THE DAIRY PRACTICES COUNCIL®

GUIDELINE FOR CLEANING & SANITATION RESPONSIBILITIES FOR BULK PICKUP & TRANSPORT TANKERS

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EXCEPTIONS FOR INDIVIDUAL STATES NOTED IN TEXT OR FOOTNOTES
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https://www.dairypc.org
evp@dairypc.org

Guideline Preparation and Review Process

Guideline development within Dairy Practices Council (DPC) is unique and requires several levels of peer review. The first step in the process of guideline development starts with a Task Force subcommittee comprised of individuals from industry, regulatory and education interested in and knowledgeable about the subject to be addressed. Drafts, referred to as 'white copies,' are circulated until all members are satisfied with the text. The final white copy may then be distributed to the entire Task Force, DPC Executive Vice President and whoever the Task Force Director feels would add to the strength of the review. Following final white copy review and correction, the next step in the process requires a yellow cover draft that is circulated to the member Regulatory Agency representatives that are referred to as "Key Sanitarians." The Key Sanitarians may suggest changes and insert footnotes if their state standards and regulations differ from the text. After final review and editing the guideline is distributed in the distinctive DPC green cover to people worldwide. These guidelines represent the state of the knowledge at the time they are written.

Disclaimer

The DPC is not responsible for the use or application of the information provided in this Guideline. It is the responsibility of the user to ensure that the information addresses their needs and that any action taken complies with appropriate regulations and standards.

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INTRODUCTION

Proper hauling procedures and effective cleaning and sanitizing of bulk milk pickup tankers are primary components of dairy total quality programs. Although appropriate procedures are generally followed, a breakdown in the system can be devastating, not only to the parties involved but to the dairy industry as a whole. Such an incident occurred in the fall of 1994, when a nationwide outbreak of salmonellosis was linked to the consumption of ice cream contaminated with *Salmonella*. The implicated ice cream was made from pasteurized mix delivered to an ice cream plant in a tank truck that previously hauled unpasteurized eggs. The tank truck was considered to be the most likely source of contamination of the mix, which was made into ice cream without re-pasteurizing it. Distribution and consumption of the contaminated ice cream resulted in thousands of suspect cases of salmonellosis, with at least 645 confirmed cases in 28 states (Food Chem. News, Feb. 13, 1995). The outbreak cost the dairy plant involved in excess of one million dollars due to product recall and disposal, loss of business, and settlements with those affected by the illness (Food Chem. News, June 12, 1995). In response, the dairy company sued the suppliers and the hauler for breach of contract and negligence, claiming that they failed to "ensure the cleanliness" of the trucks.

This incident demonstrates the importance of following proper procedures for hauling dairy products, keeping and reviewing accurate records of products hauled, treating all products hauled in tankers as "raw" ingredients and ensuring that proper cleaning and sanitation procedures are followed for all dairy transport tankers. This event also changed the mind set of dairy processors in regard to bulk transportation of pasteurized milk and dairy products for packaging at another facility without further processing. Currently, the Grade "A" Pasteurized Milk Ordinance (PMO, 2017) requires that "*bottling, packaging and container filling of milk and milk products shall be done at the place of pasteurization in a sanitary manner.*" This policy has been adopted by regulatory agencies for manufacturing facilities (e.g., ice cream) as well, although provisions may be made for the use of designated tank trucks for pasteurized milk products only following stringent sanitation procedures approved by the regulatory agency.

While a majority of tank trucks are well maintained, inadequate cleaning of tankers is not uncommon. This can result from using poorly established procedures, by taking short cuts to save time, and from faulty design of tank trucks and/or cleaning systems. Along with the potential for contamination with pathogens, especially if the tanker is used to haul products that receive no further processing, as in the case cited above, milk and other food products transported in tankers may be subject to other forms of microbial contamination due to inadequate cleaning procedures, including microorganisms that can reduce product quality. Chemical hazards are also of concern, especially if a food hauled prior to effective cleaning is considered to be a potential cross-contact allergen (i.e., eggs). These allergens could contaminate subsequent loads if proper washing procedures are not followed. DPC080, *Food Allergen Awareness in Dairy Plant Operations*, addresses these concerns. Certain foods may also result in films, stains and flavors/odors that are not easily removed. In general, tank trucks hauling other food products may require washing procedures that are dramatically different than those commonly used for dairy products and such use requires care.

The purpose of this document is to provide bulk milk haulers, dairy plant receivers, plant and wash facility managers and other employees with a set of guidelines that can be used to ensure that the tanker and its associated equipment are thoroughly washed, sanitized and inspected in order to maintain product quality and safety. Other areas of importance covered include general considerations for the materials, design and construction of transport tankers; considerations for

safety and *Occupational Safety & Health Administration* (OSHA) standards relative to entering confined spaces; and general recommendations regarding the use of tank trucks for hauling other food products. This guideline will emphasize that effective procedures and commitment, along with a strong working foundation between management, milk receivers, haulers and all others associated with cleaning and sanitizing the bulk milk tanker and its equipment will help ensure the quality and safety of our dairy products. Additional information related to this guideline can be found in the PMO, Appendix B, *Milk Sampling, Hauling and Transportation;* DPC007, *Sampling Fluid Milk;* and DPC050, *Farm Bulk Milk Collection Procedures.*

DEFINITIONS

3-A Sanitary Standards – Material specification, design criteria and other information related to sanitary design and cleanability needed to satisfy public health concerns as determined by the appropriate 3-A Sanitary Standards Committee. Other standards may be used as applicable.

Bulk Milk Hauler/Sampler (PMO) – Person responsible for collecting official regulatory samples and who may transport raw milk from a dairy farm and/or raw milk products to or from a milk plant, receiving or transfer station and is permitted by any Regulatory Agency to sample raw milk/raw milk products.

Bulk Milk Pickup Tanker (PMO) – A bulk milk pickup tanker is a vehicle, including the truck, tank and those appurtenances necessary for its use, used by a bulk milk hauler/sampler to transport bulk raw milk for [processing] from a dairy farm to a milk plant, receiving station, or transfer station.

CIP – "*Clean-In-Place*" procedures that allow cleaning/sanitizing equipment without dismantling, relying on circulatory flow, in most cases with an automated system. Also referred to as "mechanical cleaning."

COP – "*Clean-Out-of-Place*" procedures that require equipment to be dismantled to be cleaned, either manually or with assistance of circulating or turbulent wash sinks (COP tanks).

Dome, Dome Lid, Dome Cover, Vents & Gaskets – The covers attached to the tanker at the manhole area of the vessel made of stainless steel, plastic or rubber.

Farm Milk Pump – Equipment needed to transfer the raw milk from the farm bulk tank or other bulk milk source to the milk tanker, generally associated with the bulk milk pickup tanker. Includes the jumper hose (connects tank truck milk pump to tank truck tank valve), clamps and short pipe sections.

Hydraulics – Term used to describe fluid flow rate and pressure relative to wash systems.

Milk Hauler/Driver – Any person transporting or delivering milk or milk products to or from a milk plant, receiving station or transfer station.

Milk Tank Truck or Tanker (PMO) – Refers to over-the-road trucks used to carry or transport milk and milk products including *Bulk Milk Pickup Tankers* (transfer bulk milk from dairy farms) and *Milk Transport Tankers* (used to transport milk from plants, receiving stations or transfer stations).

Milk Tank Truck Cleaning Facility (PMO) – Any place, premise, or establishment, separate from a milk plant, receiving station or transfer station, where a milk tank truck is cleaned and sanitized.

Milk Tank Truck Driver (PMO) – Any person who transports raw or pasteurized milk or milk products to or from a milk plant, receiving station or transfer station. Any transportation of a direct

farm pickup requires the milk tank truck driver to have responsibility for accompanying official samples.

Milk Transport Tanker (PMO) – A vehicle, including the truck and tank, used by a bulk milk hauler/ sampler to transport bulk shipments of milk and milk products, from a milk plant, receiving station or transfer station to another milk plant, receiving station or transfer station.

Milk Transportation Company (PMO) – A company/person responsible for a milk tank truck(s).

Receiver/Milk Receiver – Employees of the milk plant or receiving station responsible for sampling incoming milk, off-loading the milk, and cleaning the milk tank truck vessel. Milk receivers are generally **Dairy Plant Samplers** (PMO), responsible for collecting official samples for regulatory purposes, and may be licensed by the state.

Industry Plant Samplers – Responsible for the collection of official "Universal" samples.

Sanitization (Sanitizing) – A process applied to a clean surface capable of reducing numbers of the most resistant human pathogen by 99.999% (5 log10) to 99.99999% (7 log10). Methods include hot water, hot air, or steam, or an EPA-registered sanitizer per label directions, by mechanical or manual methods.

Transfer Equipment – Includes, but is not limited to, the equipment needed to transfer the milk and milk products such as milk pump, jumper hose and transfer hose.

