AMBIC®

STUDY REPORT

Vision Mastitis Detectors

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Introduction

This report details work carried out to verify that the vacuum drop, caused when the "*Vision*" is placed in the Long Milk Tube, falls within the limits set by the ISO milking machine standard.

Background

1. Study Report ref. IAH627

This Study, carried out over several milkings under controlled conditions, was conducted by the Insititute for Animal Health (Compton, UK) in November 1997 (around the time of the first release of Vision onto the market). The findings are published in Study Report ref. IAH627, which concluded that "*Vision*" was:

> " . . . a significant improvement on the original Ambic Mark1 design for the retention of Mastitis clots. Both screen types performed well in the clot retention tests. The new design should benefit milkers as an aid to detect clinical Mastitis in the parlour."

In the tests and discussion section, the report quotes:

> "There was no apparent loss in vacuum caused by a fully blocked screen although in a very high flow rate cow this may be suppressed. In the unlikely event of the screen becoming fully blocked the bypass will still allow a flow rate in the region of 7kg/min. It is noted that milk flow rate tests were on a limited scale but indicated that there was no adverse effect of inclusion of the detector in the LMT. "

2. Milking Machine Standards – ISO5707 & ISO6690

These are the two standards relating to the performance and testing of milking machines. ISO5707 sets out airflow performance in the Long Milk Tube and the test for this, set out in ISO6690 para. 5.13, requires a test to be carried out under simulated operating conditions as follows:-

a) Set the machine in the milking position with all units operating and all milking liners fitted with teat cup plugs. Connect an airflow meter to the end of the Long Milk Tube in place of the claw.
b) Note the vacuum level at this point with the airflow meter closed (this should be the operating vacuum level of the plant).
c) Open the airflow meter until the vacuum level recorded at the flow meter is 5kPa lower than that measured in b) above. Note the reading of the airflow meter.

ISO5707 requires that this reading be no less than that specified by the manufacturer of the plant.

In practice most manufacturers specify an airflow reading at the end of the LMT as the minimum set by ISO5707 for bucket units – 65 Litres/minute.

Test Procedure & Discussion

Tests were undertaken to verify that the vacuum drop across the "*Vision*" and air flow passed, with "*Vision*" installed in the Long Milk Tube, were acceptable. The tests were carried out as follows:-

- In the laboratory at Ambic Equipment Ltd, Witney.
- Farm 1 – a Westfalia 14/14 herringbone parlour with Low Level 3" looped Milk Pipeline to which "Metatron" milk meters/ACR's were fitted.
- Farm 2 – an Alfa-Laval 14/14 herringbone parlour with Low Level 7 gallon Recorder Jars and early Float-type Alfa-Laval electronic ACR's.
- Farm 3 – an Alfa-Laval 16/16 herringbone parlour with High Level 3" (twin) Milk Pipeline to which Alpro "Flomaster" meters/ACR's were fitted.

The tests at all locations were carried out according to the ISO standard test detailed at 2 a) - c) above.

Airflow was measured using a Alfa-Laval AFM3000 airflow meter kit.

Vacuum measurements were taken using an Alfa-Laval (De Drie) vacuum recorder set to run for a fixed period of 60 seconds (V/8 setting) to measure the average vacuum level over that period. For each airflow setting, vacuum average values were printed out on the recorder. The recorder was connected to the airflow meter vacuum nipple (in place of the more usual vacuum gauge) in order to improve the accuracy of vacuum level readings.

The airflow through an open ended Long Milk Tube is controlled partly by the Effective Reserve of the milking plant and partly by any restriction in the system (e.g. bore of connecting tubes and any connectors). It is therefore most important that the connection to the airflow meter does not in itself introduce a restriction – for these tests, the reduction from the 42mm bore inlet of the airflow meter was via rubber reducers down to a stainless steel straight connector of 16.0mm bore and 75mm overall length. At no point was the bore of the testing apparatus less than the bore of the Long Milk Tube (i.e. 16.0mm).

