ANSI/ASABE AD3918:2007 JAN2011 (R2016ED)
Milking machine installations — Vocabulary

American Society of Agricultural and Biological Engineers

STANDARD

ASABE is a professional and technical organization, of members worldwide, who are dedicated to advancement of engineering applicable to agricultural, food, and biological systems. ASABE Standards are consensus documents developed and adopted by the American Society of Agricultural and Biological Engineers to meet standardization needs within the scope of the Society; principally agricultural field equipment, farmstead equipment, structures, soil and water resource management, turf and landscape equipment, forest engineering, food and process engineering, electric power applications, plant and animal environment, and waste management.

NOTE: ASABE Standards, Engineering Practices, and Data are informational and advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. The ASABE assumes no responsibility for results attributable to the application of ASABE Standards, Engineering Practices, and Data. Conformity does not ensure compliance with applicable ordinances, laws and regulations. Prospective users are responsible for protecting themselves against liability for infringement of patents.

ASABE Standards, Engineering Practices, and Data initially approved prior to the society name change in July of 2005 are designated as “ASAE”, regardless of the revision approval date. Newly developed Standards, Engineering Practices and Data approved after July of 2005 are designated as "ASABE”.

Standards designated as “ANSI” are American National Standards as are all ISO adoptions published by ASABE. Adoption as an American National Standard requires verification by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by ASABE.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution.

CAUTION NOTICE: ASABE and ANSI standards may be revised or withdrawn at any time. Additionally, procedures of ASABE require that action be taken periodically to reaffirm, revise, or withdraw each standard.

Copyright American Society of Agricultural and Biological Engineers. All rights reserved.

ASABE, 2950 Niles Road, St. Joseph, MI 49085-9659, USA, phone 269-429-0300, fax 269-429-3852, hq@asabe.org

Documents
Document Sharing Hub

Copyright American Society of Agricultural and Biological Engineers
Provided by IHS Markit under license with ASABE
No reproduction or networking permitted without license from IHS
Full document details: ASAE AD3918 2016

Licensee=/, User=,
Not for Resale,

ANSI/ASABE AD3918:2007 JAN2011 (R2016ED)
Approved February 2008 as an American National Standard

Milking machine installations — Vocabulary

These materials are subject to copyright claims of ISO and ASABE. No part of this publication may be reproduced in any form, including an electronic retrieval system, without the prior written permission of ASABE. All requests pertaining to the ANSI/ASABE AD3918:2007 (JAN2011) Standard should be submitted to ASABE.

History of ANSI/ASAE S300, Milking machine installations — Vocabulary: Proposed by the ASAE Milk Handling Committee; approved by the Electric Power and Processing Division Technical Committee; adopted by ASAE as a Recommendation June 1966; reconfirmed December 1970, December 1975; revised and reclassified as a Standard December 1977; reconfirmed December 1982, December 1987; revised December 1988; reaffirmed December 1994; revised July 1996 and supersedes S254.4 DEC94, Uniform Terminology for Bulk Milk Handling; reaffirmed December 2001, February 2003; reaffirmation extended two years December 2007; adoption with modification of ISO 3918:2007 February 2008; approved by ANSI September 2009.

Original content of ISO 3918 was based on ASAE S300. ANSI/ASAE S300.4 revised and redesignated to ANSI/ASABE AD3918:2007 January 2011; revision approved by ANSI February 2011; reaffirmed by ASABE March 2016; reaffirmed by ANSI March 2016.

Keywords: Dairy, Milking, Terminology

0 Forward

0.1 ANSI/ASABE AD3918:2007, Milking machine installations — Vocabulary, is an adoption with deviations of the identically titled ISO document ISO 3918:2007, Milking machine installations — Vocabulary. Deviations noted in the following Forward sections pertain to those provisions where harmonization could not be achieved between ASABE and the International Standard.

Deviations from the subsequently printed international standard are noted with underscore (additions) and strikethrough for deletions text. Deviations from the international standard figures and equations are clearly marked.

