of a milk-gathering station, manufactory or plant may also be revoked for dishonesty, incompetence, inaccuracy, or a violation of the provisions of this article by any person working under the direction of the licensee and subject to his orders.

**Section 57-a. LICENSING OF PERSONS MAKING BACTERIAL COUNTS OF MILK AND/OR CREAM OR MAKING TESTS OF MILK AND/OR CREAM TO DETECT CERTAIN ABNORMALITIES.**

No person shall test milk and/or cream in order to determine the bacterial or leucocyte count or make other tests to determine the presence or absence of abnormal milk, where the results of such test affects the rate of payment to the producer for such milk and/or cream, the classification of milk and/or cream as received from the producer, or the acceptance or rejection of such milk and/or cream by the operator of a milk-receiving or manufacturing plant, unless licensed by the commissioner. Application for such license shall be made upon a form prescribed by the commissioner. The applicant shall furnish satisfactory evidence of good moral character, and shall demonstrate his ability to make such tests by an examination under the direction of the commissioner. The applicant shall pay a license fee of five dollars to the commissioner for remittance to the state treasury. A license shall be for a period not exceeding five years. A license may be renewed in the discretion of the commissioner, without an examination, for successive periods of not exceeding five years each upon payment of a license fee of two dollars to the commissioner for remittance to the state treasury. Each license shall be kept at the place where the licensee is engaged in testing milk and/or cream and shall be open to inspection. A license may be revoked by the commissioner, after a hearing upon due notice to the licensee, for dishonesty, incompetence, inaccuracy or a violation of the provisions of this article.

## Part 6

### SAMPLING AND TESTING MILK FOR COMPONENT CONTENT (Statutory authority: Agriculture and Markets Law Sections 16, 18, 46-a, 56, 255)

Sec.

- 6.1 Definition
- 6.2 Milk receiver's license
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- 6.4 Granting, denying the renewal of, revoking and suspending licenses
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#### REQUIREMENTS FOR MILK RECEIVERS

- 6.17 Sampling
- 6.18 Equipment and procedures
- 6.19 Records availability

#### Section 6.1 Definition.

The following definitions shall apply to the terms used in this Part, unless the context unambiguously indicates otherwise.

(a) *Bulk milk pick-up truck* means a vehicle used by a milk receiver to pick up milk from dairy farms.

(b) *Commissioner* means the Commissioner of Agriculture and Markets of the State of New York.

(c) *Component* means the milk fat, protein, lactose, nonfat solids and/or total solids in milk. Depending upon the context, the term *component* may include more than one component of milk.

(d) *Dairy farmer* means a person who operates a dairy farm and produces milk, and such term, when used in the plural, shall also encompass a cooperative of dairy farmers.

(e) *He* means he or she, *him* means him or her and *his* means his or hers.

(f) *Milk* means the lacteal secretion, practically free from colostrum, obtained by the complete milking of one or more healthy animals.

(g) *Milk dealer* means a person who purchases milk directly from dairy farmers and who

is required or has agreed to pay for such milk based upon the amount of a component or components therein.

(h) *Preservative* means a substance that, when added to a sample of milk, maintains the sample's integrity, has no effect upon the amount of milk components therein and has no effect upon the proper functioning of electronic equipment used to determine the amount of a milk component or of milk components.

(i) *Standard Methods* means *Standard Methods for the Examination of Dairy Products*, 16<sup>th</sup> edition, 1992, published by the American Public Health Association, Washington, DC 20005. A copy of *Standard Methods* is available for public inspection at the Division of Milk Control, Department of Agriculture and Markets, One Winners Circle, Albany, NY 12235 and at the Department of State, 41 State Street, Albany, NY 12231.

(j) *Temperature control sample* means a sample of milk taken from the bulk tank of the first dairy farm from which milk is picked up on each day when milk is picked up and which is taken in compliance with the applicable provisions of *Standard Methods*.

(k) *Test*, when used as a verb, means to analyze a sample of milk to determine the amount of a milk component or milk components therein.

