



# Standards Understanding ISO Terminology

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# 3918: Terms



## Line

- Rigid pipeline (for example steel, glass or rigid plastic) that is a fixed part of the installation



## Tube

- Air
  - ✓ Qualifies any line used during milking exclusively for air usually, but not necessarily, below atmospheric pressure
- Pulse
  - ✓ Qualifies any line or tube used exclusively for transmitting cyclic pressure changes
- Milk
  - ✓ Qualifies any line or tube used during milking for milk
- Milking
  - ✓ Describes the function of a vacuum system or line



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## Air vent

- Calibrated aperture which allows admission of air



## Ancillary equipment

- Equipment powered by the same vacuum source as for the extraction of milk, but not directly used for milk extraction from an animal



## Upstream

- Direction opposite to the flow



## Downstream

- Direction of the flow



## Vacuum

- Any pressure below atmospheric pressure, specified as the reduction below ambient atmospheric pressure



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## Nominal vacuum

- Vacuum specified as the intended vacuum at the stated site of the milking machine



## Preferred sites for specifying a nominal vacuum for a milking machine are the following:

- The air line near the vacuum regulator for bucket milking machines and direct-to-can milking machines
- The receiver for pipeline and automatic milking machines
- The milking vacuum line for recorder milking machines

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## Average vacuum

- Arithmetic average of all values of vacuum registered by automatic data acquisition at a selected measuring point



## Working vacuum

- Average vacuum measured over a period of 5 s for specified test conditions



## Vacuum drop

- Difference in average vacuum between a downstream and an upstream point in a system, or at any one point in a system before and after an increase in airflow into the system other than through the vacuum regulator



## Transient vacuum drop

- Momentary difference in vacuum between a downstream and an upstream point in a system, or at any one point in a system during a sudden increase in air flow into the system other than through the vacuum regulator



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## Vacuum undershoot

- Maximum transient vacuum drop, caused by sudden opening of an air inlet, below the average vacuum with the air inlet open



## Vacuum overshoot

- Maximum increase in momentary vacuum, caused by a sudden closure of an air inlet, above the average vacuum with the air inlet closed



## Free air

- Air at ambient temperature and atmospheric pressure



## Expanded air

- Air at ambient atmospheric temperature at a given vacuum



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## Average milk flow

- Milk yield divided by the duration of the milk flow



## Peak milk flow

- Highest average milk yield during a specified time
- For cows this time is a period of 30 seconds



## Dry test

- Test made on a milking machine without any liquid



## Wet test

- Test made on a milking machine with simulated milking



## Milking-time test

- Test made on a milking machine during milking of live animals



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## Cleaning-time test

- Test made on a milking machine during cleaning



## Abnormal milk

- Milk which is visibly changed in homogeneity or coloured by blood or as defined by local, regional or national legislation



## Undesirable milk

- Milk which, prior to the milking of the animal, is expected to be unsuitable for dairy processing



## Withheld milk

- Milk which, prior to the milking of the animal, is known to be unfit for human consumption



## Foremilk

- First squirts of milk from a teat



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## Milking

- Withdrawal of a measurable amount of milk yield from the udder of an animal



## Successful milking

- Milking of an animal to an expected level for each udder quarter intended to be milked



## Ratio of attached teatcups

- Number of attached teatcups divided by the number of teats intended to be attached



## Milking process time

- Duration from the instant when the identified animal within the milking box of an automatic milking machine has been accepted for milking until the instant for release of the animal from the same milking box



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## Total machine-on time

- Duration from attachment of the first teatcup until the removal of the last teatcup for an individual animal



## Teatcup-on time

- Duration from successful attachment to detachment of an individual teatcup



## Pre-milking time

- Duration interval between animal identification and start of attachment of the first teatcup for an individual animal



## Teat cleaning time

- Duration of the process of cleaning teats for an individual animal



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## Attachment lag time

- Duration from the start of a physical stimulus such as teat cleaning to the first successful attachment of a teatcup for an individual animal



