

RECEPTION OF MILK

Milk reception for the cans

The first stage of reception involves emptying of cans over the tip tank or weigh tank.

Emptying cans over tip-tank

- By hand
- By hand assisted method
- By mechanical method (inverter)



Usual capacity: 20-40 ltr



weigh tank



Milk Collection Tank

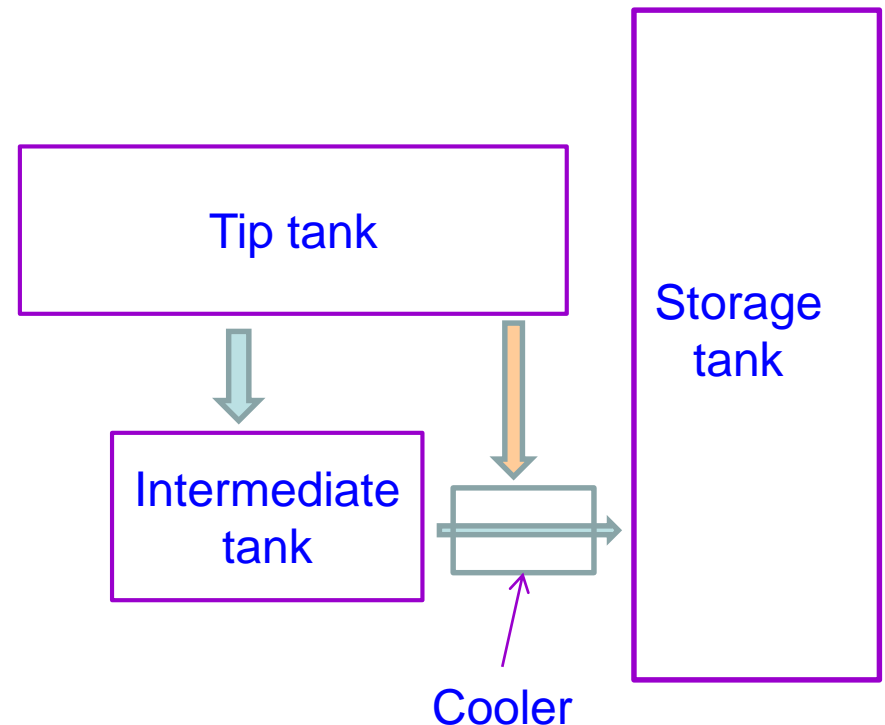
(Usually equipped with milk weighing equipment)

The process of inversion may be a serious source of contamination of the tipped milk by soil from can exteriors.

In some canneries, the can is not completely inverted (the base of can is never directly above the surface of milk)

Milk reception for the cans

- After weighing and recording of consignment, the contents are discharged into a tank immediately below the tip-tank, from which the milk is pumped through a cooler to a storage tank.
- Where milk is measured volumetrically, from the tip tank milk is pumped to the cooler.



Mechanisation of milk reception by cans

- Power driven or gravity roller conveyors.
- Tipping may be manual or completely automatic.
- The inverted can is moved in that position to the drainage rack and into can washer.





Receiving section for bulk milk

Before unloading

- Sampling
- Inspecting for off-flavours
- Agitating the milk
- Connecting the unloading hose to the truck outlet (5 cm dia pipe)

Unloading

High capacity centrifugal pump or rotary pump

Weighing

Receiving tanks mounted on scales or load cells/ volumetric measurements enroute

Modern dairy plants use **air operated valves** to control flow in the receiving operation and **CIP systems** for tankers, tanks and pipelines.

By large stationary pump; Compressed air
Plastic hoses are used.

Methods for measuring bulk milk

- Weighing or measuring tankers
- Metering during unloading
- Weighing in receiving or storage tanks (with load cells)
- Liquid level measurement in storage tank
- Weighing of trucks on scales before and after emptying



- Sanitary meters are used in a number of plants, in which the measurement is by determining volumetric displacement, mass flow rate or velocity.

Milk transport tanks (tankers)

- Usual capacities more than 12000 ltr (7500-25000 ltr)
- Basic features:
 - Inner shell of stainless steel (18% Cr and 8% Ni)
 - Intermediate thick insulation layer (cork, plastic foam, mineral wool, etc.)
 - Outer jacket (ordinary carbon steel, Al, s.s.)
 - Necessary fittings
- S.S. is preferred for long life, low maintenance cost, and excellent appearance, but costlier.
- If the milk tank incorporates a pump, hose, flow meter, or other utensils necessary for **collection** of milk, then it is called **bulk milk pick-up tank**.

Important consideration during unloading from milk transport tanks



- Safety
- Temperature
- Agitation

Agitation of milk is required when

- Milk is to be delivered to two or more storage tanks
- When it is allowed to stand still for any length of time.....for uniform butter-fat distribution.



Built in electrically driven horizontal agitator.