Transfer Hose – Milk hose carried on a tank truck used to transfer milk into the tanker from a farm bulk tank or other bulk milk source when attached to the tank truck's milk pump.

HTST Systems – High Temperature Short Time continuous-flow pasteurization of milk or milk products.

ATP Systems – Adenosine Triphosphate based test that assesses the cleanliness of surfaces or liquid samples.

GUIDELINE CONTENT

AREAS OF RESPONSIBILITIES: RECEIVING, CLEANING, SANITIZING, INSPECTION & FACILITIES

When a bulk milk pickup tanker arrives at a receiving plant, established procedures should be followed to ensure that the milk is accepted or rejected and off-loaded correctly, and that the tanker and its components are properly cleaned and sanitized. Bulk milk tankers shall be cleaned immediately after each day's use and sanitized prior to the next day's use. There are exceptions in some states, where the bulk milk tanker is not required to be cleaned or sanitized between loads during a 24 hour period, provided that the bulk milk tanker is cleaned after that day's use and sanitized prior to the next day's use. It is important that all parties involved understand and fulfill their responsibilities.

Hauler/Driver and Receiver

Generally, the person in charge of receiving the milk is responsible for proper off-loading of the milk and cleaning and sanitizing the tank truck, while the hauler is responsible for the farm transfer equipment.

The general steps for off-loading and cleaning/inspection of the tank truck and the person responsible are as follows (details to follow in later sections):

1. Check haulers/tank truck records:
   - Previous products hauled
   - Permit, wash tags, inspections, seals; file tags, record seal numbers

NOTE: The receiver is responsible for these actions.

2. Rinse back/open doors/rinse pump compartment:
   - Check for leaks and/or poor connections
   - Check condition of producer samples

NOTE: The receiver or hauler/driver is responsible for these actions.

3. Check milk through manhole:
   - Check manhole condition
   - Check milk for odor, appearance, defects
   - Check temperature

NOTE: The receiver is responsible for these actions.

4. Sample milk for appropriate tests (refer to DPC007, *Sampling Fluid Milk*):
   - Drug residue testing (required by PMO Appendix N)
   - Optional testing (recommended):
     - Freezing point
     - Direct Microscopic Count (DMC) for bacteria and/or somatic cells or alternate rapid method (e.g., Bentley, Foss)
     - Other tests as required by firm or plant

NOTE: The receiver is responsible for these actions.

5. Accept milk based on:
   - Drug residues not found
   - Odor, appearance and temperature acceptable
   - Meets other standards (optional testing in step #4 above)

NOTE: The receiver is responsible for these actions.

6. Connect hose/off-load milk:
   - Assure trailer is vented properly
   - Record received milk weight
   - Record storage tank used for load

NOTE: The receiver is responsible for these actions.

7. Dismantle/wash/sanitize transfer equipment:
   - Transfer hose, pump and components

NOTE: The hauler/driver (or receiver) is responsible for these actions.

8. Disconnect tanker from plant milk line and storage tank:
   - Connect to CIP system
   - Wash/sanitize tank truck including manhole assembly
   - Inspect for cleanliness prior to sanitizing

NOTE: The receiver (or hauler/driver) is responsible for these actions.

9. Inspection/reassembly:
    - Inspect gaskets, parts – replace as needed
    - Assure that tanker is fully drained

NOTE: The hauler/driver (or receiver) is responsible for these actions.

10. Tagging procedures:
    - Wash tags applied after inspection
    - Documentation maintained; incoming tags stored (refer to PMO, Appendix B, Section VI, #5 – Wash and Sanitize Record)

NOTE: The receiver (or hauler/driver) is responsible for these actions.

Truck Owners

Tank truck owners are responsible for ensuring that:

- drivers/milk haulers employed are properly trained and licensed, as applicable;
- trucks, tankers and all associated equipment (such as pumps, valves and hoses) are in good working order and properly maintained;
- the external surface of the tank and truck should be frequently cleaned;
- cleaning/sanitizing of milk transport equipment is properly performed by trained drivers or others designated to do so at appropriate permitted facilities (e.g., plant, receiving station, milk tank truck cleaning facility) and that proper records (e.g., wash tags; repair logs) are maintained;
- appropriate worker safety requirements are met (refer to **Appendix**, *OSHA*);
- milk tank trucks "*shall not be used to transport or contain any substances that may be toxic or harmful to humans*" (e.g., non-food), and procedures are in place to prevent allergen cross-contact;
- each milk tank truck is inspected at a frequency required by the Regulatory Agency (e.g., every 24 months under the PMO, using FORM FDA 2399b, *Milk Tank Truck Inspection Report*); and
- each milk tank truck has and displays an up-to-date *permit* for the purpose of transporting milk and/or milk products issued to the owner by an authorized Regulatory Agency.[1]

When owners maintain their own reload and transfer stations, they are responsible for cleaning and sanitizing their trucks, for providing all the necessary equipment, and for training the employees. Inspections and record keeping at these installations shall be employed to ensure that proper cleaning and sanitizing of equipment occurs at all times.

Plant/Receiving/Wash Facility Managers

Management of receiving dairy plants, receiving/transfer stations and tank truck wash facilities are responsible for providing:

- appropriate training of all receiving personnel in cleaning responsibilities and that appropriate worker safety requirements are met (refer to **Appendix**, *OSHA*);
- adequate facilities and equipment to ensure proper washing of the tank trucks and components before they leave the premises;
- designated area(s) and the necessary equipment for the hauler to manually clean milk transfer and collection components (e.g., wash basins and/or clean buckets, appropriate brushes, detergent, water and rinsing capabilities at appropriate temperatures);

[1] Illinois' milk tank truck permits do not have an expiration date.

- CIP capabilities for the milk transfer hose;
- CIP capabilities for tanker vessels with appropriate spray devices and cleaning solution pressures (hydraulics) for the size and types of trucks washed, considering built-in vs. drop-in spray units;
- all appropriate cleaning and sanitizing chemicals for the operation as determined by consultation with a dairy chemical supplier;
    - water used should be checked for hardness and other parameters that may influence cleaning chemicals, with chemicals adjusted accordingly; soft water is preferable to hard water.
    - central sanitizer hose station is strongly recommended.

Additionally, plant/receiving/wash facility managers must ensure that appropriate procedures are in place to:

- review and maintain wash tags and appropriate records;
- determine if a milk tanker has been inappropriately used (e.g., hauled a potentially toxic substance);
- inspect equipment before unloading and after wash procedures; and
- implement corrections or corrective actions as needed.

Regulatory Authorities/Agencies

It is the responsibility of the *Regulatory Agency* to supervise and enforce the sanitary regulations pertaining to the cleaning and sanitizing of tank trucks and to work with industry personnel to minimize problems created from improperly cleaned equipment. For the transport of Grade "A" milk and milk products, there are several sections of the PMO that address the requirements for condition, cleaning and sanitizing that industry must meet. The **Appendix**, *Regulatory Responsibilities*, of this document provides detailed references to the PMO regulations that pertain to milk tank truck requirements.

Generally, the Regulatory Agency is responsible for:

- ensuring that requirements for construction, condition, cleaning, and sanitizing tank trucks are met;
- conducting routine inspections (e.g., every 24 months) of tank trucks (FDA Form 2399b);
- issuing a permit for each tank truck "*for the purpose of transporting milk and/or milk products*" based on satisfactory inspections, recommended annually and required every 24 months plus the remaining days of the month; and
- evaluating haulers and receivers and issuing appropriate permits and/or licenses (e.g., primarily pertaining to sampling, see following section).

Regulatory agencies routinely review wash tags and other records to enforce PMO Item 12p, *Cleaning and Sanitizing of Containers and Equipment*, which states, "*…utensils and equipment used in the transportation, processing, handling and storage of milk or milk products shall be effectively cleaned and sanitized before each use*."

Training and Licensing

Haulers

It is required that all milk haulers receive training and are licensed. Section 3 of the PMO "*…requires that the regulatory agency establish criteria for issuing permits to farm bulk*

milk haulers." However, licensing often stresses farm milk collection and sampling procedures (refer to **Appendix**, *Regulatory Responsibilities*, and DPC050, *Farm Bulk Milk Collection Procedures*) without sufficient coverage of procedures for cleaning and sanitizing the transport tankers. Also, situations occur where a licensed hauler picks up milk at the farm and another hauler or driver delivers the load to the receiving plant. This second person may not be licensed or trained to perform the procedures and requirements for cleaning and sanitizing milk hauling equipment.[2] Under these circumstances, problems are likely. The tank truck owner should make arrangements to address this issue to ensure that all persons are properly trained.

Receivers

Those receiving milk at dairy plants or receiving stations should be properly trained.[3]

1. The milk plant or receiving station must ensure that those responsible for the acceptance of milk and for the cleaning and sanitization of bulk tank trucks are properly trained in the specific procedures established for the receiving operation.

2. Training should cover hauler responsibilities, so that the receiver can ensure that the hauler has all needed equipment and supplies for carrying out their duties and is competent in the required tasks.