## Teatcup attachment time

- Duration from initiation of attachment until the end of a successful attachment of a teatcup for an individual animal



## Cluster attachment time

- Duration from initiation of attachment of the first teatcup until the end of a successful attachment of the last teatcup for an individual animal



## Post-milking time

- Duration from detachment of the last teatcup to release of the animal from the milking box



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## Non-milking occupation time

- Duration from the instant when the identified animal occupying the milking box has been refused from milking until the instant for release of the animal from the same milking box



## Milking machine

- Complete machine installation for milking, usually comprising vacuum system, pulsation system, milk system, one or more milking units, and other components



## Automatic milking machine (AMM)

- Milking machine for unattended milking of identified animals



## Automatic milking installation (AMI)

- Automatic milking machine and milk-cooling and -storage system



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## Bucket milking machine

- Milking machine in which milk flows from one or two clusters into a portable milk-receiving bucket, connected to the vacuum system



## Direct-to-can milking machine

- Machine similar to a bucket milking machine, but which may have more than two clusters, and which has a portable transport can or milk tank that allows collection and retention of the milk from several animals



## Pipeline milking machine

- Milking machine in which milk flows from the cluster into a milk-line



## Recorder milking machine

- Milking machine in which milk flows from the cluster into a recorder jar supplied by vacuum from a milking vacuum line and is kept in the recorder jar during milking of each animal



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-  Independent air and milk transport milking machine
  - Milking machine in which air and milk are separated in or near the cluster and then transported separately
-  Vacuum system
  - Part of the milking machine which is under vacuum and not intended to come in contact with milk
-  Vacuum pump
  - Air pump that discharges air from the system and thus produces vacuum
-  Capacity-controlled vacuum pump
  - Vacuum pump, the output of which is varied in order to maintain a stable vacuum in the system



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## Vacuum regulator

- Automatic device designed to control vacuum in milk and vacuum systems



## Vacuum gauge

- Instrument to indicate the vacuum in the milking machine, relative to atmospheric pressure



## Main air line

- Air line(s) between the vacuum pump(s) and the sanitary trap(s)



## Interceptor

- Vessel in the main air line, to prevent liquid or solid matter from gaining access to the pump



## Distribution tank

- Air vessel or chamber, acting as a manifold for pipelines, upstream of the vacuum pump(s) or interceptor(s)



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-  **Sanitary trap**
  - Vessel between the milk system and the vacuum system to limit movement of liquids and other contaminants between the two systems
-  **Milking vacuum line**
  - Line between a sanitary trap and the milking units in recorder milking machines or independent air and milk transport machines
-  **Vacuum tube**
  - Connecting tube between a bucket or transport can and the air line
-  **Vacuum tap**
  - Valve to permit connection of milking units, or other vacuum operated devices, to the vacuum system



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-  **Stall tap**
  - Valve used to permit routine connection and disconnection of a pulsator to the pulsator air line
-  **Receiver air line**
  - Line between the sanitary trap and the receiver
-  **Vacuum pump capacity**
  - Air-moving capacity of the vacuum pump, when it has attained working temperature, at a specified speed and vacuum at the inlet
-  **Effective reserve**
  - Airflow that can be admitted at connection point A1 to decrease the vacuum by 2 kPa at the measuring point Vm with all units connected and operating with the teatcups plugged



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## Manual reserve

- Airflow measured at the same position and conditions as for effective reserve except that the vacuum is not controlled by the vacuum regulator



## Regulator leakage

- Airflow through the regulator when the vacuum at the regulator sensing point is decreased by 2 kPa by an air inlet in the milking machine



## Regulation loss

- Difference between manual reserve and effective reserve



## Regulation sensitivity

- Difference in working vacuum with no milking unit operating, and one with all units connected and operating with the teatcups plugged



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## Pulsation system

- Equipment that provides liner movement in the teatcup



## Pulsator

- Device that cyclically switches a connected vessel, usually the pulsation chamber, between vacuum and (atmospheric) pressure



## Pulsator controller

- Device which provides signals to operate pulsator(s)