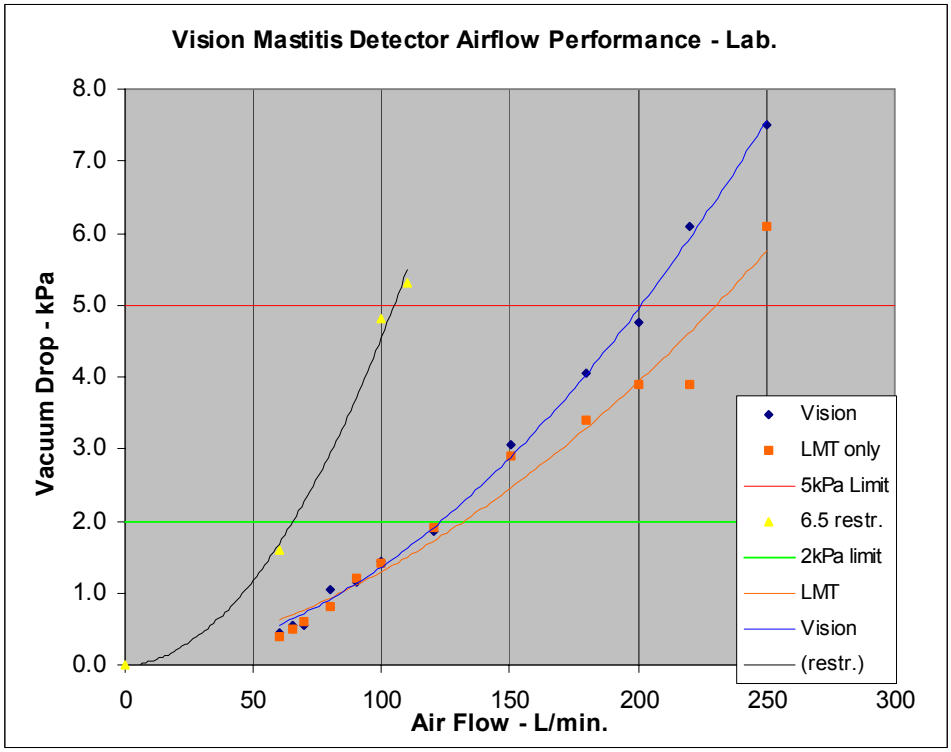
When removing the "*Vision*" from the Long Milk Tube, it was replaced by a stainless steel straight connector of 16.0mm bore and 75mm overall length.

Results & Discussion

All tests confirmed that the "*Vision*" passed the vacuum drop /air flow test as specified in ISO standards. Results are shown and discussed in more details below.

Ambic Laboratory

The results, displayed graphically, are as follows:



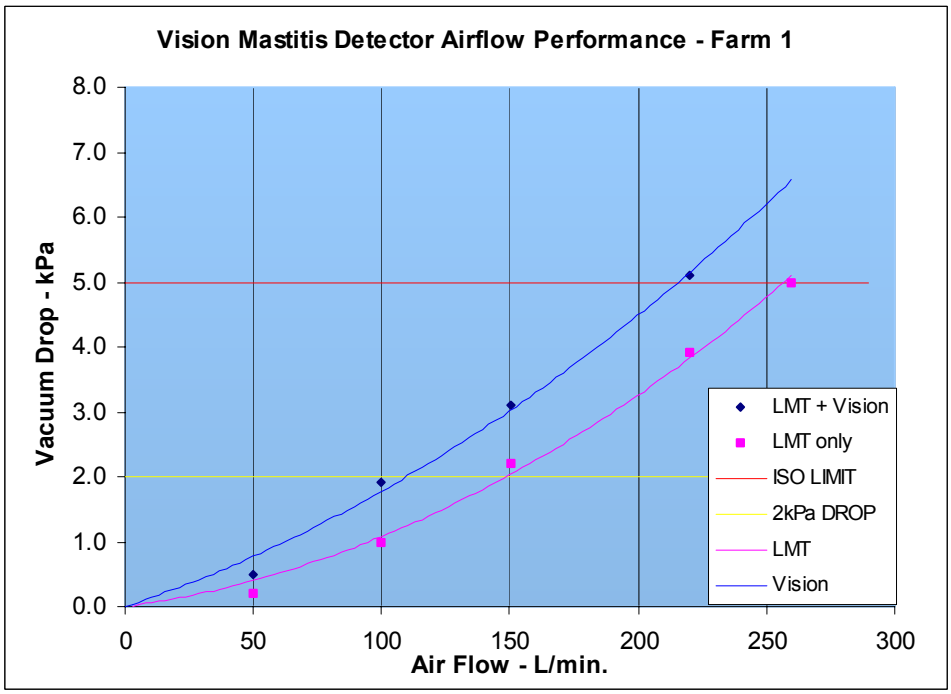
With "*Vision*" in circuit (Blue trace), it was possible to admit 200L/min of air before the vacuum drop was in excess of 5kPa – this airflow was well in excess of the minimum (65 L/min) required by the ISO standard. The Orange trace shows the airflow performance with no "*Vision*" fitted.

