# The effects of twin tube diameter and length on pulsation

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## Abstract
Understanding the effects of twin tube diameter and length on pulsation phases is important to developing a properly tuned milking system. This study focuses on creating relational models of pulsation change based on twin tube length and diameter in a research laboratory setting. As length of the air tube increases, A- and C-phases get longer and B- and D-phases get shorter. Consequently, the A- and C-phases get shorter and the B- and D-phases get longer when the twin air tube is shortened.

## Introduction
Pulsation is a major component of a milking system, determining the productivity, milking speed and teat end health of any dairy herd. Incorporating twin tube into the milking system can have dramatic changes on the A-, B-, C- and D-phases of a milking process. It is important to understand and anticipate these changes based on the length and diameter of tubing chosen.

## Objective
A short study was performed to determine the effects of twin tube length and diameter on pulsation.

## Materials and Methods
This test was performed in a laboratory setting and the same pulsator, claw, shells, and liners for each trial were used with 9/32" and 3/8" ID hoses. Tube lengths of 3', 5', 6', 12' were monitored for performance with the vacuum set at a constant level of 14.4 inHg for each trial. The pulsator used for this trial had approximately a 580 ms B-phase with no twin air tube. Adding 10 feet of 9/32" tubing to the pulsator would reduce the B-phase to about 520 ms. Consequently, using 10 feet of 3/8" tubing would make the B-phase approximately 544 ms.

## Analysis
Data was recorded and then developed into graphs to illustrate the relationship between twin tube length and diameter to pulsation phases.

## Results
The results can be observed in Figure 1 and Figure 2 on page 2 and demonstrate that as the twin air tube gets longer, A- and C-phases will get longer and B- and D-phases will get shorter. They also show that as tube diameter increases, A- and C-phases will get shorter and B- and D-phases will get longer.

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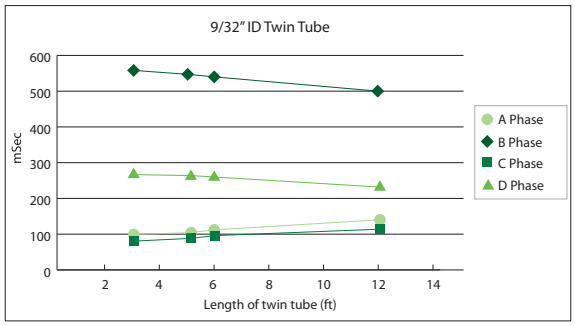
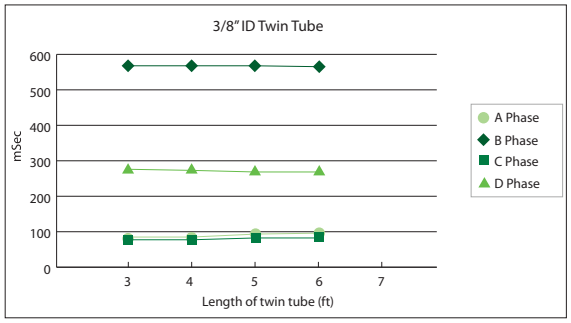
## Discussion

It is important to understand how length and diameter of the twin air tube can affect pulsation. The actual values are dependent on equipment and settings used and the graphs are only used to show the relationship of pulsation to twin tube length and diameter, however in general a longer twin tube will result in longer A- and C-phases.

## Figure 1




## Figure 2

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