0.2 ANSI/ASABE AD3918:2007 defines terms to use in research work, official regulations, design, manufacture, installation and use of milking machines for cows, water buffaloes, sheep, goats or other mammals used for milk production. This scope is identical to the scope of ISO 3918:2007 except for:

0.2.1 The term “cow” in this document generally is referring to female dairy cattle; however, for simplicity in not needing to list all female dairy animals (doe, ewe, etc.) it is sometimes used to refer to female dairy animals in general.

0.3 There are no Normative References listed in ISO 3918:2007, Milking machine installations — Vocabulary.

0.4 This standard has been submitted as an American National standard to ANSI (American National Standards Institute). The original content of ISO 3918 was based on ASAE S300.

0.5 This standard deviates from ISO 3918:2007 as follows:

0.5.1 Modified Section 2, Terms and definitions

Documents Document Sharing Hub
Copyright American Society of Agricultural and Biological Engineers
Provided by IHS Markit under license with ASABE
No reproduction or networking permitted without license from IHS
Licensee=/, User=,
Not for Resale,
Full document details: ASAE AD3918 2016

2.13 milk types, abnormalities of milk: The following types of lacteal secretions are not suitable for sale for Grade "A" purposes.

2.13.1 abnormal milk: milk that is visibly changed in color, odor and/or texture

2.13.2 undesirable milk: milk that, prior to the milking of the animal, is expected to be unsuitable for sale, such as milk containing colostrum

2.13.3 contaminated milk: milk that is un-saleable or unfit for human consumption following treatment of the animal with veterinary products, i.e. antibiotics, which have withhold requirements, or treatment with medicines or insecticides not approved for use on dairy animals by FDA or the Environmental Protection Agency (EPA)

0.5.2 Modified Section 3, Types of milking machine

3.6 recorder milking machine: milking machine (3.1) in which milk flows from the **cluster** (7.2) into a **recorder jar** (6.8) supplied by **vacuum** (2.7) from a **milking vacuum line** (4.9) and is kept in the recorder jar during **milking** (2.14) of each animal

NOTE Milk is discharged when required from the **recorder jar** (6.8) either into a milk **receiver** (6.10) by a **milk transfer line** (6.9) or into a collecting vessel.

Other acceptable terms for recorder jars are weigh jars or weigh vessels.

See Figure 3.

0.5.3 Modified Section 4, Vacuum system

4.2.1 capacity-controlled vacuum pump: vacuum pump (4.2), the output of which is varied in order to maintain a stable **vacuum** (2.7) in the system

Add 4.3.1 mechanical regulator: device that controls the vacuum level by allowing air to enter the system to maintain stable vacuum

Add 4.3.2 capacity control regulator (variable frequency regulator): device that controls the vacuum level by varying the speed of the motor driving the vacuum pump to maintain stable vacuum

4.5 main air line: the air line(s) between the vacuum pump(s) and the sanitary trap(s) or distribution tank, if provided

Add 4.5.1 trap air line: on systems with a distribution tank, the line(s) from the distribution tank to the trap

0.5.4 Modified Section 8, Cleaning and milk-cooling equipment

Cleaning equipment

8.1 air injector: device that allows the controlled, cyclic admission of air during cleaning and sanitizing to produce slug flow conditions

8.2 air injector line: washline on which an air injector is mounted to provide periodic air admission to the milkline(s)

8.3 automatic wash system: assembly of control devices, piping, valves, and chemical reservoirs needed for cleaning and/or sanitizing the internal surfaces of a CIP milking system through a predetermined sequence of wash cycles

Documents Document Sharing Hub
Copyright American Society of Agricultural and Biological Engineers
Provided by IHS Markit under license with ASABE
No reproduction or networking permitted without license from IHS
Licensee=/, User=,
Not for Resale,
Full document details: ASAE AD3918 2016

8.4 backflush system: a procedure for rinsing and/or sanitizing the milking clusters between cows.