CLEANING & SANITIZING PROCEDURES – HAULER RESPONSIBILITIES

The milk tank truck hauler has the responsibility of collecting milk on the farm according to established procedures (refer to **Appendix**, *Regulatory Responsibilities*, and DPC050, *Farm Bulk Milk Collection Procedures*), and in most cases delivering it to the plant or receiving station. Upon delivery of the product, or after disposal of rejected product, the hauler is typically responsible for washing, sanitizing, and repair of the equipment used to transfer the milk at the farm. This includes rinsing the back of the truck prior to opening, washing the transfer pump and its components, washing the milk hose and inspecting the tank truck to ensure that all cleaning procedures were performed competently. The transfer equipment contacts 100% of the load; therefore, it is essential that proper washing procedures be followed.

General hauler responsibilities include:

- open and rinse the inside of the hose and pump compartment with warm water to remove any milk residue or debris;
- remove the transfer hose, rinsing its exterior thoroughly;
- dismantle, clean and sanitize the milk pump and associated components;
- clean and sanitize the milk transfer hose, generally setting it up for circulation cleaning; and
- clean the exterior of the milk tanker.

NOTE: The following sections provide general recommendations for wash/sanitization parameters (e.g., temperatures, times, concentrations, etc.) for tankers and their components. As cleaning chemicals and systems vary, the reader of this document should

[2] California and Virginia requires the driver to be licensed if the producer samples are on the truck.
[3] Some states require licensing. Contact your local Regulatory Agency.

work with their chemical supplier to ensure that the most effective chemicals and procedures are used.

Cleaning/Sanitizing the Transfer Pump

Completely dismantle the milk transfer pump to ensure all parts are thoroughly cleaned. Pump parts must be washed manually with a brush(es) of appropriate size and configuration for the components and designated for *raw milk usage* (refer to DPC008, *Good Manufacturing Practices for Dairy Processing Plants*) with an adequate detergent solution in a wash vat designated for washing these parts. Parts may be washed in a COP tank, if available, although manual brushing is still required. The general procedure is as follows:

1. Fill a wash vat with 110-120°F (43-49°C) water. Add the proper concentration of cleaning chemicals designed to clean milk contact surfaces as recommended by your chemical supplier.

2. Dismantle the equipment entirely including the impellers, pump housing, front and back plates, O-rings, shaft seal and jumper hose, and the jumper hose clamps that hold the hose to its fittings, unless the equipment is approved for CIP cleaning. Rinse all parts thoroughly with warm water (110-120°F) and place them in the cleaning solution. Rinsing should remove most visible soil.

3. Using an *appropriately sized brush designated for raw milk food contact surfaces only* (color coded or other coding), brush wash each piece effectively until all evidence of milk has been removed (e.g., vigorous strokes in multiple directions over the entire surface). All parts, especially gaskets and O-rings, should be inspected and replaced as needed. Once brushed clean, rinse immediately with warm water (110-120°F) and then place parts on a clean, sanitized surface (no piece of equipment shall be placed on the floor).

4. Rinse all parts of the equipment with cool potable water; place parts on a clean, sanitized surface.

5. Sanitize using a proper strength sanitizer (made and used as directed) by either submerging the equipment in a COP tub or designated bucket containing the sanitizer, or by means of a central spray sanitizing system.

6. Using an appropriately sized brush designated for the raw equipment exterior only, brush wash the hose and pump compartment and rinse with cool water.

7. Reassemble the pump. Pump impellers typically need lubrication for efficient loading performance and to reduce wear. A food grade lubricant must be used; an H-1 rating is approved for incidental food contact surfaces.

8. Sanitize the compartment and exterior of the transfer equipment.

9. The farm sample dipper and dipper tube shall be properly cleaned and sanitized in the same manner as the pump components. The rubber stopper in the bottom of the dipper tube shall be periodically removed and cleaned.

10. The hauler/driver's sampler cooler should be cleaned periodically, and/or when there is obvious soil (e.g., leaking sample), and maintained in good condition.

Cleaning/Sanitizing the Transfer Hose

The inside of farm transfer hoses should be cleaned by means of recirculation cleaning (CIP). The receiving plant should provide means to circulate cleaning solutions at temperatures required to remove milk residue. At minimum, an adequate holding tank, sufficient hot water to maintain temperatures for the length of the wash cycle and a centrifugal pump are necessary, as well as an appropriately approved cleaning chemical. A recording chart to show time, temperature and tanker identification is highly recommended.

Specifications established by the manufacturer of transfer hoses and of the chemicals to be used in their cleaning and sanitizing should always be followed. To ensure that everyone responsible understands the proper way of cleaning equipment, a list of the procedures should be posted for the milk hauler's review in the receiving area. When improperly cared for, flexible plastic hoses can become prematurely etched, cracked or discolored, so that they cannot be properly cleaned, even when CIP methods are used.

Clamp-on inserted fittings (i.e., slip joints), which are not recommended, must be disassembled every time the tanker washes to ensure proper cleaning between the two surfaces.

A general procedure for CIP cleaning of a transfer hose with a designated system is as follows:

1. Rinse the outside of the hose. Brush clean if necessary, using a brush designated for transfer equipment exteriors.

2. Remove the transfer hose from the rear of the tanker. Rinse the inside with warm water to remove all milk. Ensure that the hose is on an elevated surface, not the floor.

3. Connect the transfer hose and manifolding to the CIP system (follow posted procedures). Brush wash and rinse the hose ends, clamps and gaskets before making any connections.

4. Circulate water at 110-120°F (43-49°C) or as recommended for the transfer hose and system with recommended CIP detergent concentrations (follow posted procedures) for 10 minutes. Temperatures exceeding 150°F (65°C) may cause damage to hoses; check with manufacturer.
   - If slip on fittings are used, disassemble the hose ends for manual cleaning before circulation cleaning.
   - If a CIP recorder is provided and authorized, document the tanker number of the hose that was washed on the recording chart and initial and date.

5. Rinse transfer and manifold hoses with potable water.

6. Sanitize hoses once free of all cleaning solutions. Applications will differ for each plant (follow posted procedures). All cleaned equipment must be sanitized.

7. Reassemble the hoses and return to the storage compartment of the tanker.

The information above is a general practice. Each receiving plant should provide the chemicals, brushes, posted procedures and the means to effectively wash and sanitize associated equipment. The milk transfer hose should be routinely inspected and replaced if in poor condition. Tape is not an acceptable repair method for cracked or worn hoses.

CIP Cleaning of the Transfer Hose with the Tanker

An alternative to using a designated CIP system is to wash the transfer hose within the CIP loop used to clean the tank truck. This should be placed within the CIP cycle in a manner that does not restrict the flow of the wash solution or affect the pressures at the spray balls.

NOTE: CIP systems used for washing tankers must employ return hoses that will withstand the suction of the return pump. Generally, the suction is greater than a farm transfer hose will withstand, which is why the transfer hose is usually not cleaned with the tanker CIP system; some companies do use this procedure, however.

Manual Cleaning of the Transfer Hose (Not Recommended)

If CIP methods are not available for cleaning flexible milk hoses, manual cleaning with a stiff brush (designated for raw milk usage) capable of cleaning the entire length of the milk hose and adequate wash solution must be available. If the hauler is unable to reach all parts of the internal hose, then CIP must be used.

COP Tank Cleaning of Fittings and Hose

COP tanks can be used to clean pump parts, clamps, gaskets, fittings and in some cases, hoses if appropriate attachments are available for CIP cleaning. Brush washing prior to COP tank cleaning is usually required. The design of the COP tank's mechanical washing action needs to be considered (e.g., pump circulation end to end; side jets; other). General procedures to follow when using COP tanks are:

1. Rinse all parts thoroughly with 110°F (43°C) water prior to placement in the COP tank. Rinsing before and after disassembly facilitates soil removal. Brush wash as needed.

2. Place disassembled parts in a properly designed basket to prevent abrasion damage due to high turbulence in the tank. Do not over pack baskets. Larger parts can be put directly into the tank.

3. Orient all parts, components and baskets in the COP tank so that they will be fully submerged in the wash solution and turbulent flow is optimum and not impeded or blocked.

4. Prepare the cleaning solution according to the chemical supplier's recommendations; generally, wash solution strength should be at 0.40% alkalinity (4000 PPM) with 70-100 PPM chlorine at a wash temperature of 140°F (60°C). Temperatures above 150°F (65°C) may damage hoses.

5. Turn on the COP tank to allow turbulent flow, typically washing for 20-30 minutes as needed.

6. Drain the wash solution from the tank and post-rinse with cool water. An acidified rinse (pH 4) is recommended if mineral residues are of concern.