## Pulsator air line

- Line connecting the main air line to the pulsators



## Main pulsator air line

- Part of the pulsator air line between the main air line and the first branch



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-  Long pulse tube
  - Connecting tube between the pulsator and the cluster
-  Short pulse tube
  - Connecting tube between the pulsation chamber and the claw
-  Pulsation chamber
  - Space in a teatcup between the liner and the shell
-  Pulsation
  - Cyclic opening and closing of a liner
-  Pulsation cycle
  - One complete liner movement sequence
-  Pulsation rate
  - Number of pulsation cycles per minute



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## Alternate pulsation

- Pulsation where the movement of two liners within a cluster alternates with the movement of the other two liners or, in a cluster with only two teatcups, for example for sheep or goats, cyclic movement of one liner alternating with the movement of the other liner



## Simultaneous pulsation

- Pulsation where all liners in a cluster move in phase



## Maximum pulsation chamber vacuum

- Highest average vacuum in the pulsation chamber in a period of 10 % of a pulsation cycle



## Pulsator rate

- Number of pulsator cycles per minute



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-  **Increasing vacuum phase (phase a)**
  - Period when the vacuum in the pulsation chamber is increasing from 4 kPa to the maximum pulsation chamber vacuum minus 4 kPa
-  **Maximum vacuum phase (phase b)**
  - Period when the vacuum in the pulsation chamber is above the maximum pulsation chamber vacuum minus 4 kPa
-  **Decreasing vacuum phase (phase c)**
  - Period when the vacuum in the pulsation chamber decreases from the maximum pulsation chamber vacuum minus 4 kPa to 4 kPa
-  **Minimum vacuum phase (phase d)**
  - Period when the vacuum in the pulsation chamber is below 4 kPa



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## Pulsator ratio

- Sum of the durations of the increasing vacuum phase and the maximum vacuum phase divided by the duration of one pulsator cycle or pulsation cycle



## Limping

- The unintentional difference between pulsator ratios measured at different teatcups of the same cluster, expressed in units of percentage



## Milk system

- Part of the milking machine which is intended to come in contact with milk



## Milk-line

- Line that carries milk and air during milking and has the dual function of providing milking vacuum to the milking unit and conveying milk to the receiver



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-  **Looped milk-line**
  - Milkline that forms an enclosed circuit with two full-bore connections to the receiver
-  **Dead-ended milk-line**
  - Milkline in which the distal end is closed with a cap or plug and the proximal end has a single fullbore connection to the receiver
-  **Long milk tube**
  - Connecting tube(s) carrying the milk away from the cluster
-  **Milking vacuum tube**
  - Tube between the claw or recorder jar and the milking vacuum line that provides vacuum to the claw or the recorder jar but does not transport milk



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-  **Milk inlet valve**
  - Self-sealing valve to permit routine connection and disconnection of milking units and the milkline
-  **Milk inlet**
  - Fixed inlet into a milkline, recorder jar, bucket, can or other equipment to permit connection of the long milk tube
-  **Milking system**
  - Combination of milking machine components, which together provide the dual function of supplying milking vacuum to the cluster and transporting milk away from the cluster
-  **High-level milking system**
  - Milking system in which the milk inlet valve or milk inlet to the milkline or recorder jar is more than 1.25 m above the animal standing level



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## Mid-level milking system

- Milking system in which the milk inlet valve or milk inlet to the bucket (or transport can), milkline or recorder jar is situated between 0 m and 1.25 m above the animal standing level



## Low-level milking system

- Milking system in which the milk inlet valve or milk inlet to the milkline or recorder jar is below the animal standing level



## Recorder jar

- Mounted vessel that receives, holds and allows measurement of all the milk from an individual animal and allows transfer of the milk to a receiver or milk collecting vessel under vacuum



## Milk transfer line

- Line in which milk is conveyed from the recorder jar or long milk tubes to a receiver or milk collecting vessel under vacuum



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## Receiver

- Vessel that receives milk from one or more milked animals, separates milk from air and feeds the releaser, releaser milk pump or collecting vessel under vacuum