8.5 clean-in-place (CIP): the capability to clean and disinfect the milk contact components of a milking system by circulating appropriate solutions through them without disassembly

8.6 cleaning: the process intended to remove soil from milk contact surfaces and reduce bacterial build-up

8.7 jetter assembly: assembly comprising a connection from the washline or the milking vacuum line to a manifold, together with cups or plugs to which the teatcups are attached during cleaning

8.8 jetter hose: hose or tube connecting the jetter assembly to the jetter line

8.9 jetter line: washline(s) to which the jetter assemblies are connected

8.10 rinsing: part of cleaning, flushing with water only

8.11 sanitizer: chemical solution used to kill bacteria on the product contact surfaces

8.12 suction line: washline that draws wash solutions from the wash sink, vat, or tank and connects to the jetter line

8.13 washline: line that, during the cleaning process, carries cleaning and sanitizing solutions from the wash sink, vat, or tank to the milking units, milkline, or milking vacuum line

8.14 wash vat (tank or sink): vessel designed to hold cleaning solutions for use in cleaning the milking system

0.5.5 Add Section 9, Milk cooling, milk storage and bulk milk handling on farms

9.1 blend temperature: temperature of commingled milk in the bulk milk tank as warm milk is added to cold milk during milking

9.2 bulk milk: commingled milk of a group of animals

9.3 bulk milk tank: an insulated, sanitary container used to store bulk milk; usually cylindrical, rectangular, or oval

9.4 cooling tank: refrigerated bulk milk tank used to cool milk

9.5 storage tank: non-refrigerated bulk milk tank

9.6 vacuum bulk milk tank: bulk milk tank designed to withstand milking vacuum for direct filling from the milk line, or from a receiver

9.7 bulk milk tank components

9.7.1 agitator: mechanical or pneumatic means, provided with the milk tank, for stirring the milk to facilitate cooling and to provide a uniform product mixture for sampling without damaging the milk

9.7.2 breast: portion of the metal used to join the inside lining to the outside shell. The breast is considered to be a milk contact surface

9.7.3 bridge: the part of the milk tank that extends from one side of the tank to the other across the top of open-type tanks. It is usually placed in the center, or one end, of the tank, and also is used to provide support for the agitator, gauge rod, and covers on open-top tanks.

Documents
Document Sharing Hub
Copyright American Society of Agricultural and Biological Engineers
Provided by IHS Markit under license with ASABE
No reproduction or networking permitted without license from IHS
Licensee=/, User=,
Not for Resale,
Full document details: ASAE AD3918 2016

9.8 gauge bracket: substantial, rigid element, permanently affixed to the milk tank, designed for supporting and positioning the gauge rod or surface gauge

9.9 gauge rod (calibration rod) (dip stick): graduated measuring device designed to be immersed in the product to establish the liquid level

9.10 gauge tube: vertical glass or plastic tube adjacent to a graduated measuring scale, externally mounted on the milk tank, for the purpose of reading the level of milk within the tank

9.11 gauge tube scale: metal plate or bar, with graduations, mounted adjacent to the gauge tube

9.12 level-indicating means: reference points, levels, marks, or appurtenances on the milk tank used to reestablish the calibration axis (examples: two-way or circular levels, plumb bobs, and scribe or punch marks)

9.13 lining (inside lining): surface used to contain the product, including the ends, sides, top, and bottom; part of which may be a heat exchanger (evaporator)

9.14 outer shell: material covering the exterior of the insulation on milk tanks

9.15 outlet: opening in the lining and the passage for the milk to the exterior of the tank

9.16 outlet valve: device that is attached to the outlet and is used to stop or control flow of product when emptying the tank

9.17 tank support: system of legs, saddles, or other structural means designed to support the tank and keep it "in-level"

9.18 vent: opening into a cooling or holding tank for maintaining atmospheric pressure during filling, emptying, and cleaning

9.19 calibration: precise, traceable, measurements of the volumetric or mass equivalent to the graduations on the gauge rod or surface gauge