7. Sanitize. Acid sanitizers may be used for the final rinse.

Hose Wash Fittings for CIP Cleaning

Some COP tanks provide fittings for attaching milk hoses so that circulation cleaning of the hose is provided while small parts are being cleaned in the tank. Follow guidelines above for the CIP procedures for hoses. *Transfer hoses cannot be adequately cleaned by placing them inside a COP tank.*

Cleaning the Outside of Tank Trucks

A clean and bright stainless steel tanker hauling milk is good advertisement on the road. Cleaning the outside of a tank truck is generally the hauler's and/or the owner's responsibility. Although the area of the doors to the tanker unloading section should be rinsed free of road dust and dirt before opening, washing the entire tanker can only be accomplished at the receiving plant if given permission by the management of that plant. In some facilities, exterior washing may not be allowed due to cost, debris, or a variety of other reasons. When external cleaning is not permitted at the receiving plant, alternative locations should be made available. At those locations, proper drains should be utilized that comply with local, state and federal ordinances.

Considerations for cleaning the exterior of tank trucks include ensuring that all manholes and other openings, including the loading compartment, are closed to prevent contamination of the interior of the tanker and its milk collection equipment.

CLEANING & SANITIZING PROCEDURES – DAIRY PLANT OR RECEIVING STATION RESPONSIBILITIES

Whenever milk is received or transferred, the dairy plant or receiving station should provide oversight to ensure the proper cleaning and sanitizing of the milk tank truck and its components. Tank wash facilities must provide appropriate cleaning chemicals and sanitizers, adequate hot water, appropriate brushes and wash basins, and post procedures for proper methods of cleaning and sanitization. Receiving personnel are generally responsible for the manual cleaning of the manhole dust cover, manhole lids, manhole gaskets, vents and manhole opening(s) and for cleaning the inside of the tanker either by CIP procedures (recommended) or by manual cleaning (not recommended, only as needed). Cleaning procedures shall begin only after the entire load of milk or milk product has been pumped from the bulk milk pickup tanker and the tanker is disconnected from milk or milk product receiving lines.

Tank Clean-In-Place (CIP) Procedures

Spray Devices & CIP Hydraulics

Tanks and vessels are typically washed with one or more spray devices (e.g., spray balls, other) designed to distribute the CIP wash solution in a cascading flow over the entire tank surface. Having the correct *hydraulics* (pressure and flow rate) in a CIP system is critical for proper spray device function and for getting a tank thoroughly clean. Without the correct hydraulics, spray devices will not work as intended.

The plant milk receiver should be familiar with the hydraulics of the plant/receiving station's wash system and ensure that it is appropriate for the spray devices used. The

system hydraulics should be posted in the area of the tank wash CIP controls. Some plant systems may be adjustable but even then, the receiver must have all the information available to perform a thorough job of washing the tanker.

CIP spray devices may be drop-in (part of the wash facilities CIP system) or built into the tank truck with connecting pipes for the wash facility's CIP system. Hydraulics need to be appropriate and posted:

- *Drop-in systems*. The hydraulics need to be listed for the spray devices and the CIP system.[4]
- *Tankers with built in spray balls*. The required hydraulics should be clearly posted on the tanker, ideally on a plaque near the CIP hookup point(s). The information located on the spray ball is not adequate because the individual running the system needs to have access to the information.
  - The plant receiver should determine if the plant's CIP system provides adequate hydraulics to supply built in spray balls. If this is not the case, then it is recommended that the tank be washed at a facility that has the required CIP system parameters.
- *Spray devices*. Regardless of design, they must match the system hydraulics. When replaced with "alternate" brands or styles, they will likely not function properly. Damaged spray devices typically need to be replaced with the exact design and/or with alternatives that are validated for effectiveness.

Before CIP Commences

CIP procedures for tank trucks involves clearing the tank of all product, disassembling fittings, pre-rinsing the tank, cleaning, post-rinsing, sanitizing and reassembly. Tanks must be emptied of product and disconnected from plant milk line before cleaning begins, including cleaning of manhole dust covers, lids and gaskets that must be washed manually. Once the tank is empty, manual cleaning can commence and the tank can be prepared for CIP:

1. *Disassemble* vent fittings and remove manhole gaskets, rinse as needed and place in a cleaning solution at 110-120°F (43-49°C) with the proper measured concentration of cleaning chemical.

2. *Brush wash* parts manually with a brush designated for raw milk equipment. Brushes must be sized and designed for the equipment washed, and used appropriately (e.g., vigorous strokes in multiple directions over entire surface). Wash buckets, if used, shall be designated for raw milk cleaning.

3. *Rinse* all components and store to drain while the tank truck vessel is cleaned.

CIP Procedures

1. Connect the CIP return hose to the tank outlet valve.
   - Flexible connecting hoses for CIP systems must be manufactured of food grade materials.

[4] Texas Bulk Milk Hauling Regulations require Bulk Milk Tankers to be equipped with built in spray ball systems. Manual cleaning or drop-in system may be allowed for temporary situations.

- CIP systems must employ return hoses that will withstand the suction of the return pump. Generally, the suction is greater than a farm transfer hose will withstand, which is why the transfer hose is usually not cleaned with the tanker CIP system; some companies do use this procedure, however.

2. Make sure the outlet valve is open.
   - Outlet valves with plunger type stems should be blocked open so that they do not vibrate partially closed during CIP.

3. Make appropriate connections to the spray device (e.g., ball). Spray devices may be permanently installed in the tank or attached as a drop-in spray unit on a manhole cover (see above).
   - CIP connections must never be made before the tank is emptied of product, or when connected to the plant milk transfer line.
   - Tankers that have spray devices built-in must be washed with these units and not with the drop-in devices. If built-in spray units are not used, milk or food residues can get into the spray device and it will not be cleaned completely, thus creating an area for milk soil build-up and microbial growth.
   - Drop-in devices shall be designed to properly fit the tank truck manhole opening.
   - Receivers must confirm that the CIP system hydraulics are appropriate for the spray device used and the tanker, especially when washing trucks new to the facility (see above).

4. Proceed with the CIP procedure. Pre-rinsing, washing, post-rinsing and sanitizing utilizing the spray device are best controlled by an automated programmed CIP system.
   - *Pre-rinse*. Pre-rinse water should be 110°F (43°C) with rinse water going directly to the drain.
   - *Wash*. CIP cleaning solutions should be non-foaming at a temperature of 145°F (63°C) and a chlorine content from 70-100 PPM. Depending on whether the solution is single use or recovered for pre-rinsing or for reuse, the alkalinity ranges from 0.13% to 0.25% (1300-2500 PPM). Fifteen minutes is usually adequate for the wash phase of a CIP program when the pump supplies sufficient pressure. Check with a chemical supplier for the chemicals and system used.
   - *Post-rinse*. Post-rinsing should be done with cool water. An acidified rinse (pH 4) is recommended if mineral residues are of concern.
   - *Sanitize*. Sanitize all clean surfaces and parts with an appropriate sanitizer prepared as directed.

5. When the CIP cycle is completed, disconnect the CIP hoses.
   - *Outlet valve*. The tank outlet valve must be removed and disassembled for manual cleaning.

For a more detailed discussion of CIP systems and procedures refer to DPC029, *Cleaning and Sanitizing in Fluid Milk Processing Plants*.

Spray Device Inspection

Spray devices (e.g., balls), both permanently installed and drop-in, should be checked daily to ensure they are properly assembled and free from clogs. Examination of the jet holes in spray balls should be done once a week at minimum, since debris can plug the holes and

interfere with the spray pattern. A strainer is recommended on the suction side of the CIP supply pump, which should be checked and cleaned daily.

Spray Device Venting

A vent must be provided in the drop-in spray head unit to prevent collapse of the tank liner due to rapid pressure changes. With permanently installed spray balls, venting is accomplished through the open fitting in the manhole cover. It must be stressed that proper cleaning and sanitizing of the manhole cover and vent parts on a tank can only be accomplished manually.

CIP Records

A recorder showing time and temperature of return solution is required for every CIP system.[5] Pressure recording is optional but can be included on the same time/temperature chart and is recommended to monitor system efficiency. Recorder charts must be maintained to show proper CIP function and must contain the date, time, number or name of the tanker being washed, and signature of the CIP operator.

Tank Manual Cleaning Procedure

NOTE: *Manual washing of the tanker is not recommended unless absolutely necessary*. Manual cleaning of bulk tanks requires that someone enter the tank, which is considered a "*confined space*." It is imperative that appropriate safety procedures are followed and that all *OSHA Standards* for entering a confined space are met. The OSHA Standard for Confined Space and general safety precautions are outlined in the Appendix, *OSHA*. Other OSHA Standards that may apply can be found in 29 CFR 1910.

The general procedure for manual cleaning and sanitizing is as follows:

1. *Clear the product*. Tanks should be cleared of product by rinsing with water at 110°F (43°C) as soon as possible after they are emptied.

2. *Disassemble fittings*. Disassemble all removable parts, including the entire outlet valve(s) assembly and the gasket and vent fittings from the manhole cover, and place them in a suitable detergent solution either in a manual wash vat or a COP tank. Wash as outlined above.
   - Manual washing of disassembled fittings should be done with suitable brushes that reach all surfaces with solution of the same alkalinity and temperature as used in the tank. COP tank cleaning can be used (see previous section). Rinse parts with cool water.