Included in the AFM3000 airflow meter kit is a plastic T-piece gauge connector intended primarily for use in vacuum level measurements. The bore of this is considerably restricted and an additional test was carried out (without "*Vision*" in circuit) to see what the effect would be if the bore was reduced to only 6.5mm. The Black trace illustrates this effect - which results in an airflow reduction of 50% from the previous measurement.

It should be noted that even when applying a maximum of 2kPa vacuum drop (Green Level above), the "*Vision*" still allowed an airflow well in excess of the minimum required by ISO standard.

Farm 1

The results, displayed graphically, are as follows:



On this Westfalia 16/16 direct-to-pipeline milking plant (fitted with Metatron milk meters), the nominal working vacuum was 42kPa and Effective reserve (determined at a recent test) was in excess of 900L/min. Long Milk Tubes were approximately 1.5metres long and of 16mm nominal bore. In addition to the "*Vision*", an Ambic milk sampler was also fitted in the LMT.

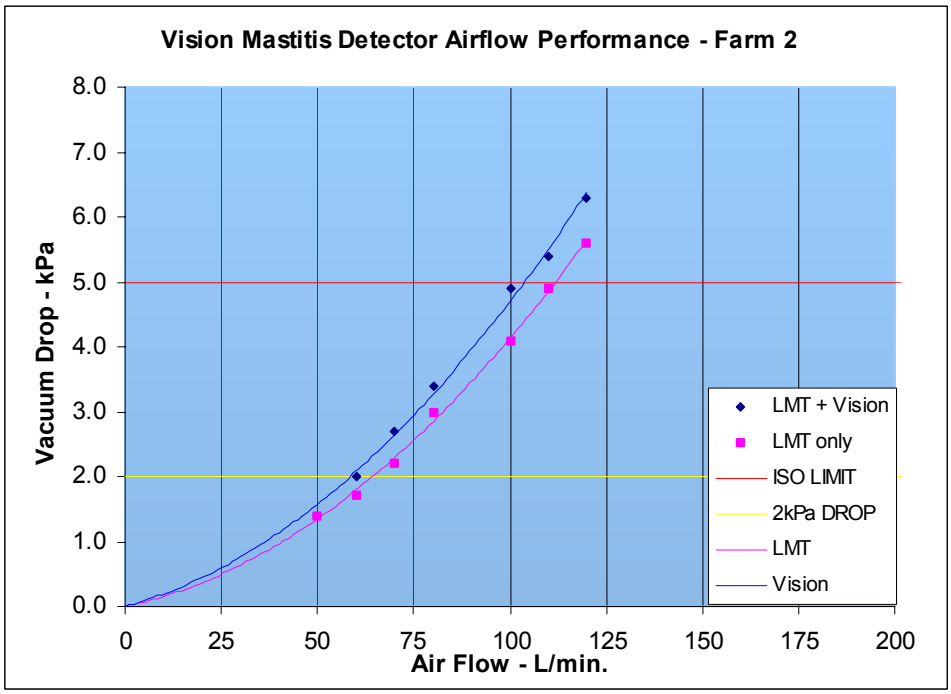
With "*Vision*" in circuit (Blue trace), it was possible to admit almost 220L/min of air before the vacuum drop was in excess of 5kPa – this airflow was well in excess of the minimum (65 L/min) required by the ISO standard. The Pink trace shows the airflow performance with no "*Vision*" fitted.

Here again, as found in the laboratory, even when applying a maximum of 2kPa vacuum drop (Yellow Level above), the "*Vision*" still allowed an airflow well in excess of the minimum required by ISO standard.

Farm 2

In contrast to the other two farms tested, this Alfa-Laval 14/14 herringbone parlour was fitted with Low Level 7 gallon Recorder Jars and early Alfa-Laval electronic ACR's (using Float-type flow sensors installed between Long Milk Tube and Jar inlet). Long Milk Tubes were approximately 1.8metres long and of 16mm nominal bore.

The results are displayed graphically overleaf:



Airflow performance, via the rather complicated system of tubing and valves of a recorder jar plant, was expected to be much reduced when compared to that of a direct-to-pipeline installation; this was indeed the case. The graph scaling has been adjusted to reflect this.