9.20 calibration chart: chart prepared for each tank from information derived by calibration for the purpose of correlating a volumetric or mass equivalent for graduations on the gauge rod or surface gauge

9.21 chiller: refrigeration heat exchanger to lower the temperature of the coolant

9.22 coolant (cooling media): recirculated cold fluid that is used in heat exchangers, including those systems in which an approved nontoxic freezing-point depressant from a safe source is used, and protected from contamination

9.23 cooling capacity: rate of heat removal in units of energy per unit time

9.24 direct expansion cooling: single-wall heat exchange method of cooling milk by a direct transfer of heat from the milk to the refrigerant contained in the evaporator section

9.25 every-day and every-other-day pickup (abbreviated ED and EOD): terms denoting the frequency of collection of milk from the farm milk storage or cooling tank

9.26 farm milk cooling and storage system: a system used to cool and store milk that is made up of a milk cooling or storage tank and an in-line heat exchanger(s). This system shall begin at the inlet to the first in-line heat exchanger and end with the milk storage vessel from which the raw milk is removed from the dairy farm.

Documents Document Sharing Hub
Copyright American Society of Agricultural and Biological Engineers
Provided by IHS Markit under license with ASABE
No reproduction or networking permitted without license from IHS
Licensee=/, User=,
Not for Resale,
Full document details: ASAE AD3918 2016

9.27 heat exchanger: device providing thermal exchange between two fluids

9.28 hose port: opening in the exterior milkhouse wall that has a self-closing door and is used for the transfer hose and electric motor cord during milk transfer

9.29 ice bank cooling: a system of heat exchange whereby ice is formed around the evaporator submerged in a water bath thus forming an ice bank. Water is then circulated around the ice and through the heat exchanger, or directly to the outer surface of the inside lining.

9.30 in-level: known and reproducible position of the milk tank that is in the normal, specified operating position

9.31 in-line-heat exchanger: a cooling device that is placed in the milk delivery line between the milk receiver and milk tank and is used to transfer heat from milk to a cooling medium, usually water. The milk may be partially or totally cooled by this method.

9.32 plate heat exchanger: in-line heat exchanger that uses plates to separate milk and coolant, which flow through alternate spaces between the series of plates

9.33 tube heat exchanger: (concentric tube, multiple tube, shell and tube): type of in-line heat exchanger, either concentric or not, that utilizes one or more tubes arranged within the larger tube or jacket

9.34 interval (intermittent) agitation: operation of the agitator for short periods as controlled by a timer between milkings, irrespective of milk temperature

9.35 meniscus: the curved upper surface along the edge of a liquid. It is important to understand when reading the gauge rod or tube of a bulk milk tank.

9.36 milk sample (universal sample): representative portion of the product

9.37 bulk milk pickup tanker: vehicle, including the truck, tank, and those appurtenances necessary for its use, used by a bulk milk hauler to transport bulk raw milk

9.38 pre-cooling: cooling of milk in an in-line heat exchanger before the milk enters the bulk milk tank

9.39 milk contact surfaces: all surfaces that are exposed to the milk and surfaces from which liquids may drain, drop, or be drawn into the milk

9.40 refrigeration: process of moving heat from one location to another by use of refrigerant in a closed loop cycle

9.41 condensing unit: unit containing the compressor, condenser, and associated electrical and refrigeration equipment

9.42 remote condensing unit: refrigerant condenser unit not affixed to the milk cooling tank

9.43 compressor: part of a refrigeration unit in which the vapor from the evaporator is compressed and delivered to the condenser

9.44 condenser: that part of a refrigeration unit in which the refrigerant changes from a vapor to a liquid. The condenser may be air cooled or liquid cooled.

9.45 evaporator: that part of the refrigeration system in which the refrigerant absorbs heat

Documents Document Sharing Hub
Copyright American Society of Agricultural and Biological Engineers
Provided by IHS Markit under license with ASABE
No reproduction or networking permitted without license from IHS
Licensee=/, User=,
Not for Resale,
Full document details: ASAE AD3918 2016

9.46 heat recovery unit: that part of the refrigeration system that allows recovery of heat from the refrigeration process for a useful purpose

9.47 refrigerant: the substance used in a refrigeration process that transfers heat from the evaporator to the condenser, creating a cooling effect. These fluids generally exhibit a phase change during this process.