3. *Pre-rinse the tank*. Rinse all interior tank surfaces with tempered water, not over 110°F (43°C).

4. *Brush washing the tank.*
   - Thoroughly dissolve an appropriate manual cleaner in a plastic or rubber pail designated for raw milk contact surfaces with 125°F (52°C) water. Use the detergent

[5] Not required in Delaware, New Hampshire or Rhode Island. Requested in Massachusetts. West Virginia requires that the hauler countersigns the recording chart.

as recommended by the chemical supplier, generally to achieve a solution of 0.25% (2500 PPM) alkalinity.

- Place the pail of solution and a long-handled brush inside the tank.
  - The *brush* should be designated for cleaning raw milk contact surfaces.
  - The *brush* should have stiff, straight, nylon bristles arranged so that the operator can apply pressure overhead and elsewhere with effective coverage.
- Position a safety-approved light (shatterproof) so that good interior illumination is achieved.
- Enter the tank following appropriate confined space procedures (*safety first*, refer to **Appendix**, *OSHA*):
  - Whenever entering a tank, wear clean rubber footwear with no abrasive particles adhering to the tread design. Disposable boot covers are recommended.
  - If a device is used to assist in entering and exiting the tank, all parts in contact with the tank surfaces should be plastic or rubber to prevent scratching.
- Brush wash the tank. Working from the front of the tank toward the outlet, wash all of the interior in a progressive pattern so that no surface is missed; brushing each area in multiple directions as able. High-pressure washing devices may also be used inside tanks, with caution.
- Remove the pail and brush from inside the tank.
- Wash the manhole surfaces and covers.
- Wash the outlet port(s) from outside the tank, including any threads.
  - Two compartment tanks with a long outlet pipe will require an extended type brush that will reach all the way into the front tank from the outlet.

5. *Post-rinse*. Thoroughly rinse all washed surfaces with cool water as soon as possible after washing. Do not allow wash solution to dry. Rinse the outlets thoroughly.

6. *Wash the tank truck transfer hose*. Tank truck transfer hose should be washed with an extension brush that reaches through the full length of the hose. Remove the fittings from the ends of the hose so that all surfaces are cleaned. Circulation cleaning is preferred over manual cleaning of flexible hoses from the standpoint of sanitation and useful life of the hose. Rinse the hose after washing.

7. *Sanitize*. Sanitize all clean surfaces and parts with an appropriate sanitizer prepared as directed. Central spray sanitizer systems or other spray devices need to be used for effective coverage.

8. *Reassemble and sanitize again as appropriate*.

VERIFICATION & DOCUMENTATION

Tagging Procedures

The PMO states: "*Whenever a milk tank truck has been cleaned and sanitized, as required by the regulatory agency, it shall bear a wash tag or a record shall be made showing the date, time, place and signature or initials of the employee or contract operator doing the work, unless the truck delivers to only one receiving unit where responsibility for cleaning and sanitizing can be definitely established without tagging. The wash tag shall be removed at the location where the tank truck is next washed and sanitized and kept on file for 15 days (or*

longer if required) as directed by the regulatory agency." (2017 PMO, ITEM 12p. *Cleaning and Sanitizing of Containers and Equipment*).

Although the PMO exempts tankers designated for one receiving unit, it is strongly recommended that all tanks be tagged regardless of their hauling patterns.

The milk receiver is responsible for "tagging" each tanker washed. The wash tag must include:

- name and address of the plant,
- tanker identification,[6]
- statement "*Washed and Sanitized*" or wording to that effect,
- initials of the person responsible for the cleaning and sanitization of the tanker,[7] and
- the date.[8]

The hauler should also initial the tag to document that the transfer equipment (pumps and hoses) have been properly washed and sanitized. The time of cleaning and a notation of the product hauled prior to washing is recommended.

These records or "wash tags" must be kept available for review for a minimum of fifteen (15) days. During an FDA or a state check rating, the inspector will ask to see the wash tags. It is good practice to have the wash tags cross-checked with the CIP charts and documented. This provides *verification* that all tankers received were accompanied by a wash tag. No tanker shall be off-loaded unless it has proper documentation that the vessel had been cleaned and sanitized prior to pick-up of the milk being delivered.

The 96 Hour Rule

Tanks that have been unused for ninety-six (96) hours or not meeting the receiving plant requirements shall be re-sanitized before use. This should be documented on the wash tag. Examination of all external equipment used for transfer of the product, particularly pumps and hoses, should also be included in the routine inspection by the hauler. Before departure from the plant or transfer station, the hauler should examine the tank to make sure all rinse and sanitizing solutions have been completely drained.

Seals, Tamper Evident

The PMO requires that all openings to tanks (i.e., covers, clamped lines, etc.) be sealed in some manner immediately after sanitizing to ensure that the tank vessel is not tampered with. This procedure is highly recommended and should be considered an industry standard. Whoever signs the wash tag, is responsible for properly sealing all openings. Seal numbers shall be recorded on the wash tag. For additional information refer to DPC105, *Sealing Bulk Milk Tank Trucks*.

Inspection and Verification of Procedures

As the milk industry moves forward, state and federal regulatory agencies, and plant quality assurance personnel are requiring *verification* that bulk milk tank trucks are properly washed and sanitized. Routine inspections of the cleaning procedures used by the receiving plant and

[6] Pennsylvania requires the license plate number.
[7] California requires full name, not initials.
[8] California, Illinois, and Virginia require time as well as date.

haulers will improve effectiveness as well as identify where proper training is needed. It is recommended that pickup tankers and associated components be visually inspected each time they are washed, while once every six months a black light should be used to inspect said parts after they are washed *and dry*. Keeping logs of when the inspections are done, what was observed, and the action taken can help institute a solid quality program.

Hauler Responsibilities

Although the hauler is not responsible for washing the tank vessel, it is their responsibility to ensure that the tank and components are properly cleaned and sanitized before leaving the washing facility. The hauler should determine the sanitary condition of the tanker unit and determine whether the truck should be used to transport food products. If the hauler finds the tank has been unsatisfactorily cleaned, steps should be taken to ensure complete cleaning and sanitizing before use. If the inspection is satisfactory, it is the hauler's responsibility to ensure that all fittings are assembled securely after inspection.

Inspection Tools

Inspection of all milk contact surfaces is necessary before reassembling the fittings and sanitizing the surfaces. Inspection is most effective when equipment is dry, although this is difficult in most use situations.

Proper inspection requires:

- adequate illumination, which is critical for inspection:
  - a low voltage, waterproof, shatter resistant droplight is recommended at each bay for safe and effective inspection of the interior surfaces of a tank
  - a good shatterproof flashlight
- tank entry devices, for tank vessel inspection, used only for access into tanks (refer to **Appendix**, *OSHA*):
  - constructed of non-porous, corrosive resistant materials with nylon or rubber tips on the legs
  - stored off the floor and maintained in a sanitary condition
- additional inspection tools:
  - hygiene monitoring swabs (e.g., ATP systems) commonly used in plants may be used
  - black light to detect protein residues on dry surfaces
  - the sense of smell (e.g., your nose) often can be used to detect areas not properly cleaned

Inspection Points

Inspection of all items previously listed in the wash sections should include checking for cleanliness as well as for wear, deterioration or defects:

- manhole gaskets, rubber pump impellers and gaskets; all rubber parts
  - check for cleanliness and for cracks or deterioration
- manhole cover, manhole filter cover, cleaned and stored in a sanitary manner
  - filter should be changed daily
- vent tube covers and parts
- outlet valves and ports
  - long outlet pipe for two compartment tanks

- milk pump components, jumper hose, gaskets; check for cleanliness and defects
- milk hoses; check for cleanliness and for cracks or leaks
  - inserted fittings are removed and cleaned if used
- tank vessel; ends, sides, ceiling
  - inspection of spray devices for proper assembly, clogs, dents or other defects
- hose and pump compartment and sample storage cooler

Unclean areas must be rewashed. Inorganic films should be treated differently from organic films. Residue remaining after a washing procedure that is otherwise effective indicates the need for special detergents such as an organic acid or chlorine. For a more detailed discussion of special treatment refer to DPC028, *Troubleshooting Residual Films on Dairy Farm Milk Handling Equipment.*

Check Lists & Documentation

Procedures involving check lists and inspection forms are often used (refer to **Appendix**, *Transport Tanker Inspection Form Example*). These are only effective if all parties involved have been properly trained and standardized for the items included in the list and inspection. Check lists serve as records of verification to support all other cleaning and sanitization records and may be performed as part of a quality control program along with cleaning and sanitization procedures. Corrections must be implemented when verification indicates failure in the system. Records may maintained be part of Hazard Analysis Critical Control Point (HACCP) programs or other food safety based programs.

