

## Tube Fan Ventilation for Pre-Weaned Calf Barns

### Part 3: Tube Options and Considerations

Tube fan ventilation systems allow air to be distributed evenly along the length of the barn through the use of an air distribution tube. Air distribution tubes come in a wide variety of materials and sizes, with various hanging options, and discharge-hole specifications. This fact sheet outlines key considerations for selecting ventilation tubes.

#### Tube Material

Ventilation tubes are manufactured from a variety of materials ranging from plastic to fabric. The three most commonly recommended materials for calf barn applications are extruded poly duct, woven polyethylene, and polyester fabric. Manufacturers most commonly recommend the 10-mil woven polyethylene tube (Figure 1) material for calf barn applications due to ease of cleaning, expected life, available product warranty, and weight relative to cost<sup>[1]</sup>.

#### Material Considerations

Each material type has a range of options available that impact tube cost. Thickness, weight, diameter, and the expected life all impact the relative cost of the tube (Table 1). Thickness options for each material vary based on the tube manufacturer but tend to range between 4 and 10-mil. Typically, the thicker tube material takes longer to wear. Although, it can impact tube expense, hanging options,



Figure 1. Polyethylene Ventilation Tubes

maintenance, durability, and collectability. Collectability refers to the ability of the tube to be bunched together and pushed to one end to facilitate cleaning access.

#### Hanging Options

There are three common options for agricultural ventilation tube suspension; single cable, band or ring, and double cable.

*Single cable* hanging of a tube is when a tube is hung by a cable located above the tube at the noon position (Figure 2). Single cable suspension requires half the amount of cable as double cable suspension, which could save on costs, but only one point of suspension also

Material	Diameter Size (Inches)	Expected Life (Years)	Thickness (mil)	Weight (oz. /sq. yd.)	Relative Cost (\$-\$\$\$)
Poly Duct	6" – 37"	2	4 - 6	4	\$
Woven Polyethylene	6" – 48"	10	4 - 14	6 - 9	\$\$
Fabric	8" – 37"	15-20	9 - 10	3 - 16	\$\$\$

Table 1. Summary of agricultural ventilation tube material information.<sup>[1][2][3][4][5]</sup>

allows the tube to hang lower than the tube diameter when not inflated, possibly interfering with operations. This method also gives the tube increased freedom to swing when the barn has free flowing air through open sidewalls, accelerating tube wear and tear, and possibly resulting in pre-mature failure.

*Band or ring suspension* is similar to single cable, but instead of clipping to a tab of material on the tube, straps or metal rings loop around the tube, and attach to the cable located centrally above the tube (Figure 3).

*Double cable* suspension is when a tube is hung by two parallel cables located at the both the 3:00 and 9:00 positions (Figure 4), or at 2:00 and 10:00. This method is recommended for barns that employ natural ventilation as winds can more likely damage single point suspended tubes. Two-point suspension also keeps the non-inflated tube from hanging lower than the tube diameter when not in use.

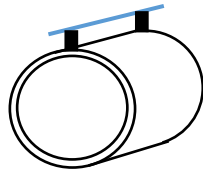
### Air Discharge Holes

The holes punctured in the tube play a crucial role in controlling air streams enough to ensure air is reaching the calf nose zone. Many calculations go into specifying hole placement and sizing for a tube. The sizing of the holes effects the air discharge rate, air velocity at calf level, and the number of holes spaced down the length of the tube.

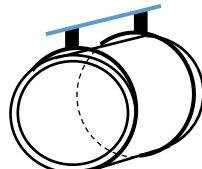
Holes can be pre-punched by the manufacturer or can be in-field punched by melting holes in the tube at the design-specified distance and size. When ordering tubes with pre-punched hole be sure to clearly specify:

- Hole size
- Hole spacing
- Number of rows of holes
- When 2 rows are specified: radial location of rows (i.e. 6 o'clock position)

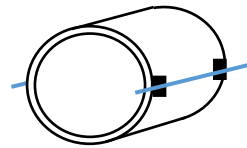
These factors should be clearly listed in any professionally designed tube fan ventilation design.



**Figure 2**  
Single cable / Single-point suspension



**Figure 3**  
Band / Ring suspension



**Figure 4**  
Double cable / Two-point suspension

#### FACT SHEET SERIES

### Tube Fan Ventilation for Pre-Weaned Calf Barns

Part 1: System Overview and Practical Information

Part 2: Fan Considerations

Part 3: Tube Options Overview

Part 4: What is needed to Design a Tube Fan System for Existing Barns?

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