9.48 sampling dipper: device for retrieving a sample of milk in a sanitary fashion

9.49 sampling container: vial, or bag, or bottle that is approved for containing a sample of milk for transport to a laboratory

9.50 surface gauge: depth-measuring device consisting of a stationary element, and a movable, graduated element designed to be moved into contact with the liquid surface from above

9.51 transfer hose: flexible plastic hose that is used to convey the milk from the milk tank to the pump of the milk tanker

9.52 volumetric standard (measuring can, standard measure, standard can, prover): a container that is used to calibrate the bulk milk tank and other volumetric measuring devices. The containers are usually checked and approved by Weights and Measures agencies to deliver an accurate volume of liquid.

Text of ISO 3918:2007, Milking machine installations — Vocabulary, follows.

1 Scope

This International Standard defines terms to use in research work, official regulations, design, manufacture, installation and use of milking machines for cows, water buffaloes, sheep, goats or other mammals used for milk production.

2 Terms and definitions

2.1 line: rigid pipeline (for example steel, glass or rigid plastic) that is a fixed part of the installation

NOTE The terms “tube” and “line” are qualified by their use and emplacement in accordance with the Note in 2.2.

2.2 tube: flexible hose or tube (for example rubber or non-rigid plastic, although it may include a piece of rigid pipeline)

NOTE The terms “tube and “**line**” are qualified by their use and emplacement as follows.

a) Air: qualifies any **line** (2.1) used during **milking** (2.14) exclusively for air usually, but not necessarily, below atmospheric pressure [for example **main air line** (4.5), **pulsator air line** (5.3)].

b) Pulse: qualifies any **line** (2.1) or tube used exclusively for transmitting cyclic pressure changes [for example, **long pulse tube** (5.4), **short pulse tube** (5.5)].

c) Milk: qualifies any **line** (2.1) or tube used during **milking** (2.14) for milk [for example **milk transfer line** (6.9)] or for both air and milk [for example, **milkline** (6.2), **long milk tube** (6.3)].

d) Milking: describes the function of a **vacuum system** (4.1) or **line** (2.1) [for example **milking vacuum line** (4.9)].

Documents Document Sharing Hub
Copyright American Society of Agricultural and Biological Engineers
Provided by IHS Markit under license with ASABE
No reproduction or networking permitted without license from IHS
Licensee=/, User=,
Not for Resale,
Full document details: ASAE AD3918 2016

2.3 air vent: calibrated aperture which allows admission of air

2.4 ancillary equipment: equipment powered by the same **vacuum** (2.7) source as for the extraction of milk, but not directly used for milk extraction from an animal

2.5 upstream: direction opposite to the flow

2.6 downstream: direction of the flow

2.7 vacuum: any pressure below atmospheric pressure, specified as the reduction below ambient atmospheric pressure

EXAMPLE: 50 kPa vacuum at an ambient atmospheric pressure of 103 kPa means an absolute pressure of 53 kPa.

2.7.1 nominal vacuum: vacuum (2.7) specified as the intended vacuum at a stated site of the **milking machine** (3.1)

NOTE Preferred sites for specifying a **nominal vacuum** (2.7.1) for a **milking machine** (3.1) are the following:

— the air line near the **vacuum regulator** (4.3) for **bucket milking machines** (3.3) and **direct-to-can milking machines** (3.4);

— the **receiver** (6.10) for **pipeline** (3.5) and **automatic** (3.2) **milking machines**;

— the **milking vacuum line** (4.9) for **recorder milking machines** (3.6).