(l) *Test in question* means the test of a universal sample that varies 0.5 percent or more from the last unquestioned test.

(m) *Universal sample* means a sample of milk taken from a bulk tank on a dairy farm, in compliance with the applicable provisions of *Standard Methods*.

(n) *Unquestioned test* means a test of a universal sample the results of which are, based upon the facts and circumstances, accurate.

## **Section 6.2 Milk receiver's license.**

Pursuant to Agriculture and Markets Law, section 57, no person shall measure, weigh or otherwise determine the volume or weight of milk, or shall sample milk when such samples are to be tested to determine the amount of component or components therein, where the result of such test is used as a basis for payment for such milk or for the purpose of official inspection or for public record, unless licensed by the commissioner.

## **Section 6.3 Tester's license.**

Pursuant to Agriculture and Markets Law, section 57, no person shall prepare or test milk samples to determine the amount of a component or components contained therein, where the result of such test is used as a basis for payment for such milk or for the purpose of official inspection or for public record or is used to calibrate electronic instruments, unless licensed by the commissioner. A person who holds a tester's license shall have the authority to conduct the activities for which a milk receiver's license is required.

## **Section 6.4 Granting, denying the renewal of, revoking and suspending licenses.**

An applicant for a milk receiver's license or for a tester's license shall file an application upon a form prescribed by the commissioner. The commissioner may decline to grant a license if the applicant has not furnished satisfactory evidence of good moral character, or if he has not furnished satisfactory evidence that he is capable of conducting the activities for which a license is required by satisfactorily answering written and oral questions prepared by the commissioner and by demonstrating the ability to conduct such activities. The commissioner may decline to

renew a license or may revoke a license, after a hearing upon due notice to the licensee, when he is satisfied by substantial evidence that the licensee:

- (a) has made a false statement in his application;
- (b) is dishonest, incompetent or inaccurate; or
- (c) has violated the provisions of article 4 of the Agriculture and Markets Law.

#### **Section 6.5 License fee, tenure.**

No license shall be granted unless the applicant pays a fee of \$5 to the commissioner for remittance to the State treasury, and no license shall be renewed unless the licensee pays a fee of \$2 to the commissioner for remittance to the State treasury. A license shall be for a period not to exceed five years and shall be renewed for successive periods not exceeding five years each, consistent with the provisions of this section and of section 6.4 of this Part.

#### **Section 6.6 Posting license.**

A licensee shall keep his license or a copy thereof at his place of employment and such license shall be posted conspicuously, except a person who holds a milk receiver" license and who picks up milk from dairy farms shall carry his milk receiver's license with him or in his bulk milk pick-up truck.

### **REQUIREMENTS FOR MILK DEALERS**

#### **Section 6.7 Duties.**

A milk dealer:

- (a) ensure that a temperature control sample is properly taken as required in section 6.17(b) of this Part;
- (b) ensure that a universal sample is properly taken from each dairy farm from which milk is picked up and such sample is properly maintained in accord with the provisions of this Part and with *Standard Methods*;
- (c) promptly notify the commissioner of all locations where universal samples are maintained, stored (other than a bulk milk pick-up truck) and tested, and ensure that all universal samples are maintained and tested in compliance with the applicable provisions of *Standard Methods*;
- (d) ensure that all universal samples are tested only by a person who holds a tester's license pursuant to the provisions of this Part;
- (e) ensure that universal samples are tested at the frequency required in section 6.10 of this Part;
- (f) determine when a universal sample taken from a dairy farm varies 0.5 percent or more milkfat from the last previous unquestioned test, and ensure that the procedures set forth in section 6.15 of this Part are complied with;
- (g) consistent with the provisions of this subdivision, calculate or ensure that a calculation is made, with regard to each dairy farm from which milk was received, of the average milk component content in the universal samples which were taken during the month and which were analyzed. Such calculation shall be made by determining the milk component content of

each sample taken during each 7- or 10-day period of the month (as appropriate) and tested, determining the average milk component content for each such period, adding such averages and dividing by three or four, as appropriate. When the last digit to the right of the decimal point is a five, the preceding digit shall remain the same if it is an even number, and shall be rounded up if it is an odd number. If such digit is less than five, the preceding digit shall remain the same. If such digit is more than five, the preceding digit shall be rounded up;