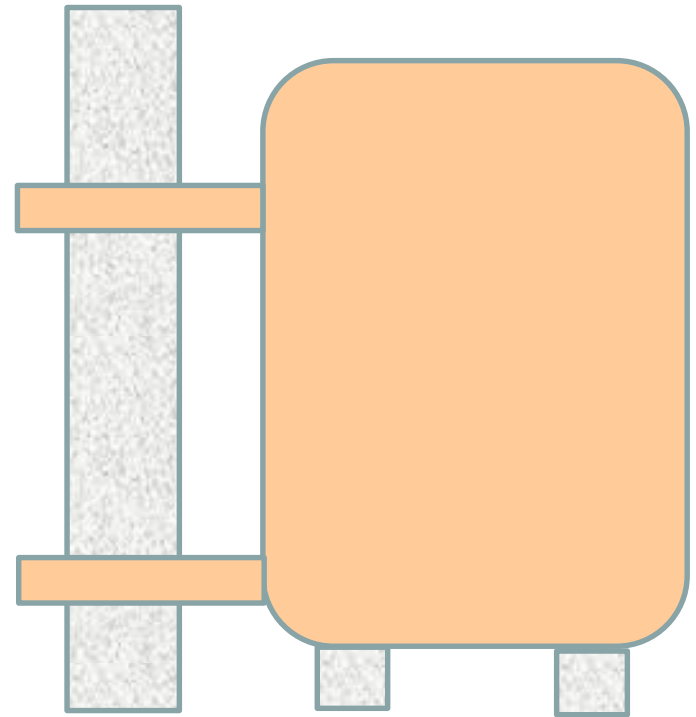
Storage tanks

Raw products

Pasteurised products

Processed products

- Usually milk is held up to 72 hours between reception and processing in the tank.
- May be cylindrical or oval; may be horizontal/ vertical.
- Often storage tanks are kept outdoors with heads extended through the wall into processing room.



Storage tanks

Main considerations

Temperature

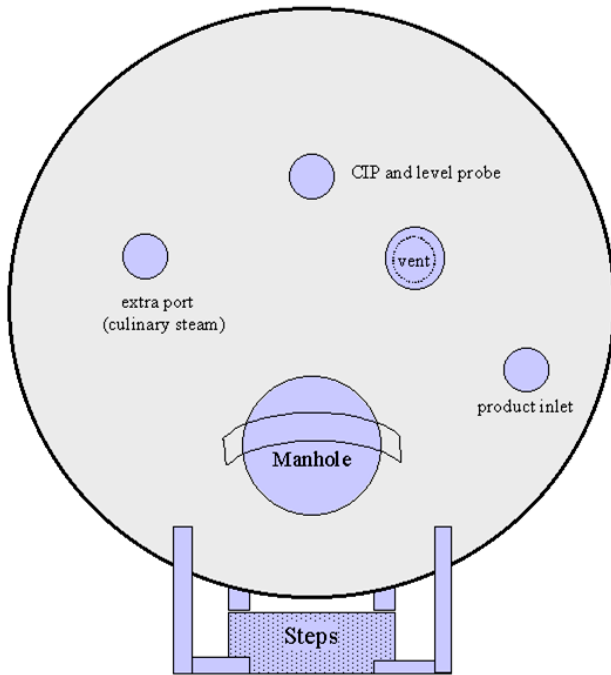
- Milk temperature is maintained at less than 7°C.