Check lists are also used in routing regulatory inspections. Inspections of milk tank trucks is required under the PMO (refer to **Appendix**, *Regulatory Responsibilities*). FDA FORM 2399b, MILK TANK TRUCK INSPECTION REPORT, is used for routine regulatory inspections of milk tank trucks and is available at:
https://www.fda.gov/about-fda/reports-manuals-forms/forms

PUBLIC HEALTH CONSIDERATIONS

Pathogen Control

It should be assumed that raw milk potentially contains pathogens and that people and equipment exposed to farm environments may potentially be vectors of pathogens from the farm (e.g., manure) to the plant. Because of increased emphasis on the control of pathogen and food safety risks, each operation should:

- Evaluate the effect of allowing exterior washing of tank trucks and trailers in their receiving (tanker) bays due to the potential increase of contamination risks.
- Restrict haulers and others that spend time on farms or handling raw milk from access to other plant areas; a properly planned receiving area would provide for toilet and hand wash facilities immediately off the tank room area for drivers and plant employees working in those areas.
- Provide laboratory space in the receiving area for all raw milk testing (e.g., drug residues); when samples have to be transported to other areas of the plant, develop procedures and training to ensure that those who travel in sensitive areas follow sanitary practices and hygienic zoning guidelines to reduce contamination risks.

- Provide mats with sanitizing solutions at key entry points to the dairy facility. The strength of the sanitizing solution must be closely monitored as any type of contaminate would lessen the concentration of the sanitizing solution.

Hauling Other Food Products

Tank trucks used to haul milk may on some occasions be used for hauling other food substances. This is not uncommon with long distance hauling where, because of the cost associated with transporting empty tankers, trucking firms will "back-haul" other items. Under no circumstances should a milk tanker be used for any non-food substance. When tankers are used for other foods, wash procedures appropriate for the food hauled should be followed to ensure complete removal of all residues. Procedures may vary, depending on the food item hauled, concerning wash temperatures, times and cleaning chemical selection. Cleaning supply companies should be consulted in this regard.

Some companies have policies that prohibit accepting milk products if the previous load hauled is not compatible with the shipment they are receiving. This emphasizes the need for all haulers to keep accurate records of the products hauled and the wash procedures used to clean that product from their tankers.

Food Allergens

Bulk milk tank trucks should not be used to haul other food allergens (e.g., liquid eggs; soy beverage), if at all possible. Without an effective validated wash procedure, cross-contact with the food allergen is likely (e.g., the contamination of milk with egg allergen). This occurs in both directions, as milk is considered a food allergen that could contaminate the "back-hauled" product (e.g., milk in liquid egg). As discussed above, procedures may vary, depending on the food item hauled, concerning wash temperatures, times and cleaning chemical selection. Cleaning supply companies should be consulted before risking an allergen cross-contact. Wash procedures should be validated using specific allergen test kits to ensure the wash parameters used are effective at removing the allergen.

Hauling Pasteurized Milk Products

All products hauled in tankers should be handled as "raw" products. Products that are pasteurized and shipped to another facility should be re-pasteurized before use. It is difficult to ensure that milk tankers are cleaned and sanitized to the standards of a pasteurized product tank. If it is absolutely necessary to use hauled pasteurized product or ingredient without further processing, then a truck designated "*For Pasteurized Products Only*" should be used following specific SOPs for handling product and washing the tanker. Regulatory authorities must be notified for approval.

According to DA Instruction 918-PS, Instructions for Dairy Plant Surveys, USDA, AMS, Dairy Programs states "condensed whey received from other sources shall be re-pasteurized at the drying plant at a minimum temperature of 166°F for at least 15 seconds or its equivalent, unless total solids content is 40% or higher."

MATERIALS & CONSTRUCTION

3-A Standards for Tank Truck Construction

All materials and construction used for dairy tank trucks should be in accordance with the most current revision of 3-A *Sanitary Standards for Stainless Steel Automotive Milk and Milk Products Transportation Tanks for Bulk Delivery and/or Farm Pick-Up Service*, 3A 05-(most recent version). A copy of the 3-A Standard can be obtained from: http://www.3-a.org.

Repair or Modification of Tankers

On occasion tankers are damaged during use. All repairs should be made in a facility that specializes in the repair of sanitary tank vessels and is experienced in meeting the most current revision of 3-A Sanitary Standards, Number 05-. Surface patching is not recommended. If repairs are required, the following steps should be taken:

1. Repairs and modifications, if any, must be completed and conform with the applicable material and fabrication criteria in the most current revision of 3-A Sanitary Standards, Number 05-, especially the finish requirements.

2. Before the tanker is returned to service it must be inspected by the regulatory agency having oversight.

3. After the tanker has been returned to service it should be inspected frequently to ensure the integrity of the repair and that it is cleaning properly.

MISCELLANEOUS INFORMATION

Brushes

Brushes should be made of non-porous material, kept in good repair, properly stored when not in use, and sanitized between each use. They should be sized appropriately for the equipment to be washed (e.g., round, snug but movable for cleaning pipes; large and flat for tank surfaces) and with handles that facilitate cleaning. It is very important to segregate brushes, so they are kept separate for use in:

1. raw product contact areas; food contact and non-food contact brushes

2. pasteurization areas, food contact and non-food contact brushes

3. environmental cleaning procedures (e.g., drains, floors, walls)

Brushes should be color coded or otherwise marked to ensure that brushes used on milk contact surfaces can be easily identified and kept separate from those brushes used on non-milk contact surfaces and that brushes used in raw milk areas can be easily identified and kept separate from those brushes used in pasteurized product areas. DPC008, *Good Manufacturing Practices for Dairy Processing Plants* provides recommendations for color coding brushes. Brushes should be stored where used and in a manner that reduces the likelihood of improper use; e.g., floor and drain brushes should not be stored in processing or receiving areas.

Re-Sanitizing Procedures for *Out-of-Service* Tanks

As sanitizing action dissipates over time, tanks that have not be used for ninety-six (96) hours after the last washing and sanitization must be re-sanitized before use. Receiving plants may have more stringent requirements (e.g., less than 96 hours). If the tank has been out of service longer, rewashing prior to re-sanitizing should be considered.

It is recommended that a tank wash facility be provided with a manual sanitizing apparatus (e.g., centralized sanitizing spray system). Spray sanitizer systems or other means are required to sanitize areas or parts missed by mechanical/CIP sanitizing systems (i.e., manhole plate, pump parts, hoses). Manually washed tankers can be sprayed through the manhole with a sanitizer solution to contact all surfaces and drain through the outlet valve(s). Pumps, hoses and parts may be spray sanitized or alternatively immersed in tub or bucket of sanitizer solution and drained prior to reassembly. Sanitizer concentrations of centralized systems, as well as immersion baths, must be routinely checked.

Sanitizers

Sanitization should be done prior to use and only after an effective wash, following the chemical supplier's/manufacturer's instructions. Sanitization may be performed with the CIP systems in the post-rinse and/or applied manually as stated above.

Any of the following sanitizers may be used at the prescribed strength and temperature: [chlorine with 200 PPM at 75°-90°F (24°-32°C); iodine with 25 PPM at 50°-70°F (10°-21°C); acid sanitizers and other approved sanitizers according to label directions]. All sanitizers must be used at the recommended "no-rinse" concentration and properly drained. Concentrations above "no-rinse" applications are not allowed unless rinsed (e.g., with pasteurized equivalent water). Concentrations must be routinely checked.

When selecting sanitizers and specific procedures for use, consideration should be given to the corrosive properties of some sanitizers and the potential deteriorating effect on tank surfaces and rubber parts (outlet valves and pumps). Minimizing the time between sanitization and the next milk pick-up will often reduce the risk of corrosion and deterioration. Sanitizing with acid sanitizers is often recommended due to their less-corrosive nature and their effectiveness in hard waters. Water quality (e.g., chloride content) may increase the risk of corrosion, even with acid based sanitizers, and should be checked routinely as directed by the chemical supplier, to optimize chemical selection and use.

Miscellaneous Information Regarding Cleaning Chemicals

1. Manufacturer's directions should always be followed for all chemicals used. Review *Safety Data Sheets* (SDS).

2. All cleaner and sanitizer containers should be kept tightly closed, in a dry area and properly labeled. "In-Use" containers (e.g., those used to transfer small amounts) must be properly labeled and stored.

3. Blending of different cleaners and sanitizers must be avoided (except where a chlorinated alkaline cleaner is called for, often premixed by the supplier). Always follow chemical supplier's instructions:
   - Alkaline and acid cleaners neutralize each other. They must never be mixed together, unless an override procedure is recommended (e.g., used for HTST systems).
   - Quaternary ammonia compounds (e.g., sanitizers) are incompatible with chlorine, iodine, certain polyphosphates and anionic detergents (but not with non-ionic detergents).
   - Acid cleaners, when mixed with chlorine solutions, even weak, liberates an irritating, potentially deadly, toxic gas.
   - Iodine and chlorine sanitizers, if mixed, are dangerous to health and rendered ineffective.
   - Chlorine and iodine sanitizer solutions are weakened or destroyed when added to alkaline wash solutions.