(h) in the event that milk is picked up from a dairy farm more than once a day (multiple pick-ups), ensure that a universal sample is properly taken on each occasion when milk is picked up, and that such samples are tested and that the weighted average of the milk component content of all such samples is calculated. Such weighted average shall constitute the milk component content of all of the milk picked up on a particular day; and

(I) maintain all weigh slips required to be furnished to him, pursuant to section 6.19 of this Part, for a period of not less than one year, and furnish such weigh slips to the commissioner upon request.

## **REQUIREMENTS FOR TESTERS**

### **Section 6.8 Equipment.**

A tester shall test only with equipment that accurately determines or aids in the accurate determination of the amount of a component. Equipment shall meet the specifications and be in compliance with the applicable provisions of *Standard Methods* and/or approved by the commissioner.

### **Section 6.9 Surroundings.**

A tester shall test only in an environment which is free of undue dust, noise and vibrations, which has adequate lighting, ventilation and work space, and which is otherwise in compliance with the applicable provisions of *Standard Methods*.

### **Section 6.10 Frequency of testing of universal samples.**

(a) Testing of universal samples taken from a dairy farm from which milk is picked up on an every-other day basis. A tester shall test not less than three universal samples taken during a month, and shall test at least one universal sample taken during each 10-day period of the month. In lieu of the foregoing, a tester shall test not less than four universal samples taken during a month, and shall test at least one universal sample taken during each seven-day period of the month commencing at the beginning of the month.

(b) Testing of universal samples taken from a dairy farm from which milk is picked up on a daily basis. A tester shall test not less than six universal samples taken during a month, and shall test at least two universal samples taken during each 10-day period of the month. In lieu of the foregoing, a tester shall test not less than eight universal samples taken during a month and shall test at least two universal samples taken during each seven-day period of the month commencing at the beginning of the month.

(c) Notwithstanding the provisions of subdivisions (a) and (b) of this section, a tester shall test additional universal samples, when required to do so by the provisions of section 6.15

of this Part and when a particular test indicates that the amount of milk component in the universal sample tested cannot be accurately determined, as set forth in section 6.11(c) of this Part.

## **Section 6.11 Procedures for testing of universal samples.**

(a) A universal sample shall be tested by a method, and in compliance with the provisions, set forth in *Standard Methods*. The result of each test upon a universal sample shall be expressed as a percentage, to the nearest 0.05 percent when the Babcock or Gerber method is used and to .01 percent when electronic or other extraction method is used, with the percentage representing the amount of the milk component tested for in the universal sample.

(b) No universal sample shall be tested more than 72 hours after having been taken from a dairy farm unless a preservative has been properly added to such universal sample prior to the expiration of such 72-hour period, in accordance with the provisions set forth in *Standard Methods*.

(c) No universal sample shall be tested if it is in a condition where the amount of a component or components therein being tested for cannot be accurately determined. With regard to tests done by the Babcock or Gerber method, a universal sample which has been tested to determine the amount of milk fat therein shall be re-tested if the fat column contains charred, foreign matter, curd particles; is milky, foggy, cloudy or indistinct; or if the meniscus is inverted. No result of testing shall be recorded or reported if the fat column is in such a condition.

## **Section 6.12 Bottles for testing by the Babcock or Gerber method.**

All universal samples shall be tested in bottles that are graduated in one-tenth of one percent intervals, with each whole percent interval having significantly greater prominence than the one-tenth of one percent intervals. All bottles shall be graduated from zero to eight percent and shall hold a sufficient amount of milk so that the test to be done on such milk may be accurately performed. No bottle shall be used unless examined by the commissioner and approved and branded by him.

