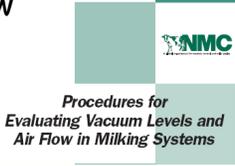




MilkTech International 

Evaluating Vacuum and Airflow in Milking Systems (NMC Tests)

Introduction
Overview



Procedures for
Evaluating Vacuum Levels and
Air Flow in Milking Systems

1

Objectives of this lesson

-  To define the Purpose, the Scope and the Sections of the NMC Vacuum Tests Procedures.
-  Discuss Prioritizing and Making recommendations based on the results of these test procedures.

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Purpose and Scope

1. Evaluate the adequacy of milking systems to maintain the average vacuum in the claw within the intended range during milking, and
2. Ability of the pulsation system to operate within the manufacturer's specifications.
(does not assess milking procedures)

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The NMC does not set standards

-  The “NMC Procedures for Evaluating Vacuum Levels and Airflow in Milking Systems” are *GUIDELINES* based on the standards developed by:
 - ❶ International Standards Organization (ISO, 2007)
 - ❷ American Society of Agricultural and Biological Engineers (ASABE, 2011)

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Standards referenced in the NMC document

 The specific standards referenced in the NMC document are:

❶ ISO/ASABE 5707

- ✓ Milking Machine Installations:
 - o Construction And Performance

❷ ISO/ASAE 6690

- ✓ Milking machine installations:
 - o Mechanical tests

Three sections

1. Milking-time tests
 - Claw Vacuum
 - Milkline Vacuum Stability
 - Receiver Vacuum Stability
2. Testing pulsation
3. Diagnostic Tests
 - Dry tests of vacuum and airflow

Milking-time tests: Milk and air flowing in machine

- Tests performed during milking of live cows.
 - ❶ The most direct method for determining the adequacy of the vacuum production and regulation of any milking system under its intended use conditions.

Dry tests: only air flowing in machine

- Dry tests of pulsators
 - ❶ Proper pulsator function is also critical to the success of the milking process.
- Diagnostic Tests
 - ❶ More detailed diagnostic testing to determine causes of failure in milking-time tests of vacuum regulation or pulsator performance.

Units of Measure

- Both metric and English units of measures are used in the NMC document.
- Airflow rate is measured as its equivalent volume per minute (LPM or CFM) at atmospheric pressure.
 - This method is also referred to as ASME (American Society of Mechanical Engineering Standard) or free air.

Units conversion

- Conversion for measures of pressure (or vacuum) are:
 - 1 inch of Mercury ("Hg) = 3.39 kilopascals (kPa)
 - 1 kilopascal (kPa) = 0.295 inches of Mercury ("Hg)
- Conversion for measures of flow rate are:
 - 1 cubic foot per minute (CFM) of airflow = 28.3 Liters/minute (LPM) of airflow
 - 1000 Liters/minute (LPM) = 35.3 CFM of airflow

When to perform an evaluation?

- A complete system evaluation should be performed for any new installation, as part of a scheduled maintenance program, after major modifications to the system, or if milking-time tests indicate a potential problem.

Recommendations to the owner of the milking system

- When evaluation of the milking machine is completed, a clear set of recommendations should be provided to the owner.
- Reasons to suggest changes to a milking system, include:
 - Improved milking performance (speed or completeness of milking).
 - Improved cleaning performance.
 - Improved mastitis control and milk quality.
 - Decreased power or energy consumption.
 - Decreased wear on pump components.
 - Improved aesthetic or cosmetic appeal.

Prioritizing recommendations

✉ Recommendations for changes to a milking machine should be listed in order of priority according to their likely cost-benefit for the client:

❶ Priority 1:

✓ Urgent and important changes

❷ Priority 2:

✓ Important but not urgent improvements

❸ Priority 3:

✓ Cosmetic or other improvements