4. Chlorine or iodine sanitizer solutions left in contact with metals, even stainless steel, for a considerable amount of time (as overnight) can cause corrosion and the sanitizer will lose its effectiveness.

5. Caustic, when added to water without stirring, sinks to the bottom, overheats and forms a supersaturated solution, which on cooling, crystallizes and forms a layer on the bottom of the tank. Always add caustic slowly to water and not water to caustic to avoid caustic burns.

6. Wash and sanitizing solutions should be prepared by adding cleaner or sanitizer *to the water* and stir to dissolve or mix. Many cleaners will crystallize when a little water is added to product and will then cling to equipment.

Chemical Safety Precautions

There is always some risk when handling and using toxic chemicals. However, risks can be minimized by developing the proper work habits and safety consciousness when using toxic chemicals. Listed below are some safety precautions that should be followed:

1. Always wear eye protection and use protective gloves and gear when mixing chemicals.

2. Know the location of the emergency shower; know the location of the eyewash station.

3. Use extreme caution when mixing or handling caustics or acids.

4. Never add water to chemicals; always slowly add chemicals to water.

5. Never add chemicals manually to hot water.

6. Never mix chlorine-bearing compounds with other detergents or acids.

7. Never spray concentrated chemicals.

8. Any chemical detergent contacting the skin should be flushed immediately with water for 15 minutes; know the location of the emergency shower.

9. Any chemical in the eyes should be flushed with water immediately for 15 minutes followed by an examination by a physician.

10. Obtain medical assistance if skin or eye contact is with concentrated chemicals.

11. Remove any clothing and foot wear that has been contaminated by a chemical detergent and flush affected area as outlined in steps 8 and 9.

12. Always wear protective footwear to prevent slips and chemical penetration.

13. All cleaners and sanitizers should be properly labeled and easy to identify.

14. Read the labels on the product being used. Don't select products by color or odor. Warning labels are your signal that the contents are hazardous. Look for the words, "Danger" or "Poison" or "Irritant." The hazardous material will be listed, and the proper antidote given.

15. Follow directions on the label as outlined on the cleaning procedure sheets.

16. Store chemicals properly at all times, generally in cool, dry, ventilated cabinets or storage rooms.

REFERENCES

- Grade "A" Pasteurized Milk Ordinance (PMO), 2017 Revision. The PMO is updated every 2 years. While the DPC attempts to keep Guidelines up to date with current references, there may be lapses. The reader should consult the most up to date version of the PMO and other referenced documents.

APPENDIX

OSHA & SAFETY CONSIDERATIONS FOR CONFINED SPACES

OSHA Requirements

When entering a milk tank, one must conform to OSHA confined space requirements as defined in 29 CFR Part 1910.146. The regulation (1910.146b) defines a "confined space" as:

1. A space that is large enough and so configured that an employee can bodily enter and perform assigned work; and
2. Has limited or restricted means for entry and exit, and;
3. Is not designed for continuous employee occupancy.

The regulation (1910.146b) further defines a "non-permit confined space" as a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

A "permit required confined space" means a confined space that has one or more of the following characteristics: (1) has a potential to contain a hazardous atmosphere; (2) contains a material that has the potential for engulfing an entrant; (3) has an internal configuration such that an entrant could be trapped or asphyxiated or (4) contains any other recognized serious safety or health hazard.

For Inspection Purposes Only

A properly cleaned, vented and maintained milk tank should not have atmospheric hazards present. However, plants should have on file documentation that oxygen levels have been checked in the milk tank. It is important to ensure proper cleaning, venting and maintenance of all milk tanks, not only to maintain milk tank integrity, but also to maintain the milk tank's non-permit confined space status. Interpretation of these regulations may vary in different regions. A dairy plant or receiving station should check the specific requirements of the appropriate regulatory agency first and then develop their own program for keeping their employees safe.

Safety Procedures for Milk Tank Inspections

1. Train all personnel properly, with respect to non-permit confined space regulations, safety procedures and safety equipment.
   - Inspection personnel shall receive training in the potential hazards of entering a milk tank for inspection purposes.
   - Inspection personnel shall receive training in the regulatory requirements, proper procedures and the use of safety equipment required for entering the interior of a milk tank.

2. Provide appropriate safety equipment:
   - Oxygen meter properly calibrated.
   - Low voltage light or battery operated hand light.
   - Blower and flexible hose to purge the tank and add clean fresh air.

- Safety helmet.
- Safety harness and tether.
- Stainless steel entry device with rubber stops on legs.
- Clean non-slip boots.

3. Follow Safety Procedures
    - Check manifest to ensure that the product last hauled was non-hazardous and that the milk tank was properly cleaned prior to entry.
    - Secure the milk tank so that it cannot be moved during the inspection.
    - Disconnect all wash lines.
    - Secure manhole so that it cannot be closed while inspection is performed.
    - Ventilate with a blower in continuous operation at least 5 minutes prior to entry and continue operation during inspection.
        - Blower intake should be positioned at least 18 inches off the floor and in a position so as to introduce only clean fresh air into the tank through a flexible hose attached to the rear valve(s) or through the manhole.
    - Check air space within the milk tank with a properly calibrated oxygen meter. Readings should be between 19.5% and 23.5%. Do not enter milk tank if the reading is above or below these levels.
    - A trained attendant should be present outside of the milk tank while an interior inspection is being performed.

NOTE: General information provided above was from one OSHA office. Check with your Local, State & Federal Regulatory Agencies for specific requirements for your area. For additional OSHA information:

- OSHA Web Site: https://www.osha.gov
- Occupational Safety & Health Standards (29 CFR 1910): https://www.osha.gov/laws-regs/regulations/standardnumber/1910
- Permit-Required Confined Spaces (29 CFR 1910.146): https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.146
- Requirements for Hazard Communication and Training (29 CFR 1910.1200): https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1200

NOTE: Regulations, references and links change; the reader should ensure that links and resources are current and consult with the local regulatory agency regarding additional or modified requirements.

REGULATORY RESPONSIBILITIES

It is the responsibility of the regulatory agency to supervise and enforce sanitary regulations pertaining to the construction, condition, and cleaning and sanitizing of tank trucks. This Appendix cites sections of the 2017 PMO that pertain to bulk milk tank trucks and hauling.

NOTE: Regulations, references and links change; the reader should refer to the most recent revision of the PMO and other appropriate documents and consult with the local regulatory agency regarding additional or modified requirements.

PMO Cleaning and Sanitizing Requirements

For tank trucks used in the handling of Grade "A" milk and milk products there are several PMO Section 7 *Items* that address cleaning and sanitizing. Specific requirements for wash frequency and tagging washed tankers are outlined under the "Administrative Procedures" in Item 12p:

- ITEM 12p. *Cleaning and Sanitizing of Containers and Equipment*. The product-contact surfaces of all multi-use containers, utensils and equipment used in the *transportation*, processing, … and storage of milk or milk products shall be effectively cleaned and shall be sanitized before each use.

  Administrative Procedures, Number 1:
  "All milk tank trucks that transport Grade "A" milk and/or milk products, shall be washed and sanitized at a *permitted* milk plant, receiving station, transfer station, or milk tank truck cleaning facility. The milk tank truck shall be cleaned and sanitized prior to its first use. When the time elapsed after cleaning and sanitizing, and before its first use, exceeds ninety-six (96) hours, the tank shall be re-sanitized. NOTE: First use shall be defined as when milk is first transferred into the milk tank truck and the time is documented."

  "Whenever a milk tank truck has been cleaned and sanitized, as required by the Regulatory Agency, it shall bear a tag or a record shall be made showing the date, time, place and signature or initials of the employee or contract operator doing the work, unless the milk tank truck delivers to only one (1) receiving facility where responsibility for cleaning and sanitizing can be definitely established without tagging. The tag shall be removed at the location where the milk tank truck is next washed and sanitized and kept on file for fifteen (15) days as directed by the Regulatory Agency."

Additional regulatory requirements can be found in the "**Administrative Procedures**" of the following listed Items. The reader should refer to the most recent revision of the PMO:

Construction, Cleaning & Sanitizing

- ITEM 9r. *Utensils and Equipment – Construction*. "All multi-use containers, utensils and equipment used in the handling, storage or transportation of milk shall be made of smooth, nonabsorbent, corrosion-resistant, non-toxic materials, and shall be so constructed as to be easily cleaned. All containers, utensils and equipment shall be in good repair."

- ITEM 10r. *Utensils and Equipment – Cleaning*. "The product-contact surfaces of all multi-use containers, equipment and utensils used in the handling, storage or transportation of milk shall be cleaned after each usage."
- ITEM 11r. *Utensils and Equipment – Sanitization*. "The product-contact surfaces of all multi-use containers, equipment and utensils used in the handling, storage or transportation of milk shall be sanitized before each usage."
- ITEM 12r. *Utensils and Equipment – Storage*. "All containers, utensils and equipment used in the handling, storage or transportation of milk, unless stored in sanitizing solutions, shall be stored to assure complete drainage and shall be protected from contamination prior to use."