## **Section 6.13 Storage of universal samples.**

A tester shall maintain universal samples under conditions designed to and which ensure their integrity. A tester shall maintain the portion of each universal sample left over after testing for 24 hours, under conditions set forth in the applicable provisions of *Standard Methods*.

## **Section 6.14 Records.**

Subsequent to testing a universal sample to determine the amount of a component therein, tester shall ensure that a record is made reflecting the result of the test, the identification number of the dairy farmer from whose farm the universal sample tested was taken, the date the universal sample was taken, the date of the test, information that reflects the name of the tester and any other information required by the commissioner. Such record shall be immediately furnished to the milk dealer who receives the milk of such dairy farmer and a copy thereof shall be maintained for one year from the date the universal sample was tested, at the tester's place of employment.

**Section 6.15 Variances.**

(a) When the result of the test on a universal sample varies 0.5 percent or more milk fat from the last unquestioned test, the milk dealer shall notify the appropriate milk receiver to submit the next sample taken after such notification (such sample) to a licensed tester. Such licensed tester shall properly test such sample and, if the result of the test upon such sample is within 0.5 percent of the test in question, the result of the analysis upon the test in question and upon such sample shall each be used in the calculation of the average milk component content in a dairy farmer's milk for the appropriate 7- or 10-day period. If the result of the test upon such sample varies more than 0.5 percent from the test in question, only the results of the test closest to the result of the last previous unquestioned test shall be used when calculating the average milk component content in a dairy farmer's milk for the appropriate 7- or 10-day period.

(b) Notwithstanding the provisions of subdivision (a) of this section, the tester shall not use the result of any test which is, based upon all the facts and circumstances, erroneous.

**REQUIREMENTS FOR MILK RECEIVERS**

**Section 6.16 Other duties.**

A tester shall comply with the requirements set forth in section 2.7 of this Title, when performing biological, chemical and or physical tests upon the milk and milk products defined in Part 2.

**REQUIREMENTS FOR MILK RECEIVERS**

**Section 6.17 Sampling.**

(a) A milk receiver shall obtain a universal sample(s) of the total production from each dairy farm, on each occasion on which milk is picked up. Each universal sample taken shall be promptly delivered to a safe and secure location. A milk receiver shall also obtain a universal sample, or a sample of milk other than a universal sample, from a dairy farm when requested by the commissioner, which sample shall be submitted to the commissioner if and as required by him.

(b) A milk receiver shall properly obtain a temperature control sample which shall be held in a manner such that the milk held therein is the same temperature as the milk held in the universal sample(s) obtained from the dairy farm(s) from which milk was picked up. The temperature of the milk in such temperature control sample shall be determined at approximately the same time that such universal sample(s) is (are) delivered to a safe and secure location. Such temperature shall be recorded along with the name of the milk receiver who took such temperature control sample, the date on which such temperature control sample was taken, the bulk milk pick-up truck identification, and other information required by the commissioner. All such information shall be recorded in a manner approved by the commissioner and shall be maintained for a period of not less than one year.

(c) In the event that milk picked up from a dairy farm is frozen, partially frozen, lumpy, curdled, churned or otherwise abnormal, the milk receiver shall identify the sample vial so that the condition of such milk may be readily discerned.

**Section 6.18 Equipment and procedures.**

A milk receiver shall:

(a) use the equipment and the procedures for taking and maintaining universal samples as provided for in *Standard Methods* and Appendix 6 of Part 3 of this Title, except as provided for in this Part; and

(b) possess equipment and materials to determine the strength of the sanitizer used, to be used or which can reasonably be expected to be used. A milk receiver shall determine the strength of the sanitizer as often as is necessary to ensure that its concentration meets the requirements set for in *Standard Methods*.

**Section 6.19 Records availability.**

A milk receiver shall prepare a weigh slip while or immediately after sampling and picking up milk from a dairy farm. The weigh slip shall set forth the name of the dairy farmer from whose dairy farm milk was picked up and/or his identification number, the date and time such milk was picked up, the temperature of such milk, the amount of milk in the dairy farmer's bulk tank, expressed in pounds or in a number that can be readily converted to pounds and the milk receiver's full name. A copy of such weigh slip shall be left at the dairy farm and the original thereof shall be promptly furnished to the appropriate milk dealer.