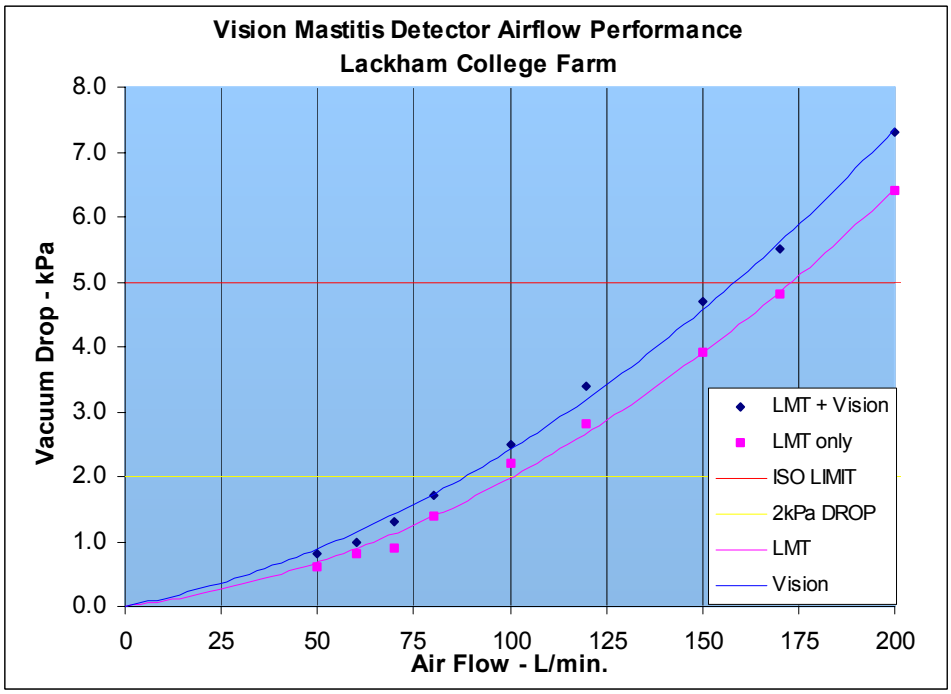
With "*Vision*" in circuit (Blue trace), it was possible to admit slightly more than 100L/min of air before the vacuum drop was in excess of 5kPa. This airflow was still in excess of the minimum (65 L/min) required by the ISO standard. The Pink trace shows the airflow performance with no "*Vision*" fitted.

When applying a maximum of 2kPa vacuum drop (Yellow Level above), the "*Vision*" failed to allow an air flow of 65 L/min (graphical value of 60 L/min). However, this could not be attributed to excessive restriction caused by the "*Vision*" itself since the unrestricted Long Milk Tube fell short (graphical value of 64 L/min) of allowing the minimum required by ISO standards.

Farm 3 – Lackham College of Agriculture

The College milking plant is an Alfa-Laval 16/16 direct-to-pipeline system (fitted with Alpro Flomaster milk meters), whose nominal working vacuum was 46kPa and Effective reserve (determined at a recent test) was 1100L/min. Long Milk Tubes were approximately 2metres long and of 15mm nominal bore. In addition to the "*Vision*", an Ambic milk sampler was also fitted in the LMT.

The results are displayed graphically overleaf:



With "*Vision*" in circuit (Blue trace), it was possible to admit somewhat less air than that on the Westfalia direct-to-pipeline system. Slightly more than 150L/min of air could be admitted before the vacuum drop exceeded 5kPa; however, this airflow was still well in excess of the minimum (65 L/min) required by the ISO standard. The Pink trace shows the airflow performance with no "*Vision*" fitted.

Here again, as found in the laboratory, even when applying a maximum of 2kPa vacuum drop (Yellow Level above), the "*Vision*" still allowed an airflow (~85 L/min) in excess of the minimum required by ISO standard.

Conclusions

All tests, including those in the laboratory, combined with the findings of the IAH report confirm that with "*Vision*" fitted in the Long Milk Tube:

- the milking machine performance will still comply with the ISO requirements
- the extent of vacuum drop is unlikely to adversely affect cow milking performance

The minimal vacuum drop introduced by "*Vision*" could however show some affect on high yielding, fast milking cows if those animals are milked at the lowest possible vacuum level. In such cases, a slight drop in milking performance could easily and safely be compensated for by increasing vacuum level by 0.5 – 1 kPa until optimum milking performance is restored.

Richard May – January 2003.