Facilities

- Facilities for the cleaning and sanitizing of milk tank trucks shall comply with Items 1p, 4p, 6p, 7p, 8p, 9p, 10p, 11p, 12p, 14p, 15p(A) and (B), 20p and 22p and as climatic and operating conditions require, the applicable provisions of Items 2p and 3p. Provided, that in every case, overhead protection shall be provided.
- ITEM 5p. *Separate Rooms*. Facilities for the cleaning and sanitizing of milk tank trucks are properly equipped for manual and/or CIP operations. When such facilities are not provided on the milk plant premises, these operations shall be performed at a receiving station, transfer station or separate milk tank truck cleaning facility. Items relating to facilities for cleaning and sanitizing milk tank trucks are listed at the beginning of this section.

Protection – Temperature & Toxic Substances

- ITEM 21p. *Vehicles*. "All vehicles used for the transportation of pasteurized milk and milk products shall be constructed and operated so that the milk and milk products are maintained at 7ºC (45ºF) or less and are protected from contamination. Milk tank cars, milk tank trucks, and portable shipping bins shall not be used to transport or contain any substances that may be toxic or harmful to humans."

Grade "A" Tank Truck Inspections & Permits

The inspection and permitting for milk tank trucks used for Grade "A" milk and milk products is addressed in the PMO in Appendix B, *Milk Sampling, Hauling and Transportation* under Item VI. *Milk Tank Truck Permitting and Inspection*. Permits are issued by the governing Regulatory Agency, typically based on satisfactory inspections using FORM FDA 2399b - *Milk Tank Truck Inspection Report*.

Permitting

"Each milk tank truck shall bear a permit for the purpose of transporting milk and/or milk products. (Refer to Section 3. of this *Ordinance.*) The permit shall be issued to the owner of each milk tank truck by an authorized Regulatory Agency. The permit identification and Regulatory Agency issuing the permit shall be displayed on the milk tank truck. It is recommended that this permit be renewed each year pending satisfactory completion of an inspection as outlined in the following Inspection Section."

Inspection

"Each milk tank truck shall be inspected at least once every twenty-four (24) months plus the remaining days of the month in which the inspection is due by a Regulatory Agency. (Refer to Section 5. of this Ordinance.) A copy of the current inspection report shall accompany the milk tank truck at all times, or the tank shall bear an affixed label, which identifies the Regulatory Agency with the month and year of inspection. The affixed label shall be located near the tank outlet valve or on the front left side of the milk tank truck bulkhead. When significant defects or violations are encountered by a Regulatory Agency, a copy of the report shall be forwarded to the permitting Regulatory Agency and also carried on the milk tank truck until the violations are corrected."

TRANSPORT TANKER INSPECTION FORM EXAMPLE

TANKER SERIAL NUMBER:	TANKER PERMIT NUMBER:	STATE ISSUING PERMIT:
MILK TANK TRUCK OWNER & ADDRESS:	DATE & TIME OF INSPECTION:	
OPERATOR/DRIVER & ADDRESS:	NAME AND ADDRESS OF INSPECTION LOCATION:	
SAMPLER, IF DIFFERENT FROM DRIVER:	INSPECTION PERFORMED BY:	
SAMPLER'S PERMIT NUMBER:		

INSPECTION ITEM	S/U*
1) WASH TAG	
a. Date of last cleaning	
b. Location of last cleaning	
c. Last product hauled	
2) MANHOLE(S)	
a. Cover tight fitting	
b. Cover in good repair & clean	
c. Gaskets in good repair & clean	
d. Filter cover in good repair & clean	
e. Filter changed	
3) VENT(S)	
a. In good repair & clean	
4) TANK VESSEL (all surfaces)	
a. In good repair (smooth/flush seams) & clean	
b. Free of off-odors	
c. Properly drained	
5) SPRAY BALL/DEVICE (if built in)	
a. In good repair (e.g., no dents) & clean	
b. Free from clogs/debris	
6) TANK EXTERIOR	
a. In good repair & clean	
7) HOSE & SAMPLE COMPARTMENT	
a. Doors tight fitting	
b. Dust proof gasket, in good repair & clean	
8) SEALS, TAMPER EVIDENT	
a. Present & properly recorded	

INSPECTION ITEM	S/U*
9) MILK PUMP	
a. Body, seals, impellers in good repair & clean	
b. Protected from contamination (capped)	
c. Gaskets in good repair & clean	
d. Jumper hose in good repair & clean	
10) OUTLET VALVE(S)	
a. Body, plug, gaskets in good repair & clean	
b. Valve port in good repair & clean	
c. Two compartment pipe in good repair & clean	
11) MILK HOSE, HOSE CONNECTIONS	
a. Hose in good repair & clean	
b. Connections < 8 feet unless CIP cleanable	
c. Protected from contamination (capped)	
12) SAMPLE EQUIPMENT	
a. Sample storage cooler in good repair & clean	
b. Sample storage cooler lid tight fit	
c. Sample dipper properly stored, sanitizer	
d. Sample dipper in good repair & clean	
e. Calibrated thermometer available	
f. Applicable test kit for checking strength of sanitizer	
13) ASEPTIC SAMPLER (if present)	
a. In good repair & clean	
14) SAMPLES (if present)	
a. Samples 0°C-4.5°C (32°F-40°F)	
b. Temperature control	
c. Samples in proper float or rack	

*** S = Satisfactory; U = Unsatisfactory; NA if "Not Applicable"**

Comments:

FDA FORM 2399b, MILK TANK TRUCK INSPECTION REPORT, used for routine regulatory inspections of milk tank trucks is available at:
https://www.fda.gov/about-fda/reports-manuals-forms/forms

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**This guideline was developed by contributors who are of experienced individuals in a related field(s). The acknowledged persons are included with their professional affiliations and may be contacted via a DPC Officer(s) and/or Task Force Director(s) for questions or concerns.*

Officers

Name	Position
Chris Hylkema	President
Keith Hay	Vice President
Mary Wilcox	Executive Vice President

Task Force Director

Carli Peskar, Plant Equipment and Procedures Task Force

Lead Author(s)

James Hassinger, Land O'Lakes

Contributor(s)

- Rona Robertson *(Hershey)*
- Zach Harmes *(Hershey)*
- Paul Pickett *(Land O' Lakes)*
- Philip Wolff *(USDA – Retired)*
- Gerald Noah *(USDA-AMS)*
- Miles Beard *(IBA)*
- Amy Rhodes *(HP Hood)*

HISTORICAL ACKNOWLEDGEMENTS

Version(s)

October 1999

- Gaylord B. Smith *(Plant Equipment & Procedures TF, Director)*
- Patrick Boyle *(Readington Farms)*
- Robert Gilchrist *(Agri-Mark)*
- George Wilcox *(Agri-Mark)*
- Bebe Zabilansky *(MICO Equipment & Supply)*
- Ellen Fitzgibbons *(Agri-Mark)*
- David Brown *(Cornell University)*
- Thomas Angstadt *(Dairylea)*
- Neil A. Bendixen *(Dairylea)*
- Rick Barefoot *(H. Fred Barefoot Trucking)*
- Thomas M. Gilmore *(3-A Sanitary Standards)*
- Steve Murphy *(Quality Assurance TF, Director)*

- Patrick Cleary *(St. Albans Co-op)*
- Harold Rudnick *(NYS Dept. of Ag. & Markets)*
- Greg Leach *(St. Albans Co-op)*
- Philip S. Wolff *(USDA)*
- Sidney E. Barnard *(Penn State Univ.)*

July 1990

- Armand Dragon *(IBA, Director)*
- William D. Godwin *(IBA, Vice Director)*
- V. Bruce Parizo *(Delaware County Dairies, Secretary)*
- Gaylord Smith *(Mohawk Associates)*
- Dale Chilton *(NYS Dept. of Ag. & Markets)*

August 1978

- David H. Mattson, Sr. *(HP Hood, Chairman)*
- Thomas Chicoine *(HP Hood, Subcommittee Chairman)*
- Frank G. Broughton *(IBA)*
- John B. Clark *(IBA)*
- Nicholas Dilisio *(MA Milk Control)*
- Thomas J. LaBudde *(Diversey)*
- Clarence A. Perkins *(West Argo-Chemical)*
- Russell C. Weinhold *(HP Hood)*

November 1977

- David H. Mattson, Sr. *(HP Hood, Chairman)*
- Thomas Chicoine *(HP Hood, Subcommittee Chairman)*
- Frank G. Broughton *(IBA)*
- John B. Clark *(IBA)*
- Nicholas Dilisio *(MA Milk Control)*
- Thomas J. LaBudde *(Diversey)*
- Clarence A. Perkins *(West Argo-Chemical)*
- Russell C. Weinhold *(HP Hood)*