**PART 12**

**ADULTERATION AND CLEANLINESS OF MILK**

(Statutory authority: Agriculture and Markets Law, Sections 18, 46, 46-a, 47, 255)

Sec.

- 12.1 Routine tests to be made
- 12.2 Equipment for sediment testing
- 12.3 Standard testing discs
- 12.4 Reference discs
- 12.5 Testing methods
- 12.6 Rejection of unsatisfactory milk
- 12.7 Notice to producers
- 12.8 Care and filing of discs
- 12.9 Disposal of rejected milk
- 12.10 Rejected milk to be tagged
- 12.11 Record of sediment tests

**Section 12.1 Routine tests to be made.**

At each plant where milk is received from producers, routine sediment tests shall be made as follows:

(a) Except as provided in subdivision (b) of this section, at each plant where milk is received from producers, whether in cans or by tank truck, it shall be the duty of the plant manager, or individual in charge, to have a sediment test made of each producer's milk at least once each month or more frequently if the sediment test results on samples from plant storage tanks, transport tanks, farm pick-up tanks, or other blended supplies, when tested by the mixed sample method as hereinafter defined, are found to contain sediment of one mg. Or more in a one gallon sample or proportionately lesser quantities of sediment if less than one gallon is tested. In the event that milk in such bulk supplies is found to contain one mg. Or more of sediment in a one gallon sample, or its equivalent, it shall be the duty of the plant manager, within 48 hours, to take additional samples of individual producer supplies involved, and to proceed as provided pursuant to section 12.6, or take such other action as is necessary to correct the unsatisfactory condition.

(b) In the case of any producer whose milk is found to be satisfactory on the basis of three successive monthly tests, tests of that producer's milk need not be made more than once each three months so long as tests show continued compliance with these regulations.

(c) At each plant where milk is received from producers it shall be the duty of the plant manager or individual in charge to have a sediment test made on the first day of receipt of milk from any producer from whom milk has not previously been received or whose deliveries of milk have been interrupted, and no milk shall be accepted from such producer unless such milk is found to contain less than 1.5 mg. of sediment.

(d) In the case of milk collected at producers' farms by tank truck, and delivered to a plant, the plant manager or person in charge of such plant may be relieved from making such tests if a cooperative association or the operator of some other plant has agreed to make such tests and to comply with these regulations and if the samples so tested are taken at the point of original receipt of the milk before the milk so sampled is co-mingled with other milk.

## **Section 12.2 Equipment for sediment testing.**

In making sediment tests, equipment shall meet the following requirements:

(a) A tester of simple construction, which allows easy cleaning and adjustment between samples and for sanitary removal of used disc and replacement with clean, unused disc, shall be used.

(b) For stirred sample method, a pressure, gravity, or vacuum type device shall be used. Equipment may be needed for warming the milk and to aid in its passage through the disc. Burning of the milk shall be avoided.

(c) When testing a one gallon stirred sample, a tester with filter area one and one-eighth inches in diameter shall be used.

(d) When testing a one pint mixed sample, a tester with a filter area of 0.40 inch in diameter shall be used. When testing mixed samples of other quantities, the diameter of the filter area shall have the same relation to the quantity sampled as one and one-eighth inches for one

gallon. For example, the diameter of the filter area for a one quart sample shall be 0.56 inch; for a two quart sample 0.80 inch; and for a three quart sample 1.0 inch.

### **Section 12.3 Standard testing discs.**

When testing samples, a standard white cotton lintine disc, or a disc of other suitable equivalent material, or the same material cut in other shapes, shall be securely fitted in the tester so that no milk or sediment by-passes the filtering area. The discs used shall meet the requirements as prescribed in the latest edition of "Standard Methods for the Examination of Dairy Products" as published by the American Public Health Association.