Sanitation

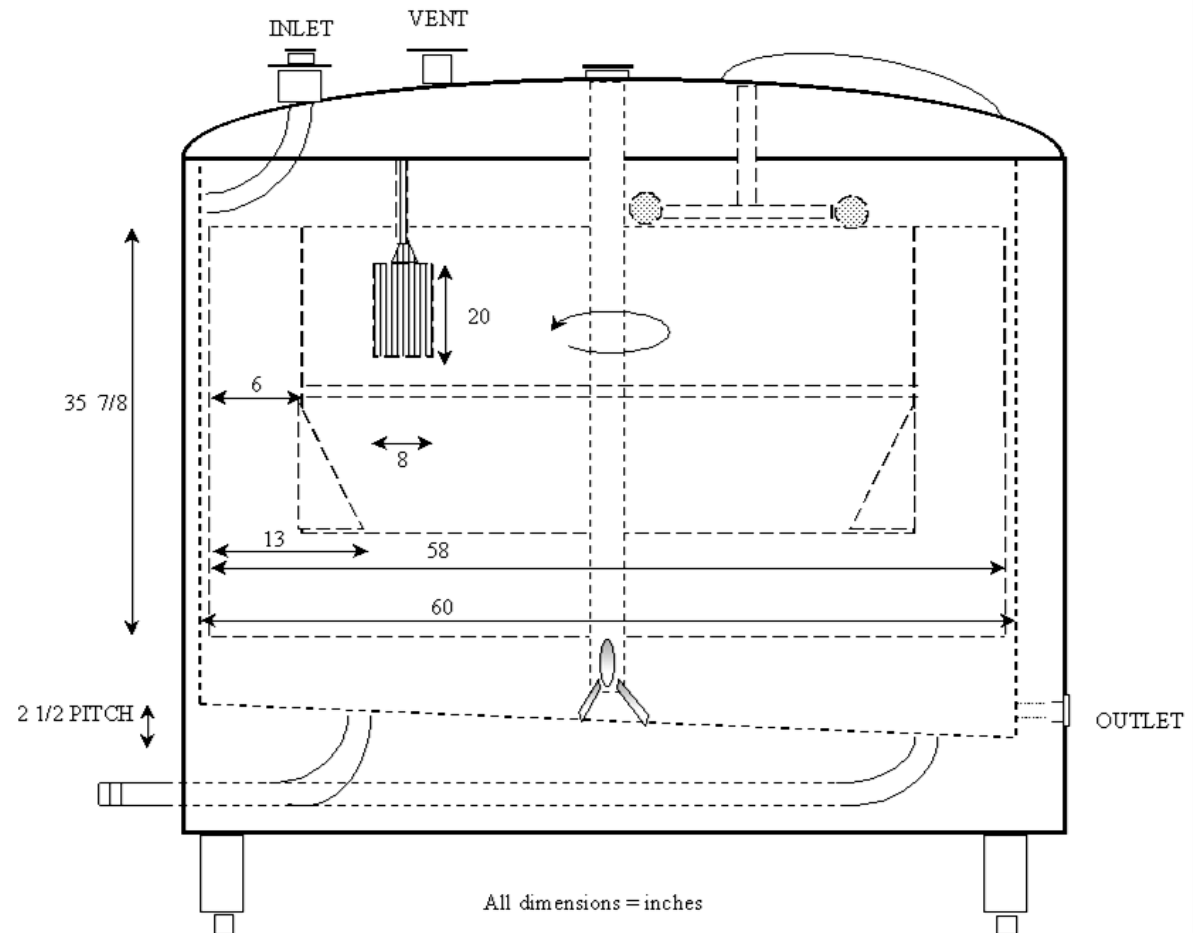
- Tanks must be designed for sanitizing, preferably for CIP.
- Surfaces must be smooth, polished and welds in particular have to be made flush, polished and pickled.
- Closed type tanks must be equipped with a manhole, either round (dia about 450 mm) or oval in shape, to permit access to the interior for cleaning and inspection. It should have swing cover
- Head space of approximately 15 cm

Storage tanks

PASTEURIZED TANK 1: TOP



PASTEURIZED TANK 1 (500 gal): ANCHOR IMPELLER



Storage tanks-accessories

- A curved filling pipe which guides the milk towards the wall (for foam free entry of milk).
- Better to fill the tank from below.
- Viewing ports and lights
- Spray heads and rotating heads (for cleaning) in the head space.
- Air vent (with screen) of sufficient size to prevent excessive pressure during filling and vacuum during emptying.
- Thermometer probes
- Liquid level gauges (may be a sanitary float with external indicator.)
- Agitators (for assuring uniform composition to aid in standardising, and to improve cooling efficiency in refrigerated storage tanks- may be vertical/ horizontal).

Silo

- 50,000-100000 tonnes
- Large product in less area
- **Bottom slope 6%**
- Control panel to show temperature, pressure, etc.
- Electrode at the drainage line to indicate when tank becomes empty
- **Agitation to avoid cream formation**
 - Agitation should be smooth
 - Vigourous agitation causes aeration of milk and fat globule disintegration, aeration will expose the fat to lipase in the milk.
 - Propeller agitator is preferred.
 - Very tall tanks: two agitators at different levels.



Silo

Refrigerated storage tank

- Usually there is a **jacket around the tank** for circulation of chilled water or refrigerant (Important to cool the milk to a required temperature in a specified time).
1. Must maintain the milk below a specified temperature.
 2. Must maintain the milk below a designated maximum when milk is added.

Process tanks

- Used for treatment of product.
- Examples are ripening tanks for butter cream and for cultured products such as yoghurt, and crystallization tanks for whipping cream, and tanks for preparing starter culture.



Silo

Aseptic tank

- Used to store UHT processed milk if it is necessary to have an intermediate tank between sterilizing plant and packaging machine.
- When part of a plant is out of operation (for instance when it has to be cleaned or because there has been a breakdown) a total shut down is not necessary.
- Should have strong and thick walls (as it has to be sterilised together with product pipes by dry steam at pressure of 3 to 5 kg/cm², before it can be used).
- Cooling jacket for cooling after steam sterilisation.
- Before the UHT milk enters the tank, it must be ventilated with sterile air to drain away any condensate which may have formed.

Thank You