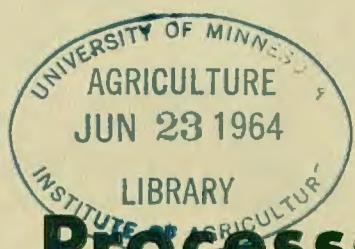


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Dairy Products Processor

AGRICULTURAL EXTENSION SERVICE • INSTITUTE OF AGRICULTURE
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Editor - V. S. Packard

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Recent editions of this newsletter have dealt with problems in bulk handling. Control of losses is essential. The hauler is most important in this regard. Let's take a look at bulk tanks as measuring devices and the role of the hauler in bulk handling.

HISTORICAL INFLUENCES

Over the years milk has been purchased on the basis of weight and butter-fat test. The bulk tank, however, is a device for measuring volume, not weight. Therefore a conversion is necessary. In making a conversion from volume to weight, it is commonly assumed that a gallon of milk weighs 8.6 pounds. In practice this may be accurate enough. In reality, weight per unit volume depends on the solids content of milk and this varies between herds and within herds from time to time. A conversion to weight must be considered a potential source of error, though small. Misreading charts in making conversions can be much more significant.

ACCURACY OF BULK TANKS

Many factors affect bulk tank accuracy. In any volume measurement the cross-sectional area of the measuring device is important. That is, a more sensitive measurement can be made in a long narrow cylinder than in a wide flat tub.

Rigidity is necessary. Dents, bubbles, or weaknesses in a tank that allow warping decrease accuracy.

Positive seats for gauges, dull finishes on gauges, and a simple numbering system on gauges (rather than inch-graduations) assist in accurate readings.

Some error must be expected. This varies with tank size:

150 gallon tank--accurate to within 1/3 gallon, about 2.9 pounds

300 gallon tank--accurate to within 2/5 gallon, about 3.4 pounds

1,000 gallon tank--accurate to within 1 1/5 gallon, about 10.3 pounds

MAKING A READING

Two major causes of misreading result in excessively high values. The first is a dirty measuring rod--one stored in the bulk tank and not washed properly. The measuring rod must be absolutely clean or milk will creep up on it. The meniscus must be flat. Bon Ami works well as a cleaning agent. But it must be used every pickup.

Second, measuring rods must be dry when inserted in the tank. A moisture film causes milk to creep. To obtain a dry stick after cleaning, wipe it with a disposable paper towel. It must also be warmer than the surrounding temperature. A cold measuring rod provides a surface on which moisture in the air condenses. This nearly invisible film is enough to pull the meniscus up slightly and overreading results. Many pounds of milk are at stake on most routes if these two items are neglected.

One problem arises in consideration of the above requirements for accurate readings. It is unreasonable to assume that a hauler can properly clean, or warm a measuring rod without ready access to running hot water. Yet, many bulk installations are remote from such basic facilities. The need for milkhouse legislation has not lessened. It is greater than ever.

A hauler who has not been using the above technique (and many have not) may be suspected by the producer when this change in technique is first noted. In fact, many producers make their own readings, before the hauler arrives. Unless similar procedures are used, different readings result.

Inform the producer that accurate measurements of milk volume in the tank can be made only in the above manner. Farm weights and delivered weight can be brought into agreement only by these methods.

OTHER CONSIDERATIONS

Storage of the measuring rod outside the tank is another method that has been used. This assures a warm stick (at least during warm months) and precludes moisture condensation. Because of unsanitary tank locations, this is a questionable practice unless the rod is sanitized before inserting it in the tank. Also, some local health regulations demand that the rod be kept in the tank at all times.

If the agitator is running when the hauler arrives, a waiting period is necessary to allow milk to stop surging. Time required for milk to quiet varies. A minimum of 3 minutes should be observed strictly. In some cases 10 minutes will be necessary. Haulers should be discouraged from starting on their routes too early, before milk is adequately cooled and when agitators will be running.

RINSING BULK TANKS

A common practice is that of rinsing out last traces of milk with water. If checkweighing is to be meaningful and adulteration prevented, this cannot be done. Tanks are sloped to drain adequately. Inclusion of unknown quantities of water renders checkweighing useless. And contamination of milk with undesirable organisms in the water should be avoided. Water is an excellent source of psychrophiles--bacteria that grow at relatively cold temperatures--as well as other spoilage bacteria. Quality tests cannot account for bacteria added after sampling. Always disconnect hose before rinsing tank.

CHECKWEIGHING

A few precautions permit accurate scale weighing and give haulers confidence in this accounting practice:

1. Inspect scales regularly.
2. Balance scales daily.
3. Don't weigh on snowy or rainy days.
4. Don't weigh in the open on a windy day.
5. Wait for tank to stop surging.
6. Have a good man operating scales.
7. Don't insert sticker until scale stops fluctuating.

Where platform scales simply are not available and no metering device is used, the can weigh-tank, if still in use, may be substituted to provide some means of checking. Accuracy is not as good. Small errors in weighing each portion of milk until tanker is emptied can collectively cause a sizeable error.

ACCOUNT FOR BUTTERFAT RECEIPTS

Check farm butterfat test against tank truck milk test. Remember that the average farm test must take into account weights of milk. Multiply each producer's weight of milk by his test. Add up the pounds of butterfat and divide by the total weight of milk included. Multiply by 100. This calculated test should agree closely with a test made on the tanker milk. Consistently low tanker tests indicate rinse water addition.

Some concern has been voiced over the presence of yellowish flakes in bulk milk which may or may not be churned butterfat. Considerable churning would have to take place before a detectable difference in test would occur, assuming churned fat is totally lost. To lower the test of 2,000 pounds of 4.0 percent milk to 3.9 percent requires the removal of 2 pounds of butterfat. Losses rarely reach this magnitude.

SUMMARY

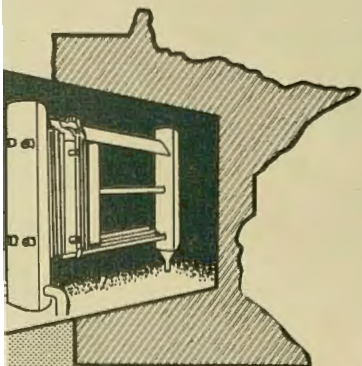
Control of bulk losses:

1. Educate haulers in correct methods of measuring milk in bulk tanks.
2. Calibrate all bulk tanks at initial installation and make routine checks thereafter to assure continuous calibration. Check chart accuracy. Printing errors do occur.
3. Check-measure all tanker loads against farm receipts.

DAIRY PRODUCTS INSTITUTE

Dairy Products Institute will be held September 8, 9, and 10 this year. We hope to see you there.

To simplify terminology, trade names of products or equipment occasionally are used. No endorsement of products or firms named is intended, nor is criticism implied of those not mentioned.



Agricultural Extension Service
Institute of Agriculture
University of Minnesota
St. Paul, Minnesota 55101

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