### **Section 12.4 Reference discs.**

For the purpose of determining the sediment content of milk, reference discs or photographic reproductions of same shall be used. The commissioner recognized for the purpose of this Part, the applicable charts of sediment standards for milk and milk products as prescribed by the United States Department of Agriculture, numbered CFR 58.2728 through CFR 58.2731 and/or those prescribed in the latest edition of "Standard Methods for the Examination of Dairy Products" as published by the American Public Health Association, or such other charts approved by the commissioner.

### **Section 12.5 Testing methods.**

When testing milk to determine its sediment content, a mixed sample shall be used.

(b) A mixed sample shall mean a sample taken from the milk which is to be tested, which milk has been adequately agitated immediately prior to the sampling, sufficient for the procurement of a representative butterfat sample. Farm bulk milk samples to be tested shall be warmed to 90° F to 100° F.

(c) If one test is to be made of the entire quantity of milk received in several cans, the milk in each can shall be thoroughly agitated. A sufficient proportionate amount shall be promptly transferred from each can to a clean container from which a representative stirred portion shall be taken for the test, or the test portion shall be removed from the entire delivery immediately after it has been dumped in the weigh vat.

(d) The sample to be tested shall be filtered through a standard filter disc which conforms to the provisions of section 12.3 of this Part, and the size of the filter area shall conform to the provisions of section 12.2 (c) and (d) of this Part.

*Note:* In addition to the tests as prescribed in these rules and regulations, the off-bottom method of testing may be used as a screening test, but the results of such tests are not to take the place of the tests required by these rules and regulations.

### **Section 12.6 Rejection of unsatisfactory milk.**

(a) For the purposes of this Part, when reference is made to the quantity of sediment, such as 1mg., 1.5 mg., or 3.0 mg., it is to be understood that this refers to the amount of sediment

in a one-gallon sample filtered through a filter area 1 1/8 inches in diameter, and that when smaller samples are filtered through proportionately smaller filter areas, the quantity of sediment which necessitates action is proportionately less.

*Note:* Filter areas for different volume samples are as follows:

<i>Quantity Filtered</i>	<i>Diameter of Filter Area</i>
1 pint	0.40 inch
1 quart	0.56 inch
2 quarts	0.80 inch
3 quarts	1.0 inch
1 gallon	1.125 inches

(b) Milk received from producers or from any other source may be rejected if it is found to be unclean by an off-bottom screening test of milk in cans.

(c) Milk received from producers or from any other source shall be rejected under the following conditions:

(1) If it is found to contain any floating extraneous matter such as flies, hairs, dirt, chaff, etc.

(2) If any milk is found to contain 1.5 mg. or more of sediment, except as otherwise provided in paragraph (3) of this subdivision.

(3) If milk which has been sampled has been received in a bulk tank truck and commingled with other milk before the sample is tested or if milk is received in cans and is dumped into a weigh tank or other receiving equipment before sampling, the following procedure shall be followed, except as provided in subparagraph (iv) of this paragraph:

(i) If the milk is found to contain 1.5 mg. or more of sediment, the producer or other person from whom such milk was received, shall be promptly notified of such condition and advised to correct it immediately.

(ii) At the time of the first delivery of milk by such producer or other person after 48 hours from such notice, the milk so delivered shall be tested. If the milk is found to contain 1.5 mg. or more of sediment, the producer shall be immediately notified and no more milk thereafter shall be accepted from such source until it is found to contain less than 1.5 mg. of sediment.

(iii) If the milk is found to contain 3.0 mg. or more of sediment, the producer or other person from whom such milk was received shall be promptly notified of such condition and that no more milk will be accepted from such source until it is found to contain less than 1.5 mg. of sediment.

(iv) With respect to milk received from producers in cans prior to January 1, 1969, if it is found to contain 1.5 mg. or more but less than 2.0 mg. of sediment, such producer shall be notified that his milk is probational, but such milk need not be rejected unless it is found to contain 2.0 mg. or more of sediment.