## Receiver milk inlet

- Inlet into a receiver to permit connection of the milkline or milk transfer line to the receiver



## Releaser

- Device for removing milk from vacuum and discharging it to atmospheric pressure



## Releaser milk pump

- Pump for removing milk from vacuum and discharging it to atmospheric pressure



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## Delivery line

- Line in which milk flows from a releaser to a collecting or storage vessel



## Milking unit

- Assembly of components, necessary for milking an individual animal and which can be replicated in a milking machine so that more than one animal may be milked at one time



## Cluster

- Assembly to milk one mammal consisting of teatcups and may include a claw or connectors between long and short milk tubes and long and short pulse tubes



## Teatcup

- Assembly consisting of a shell, a liner and may include a short pulse tube, a separate short milk tube and connector or sightglass



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## Shell

- Rigid cover to retain the liner



## Liner

- Flexible sleeve, having a mouthpiece and a barrel, which may have an integral short milk tube



## Short milk tube

- Connecting tube between the claw and the liner barrel, connector or sightglass



## Automatic teatcup valve

- Device in the milking unit, which opens for vacuum to the liner when the teatcup is attached, and automatically shuts off the vacuum to the liner when the teatcup is detached or falls off



## Claw

- Manifold that spaces the teatcups in a cluster and connects them to the long milk tube and long pulse tube



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## Automatic shut-off valve

- Valve in the milking unit which immediately shuts off the vacuum, to the teatcup or cluster when one or more teatcups fall or are kicked off



## Teatcup plug

- Plug or stopper to simulate the animal's teat and close off the mouthpiece of a teatcup for testing purposes



## Milk meter

- Device used to measure all the milk from an individual animal or teat



## Milk flow indicator

- Device used to provide a visual indication of milk flow



## Milk flow sensor

- Device used to signal milk flow or one or more predetermined milk flows from an individual animal or teat



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## Automatic teatcup attacher

- Device that without human intervention attaches the teatcups to an animal to be milked



## Automatic teatcup remover (ATR)

- Device that without human intervention removes a single teatcup after shutting off the milking vacuum



## Automatic cluster remover (ACR)

- Device that without human intervention removes all teatcups of the cluster after shutting off the milking vacuum to all teatcups



## Liner vacuum

- Vacuum in the barrel below the teat for specified conditions of liquid and air flow or during milking



## Mouthpiece vacuum

- Vacuum measured in the mouthpiece during milking or testing



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## Touch point pressure difference (TPPD)

- Pressure difference between the pulsation chamber and the inside of the liner barrel at which the opposing walls of the liner start to touch each other when it is mounted in its shell



## Initial delay time

- Delay at the start of milking to avoid automatic teatcup or cluster detachment or other pre-set change in milking vacuum or pulsation characteristics



## Milk flow switch point

- Threshold milk flow at which a delay time starts or other equipment is activated



## Delay time

- Elapsed time from the milk flow switch point to teatcup or cluster removal or other pre-set change in the function of the milking unit



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## Bulk milk tank

- Sanitary storage vessel or vat, used to cool and/or store milk



## Cleaning

- Process intended to remove soil from milk contact surfaces and reduce bacterial build-up



## Rinsing

- Part of cleaning with water only



## Sanitation

- Part of cleaning with disinfectant means



## Clean-in-place (CIP)

- System for cleaning and disinfecting the milk and/or cooling system without disassembly



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## Jetter assembly

- Assembly to which the teatcups are attached during cleaning to establish a connection from the washline or milking vacuum line to the teatcups



## Washline

- Line that, during the cleaning process, carries cleaning and disinfectant solutions from the wash trough or water heater to the milking units, milkline or milking vacuum line



## Air use for cleaning

- Air that is admitted during the cleaning process to increase turbulence and velocity of cleaning solutions



This presentation has supplied definitions of the terms given in ISO 3918. However, it would be beneficial to become familiar with the document itself which has additional notes and diagrams to help understand each term.