2.7.2 average vacuum: arithmetic average of all values of **vacuum** (2.7) registered by automatic data acquisition at a selected measuring point

2.7.3 working vacuum: average vacuum (2.7.2), measured over a period of 5 s for specified test conditions

2.7.4 vacuum drop: difference in **average vacuum** (2.7.2), between a **downstream** (2.6) and an **upstream** (2.5) 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** (4.3)

2.7.4.1 transient vacuum drop: momentary difference in **vacuum** (2.7) between a **downstream** (2.6) and an **upstream** (2.5) 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** (4.3)

2.7.4.2 vacuum undershoot: maximum **transient vacuum drop** (2.7.4.1), caused by sudden opening of an air inlet, below the **average vacuum** (2.7.2) with the air inlet open

2.7.4.3 vacuum overshoot: maximum increase in momentary **vacuum** (2.7), caused by a sudden closure of an air inlet, above the **average vacuum** (2.7.2) with the air inlet closed

2.8 free air: air at ambient temperature and atmospheric pressure

2.9 expanded air: air at ambient atmospheric temperature at a given **vacuum** (2.7)

2.10 average milk flow: milk yield divided by the duration of the milk flow

2.11 peak milk flow: highest average milk yield during a specified time

NOTE For cows this time is a period of 30 s.

Documents Document Sharing Hub
Copyright American Society of Agricultural and Biological Engineers
Provided by IHS Markit under license with ASABE
No reproduction or networking permitted without license from IHS
Licensee=/, User=,
Not for Resale,
Full document details: ASAE AD3918 2016

2.12 tests

2.12.1 dry test: test made on a **milking machine** (3.1) without any liquid

2.12.2 wet test: test made on a **milking machine** (3.1) with simulated **milking** (2.14)

2.12.3 milking-time test: test made on a **milking machine** (3.1) during **milking** (2.14) of live animals

2.12.4 cleaning-time test: test made on a **milking machine** (3.1) during cleaning

~~**2.13 milk types**~~

2.13 milk types, abnormalities of milk: The following types of lacteal secretions are not suitable for sale for Grade "A" purposes.

2.13.1 abnormal milk: milk that is visibly changed in color, odor and/or texture

2.13.2 undesirable milk: milk that, prior to the milking of the animal, is expected to be unsuitable for sale, such as milk containing colostrum

2.13.3 contaminated milk: milk that is un-saleable or unfit for human consumption following treatment of the animal with veterinary products, i.e. antibiotics, which have withhold requirements, or treatment with medicines or insecticides not approved for use on dairy animals by FDA or the Environmental Protection Agency (EPA)

~~**2.13.1 abnormal milk:** milk which is visibly changed in homogeneity or coloured by blood or as defined by local, regional or national legislation~~

~~**2.13.2 undesirable milk:** milk which, prior to the **milking** (2.14) of the animal, is expected to be unsuitable for dairy processing~~

~~EXAMPLE Colostrum or milk with high content of somatic cells.~~

~~**2.13.3 withheld milk:** milk which, prior to the **milking** (2.14) of the animal, is known to be unfit for human consumption~~

~~EXAMPLE Milk expected to contain residues of antibiotics or other pharmaceutical products and with a milk withhold requirement.~~

2.13.4 foremilk: first squirts of milk from a teat

2.14 milking: withdrawal of a measurable amount of milk yield from the udder of an animal

2.14.1 successful milking: milking (2.14) of an animal to an expected level for each udder quarter intended to be milked

2.15 ratio of attached teatcups: number of attached **teatcups** (7.3) divided by the number of teats intended to be attached

NOTE This can be calculated for each animal, **teatcup** (7.3) or **AMM** (3.2).

2.16 milking process times

2.16.1 milking process time: duration from the instant when the identified animal within the milking box of an **automatic milking machine** (3.2) has been accepted for **milking** (2.14) until the instant for release of the animal from the same milking box

Documents Document Sharing Hub
Copyright American Society of Agricultural and Biological Engineers
Provided by IHS Markit under license with ASABE
No reproduction or networking permitted without license from IHS
Licensee=/, User=,
Not for Resale,
Full document details: ASAE AD3918 2016