(4) For the purpose of determining whether or not additional milk is to be received from any source, samples shall be taken and tested as follows:

(i) If the milk is to be received in bulk, a representative sample shall be taken from such source and shall be tested before accepting any such milk, and such milk shall not be accepted if it contains 1.5 mg. or more of sediment.

(ii) If the milk to be received is in cans, a representative proportionate sample shall be taken from each can if the delivery consists of five cans or less; from at least five cans if the delivery consists of more than five cans but not more than 10 cans, and from at least one half of the cans if the delivery consists of more than 10 cans. The samples from each can shall be promptly transferred to a clean container from which the proper amount shall be taken for making the test. Except as provided in subparagraph (3) (iv) of subdivision (c) of this section, unless this milk is found to contain less than 1.5 mg. of sediment, no milk shall be accepted from such source.

### **Section 12.7 Notice to producers.**

When notice of unsatisfactory milk is given to producers pursuant to the provisions of section 12.6(c)(ii) or (iii) of this Part, or when milk is rejected pursuant to the provisions of section 12.6 (c)(2) or (3) of this Part, the producer shall be notified that the sediment disc resulting from the test of such milk is available for examination during the following two week period.

### **Section 12.8 Care and filing of discs.**

Discs resulting from sediment tests shall be mounted, graded, and filed at the plant within 48 hours after testing, in the following manner:

(a) To mount and grade discs, the discs shall be removed from the tester and mounted on a smooth white surface or shall be mounted for storage in individually identified envelopes, with transparent opening for viewing face of discs with retained sediment thereon.

(b) Each unsatisfactory disc shall be graded as to the amount of sediment thereon by visual comparison with the standard as provided for in section 12.4. If unsatisfactory discs do not contain the same amount of sediment as any standard reference disc, such discs shall be graded by referring to the closest lower reference disc and reported as “more than \_\_\_ mg.” of sediment, as so determined.

(c) On the surface referred to in subdivision (a) of this section or on the envelope on or in which the disc is mounted, the following information shall be legibly recorded:

- (1) the name or permanent number assigned to the producer;
- (2) the date upon which the test was made;
- (3) the method used, such as “1 pint mixed” or “1 gallon mixed”;
- (4) the grade assignment given to each unsatisfactory disc.

(d) Discs shall be filed systematically at the plant where prepared. All discs shall be retained at least one month.

**Section 12.9 Disposal of rejected milk.**

Milk which is rejected because it contains sediment in excess of that permitted pursuant to this Part shall be so handled and disposed of that it will not be used as food or as an ingredient in any form in a food product, except that it may be used by the producer of such milk on his own farm.

**Section 12.10 Rejected milk to be tagged.**

Milk rejected because of sediment in excess of that provided pursuant to this Part shall bear an identifying tag attached to the container thereof as soon as such determination has been made. The tag shall state the reason for such rejection and a warning printed thereon declaring that it shall be illegal for any person to purchase such rejected milk or to use such rejected milk as food or as an ingredient in any form in a food product, except that the producer of such milk, as set forth in section 12.9 may use it on his own farm. The tag on any container of rejected milk shall not be removed therefrom while such rejected milk is in such container.

**Section 12.11 Record of sediment tests.**

(a) A separate written record shall be made and kept for each producer, which may be combined with other quality records for such producer, and for each other source from which milk is received, and such record shall contain the following information:

- (1) The name or permanent number of each producer or other person from whom milk is received.
- (2) The dates upon which tests of milk from such producer or other source, were made.
- (3) The results of the test made, whether acceptable or unsatisfactory and if unsatisfactory, the amount of sediment found.
- (4) The date and method of giving notice of unsatisfactory milk pursuant to section 12.6(c)(3)(I), (ii) and (iii) of this Part.
- (5) The quantity of milk rejected and the date of such rejection.

(b) Such records shall be kept on file at least one year at the plant where the tests are made, or in the case of milk in farm bulk tanks tested at the farm, at the plant having the responsibility for making such tests.