

Drafts: A calf's best friend or greatest foe?

Ryan Leiterman for *Progressive Dairy*

AT A GLANCE

Drafts kill calves – not necessarily. In cold weather they can exacerbate cold stress, but at other times, especially during the summer, drafts can be beneficial, even desirable.

Drafts and pre-weaned calves – rarely is a topic so misunderstood. Many calf raisers are uncomfortable with the topic of drafts on calves, regardless of the outside temperature. Most people believe drafts are to be avoided at all costs. I once heard of a veterinarian who would spark a lighter in a calf pen and if the flame flickered, even the slightest bit, would declare the presence of a dangerous draft.

Contrary to popular belief, however, drafts on pre-weaned calves are not always a bad thing. In fact, in certain situations, they can even be beneficial.

Drafts defined

What defines a draft? If you can feel air movement on your face, does that make it a draft on the calf? Is a draft always bad for calf health? These

are simple questions, but the answers can be more complex.

Webster's dictionary defines a draft simply as "a current of air ...". This

definition implies it is neither good nor bad.

A paper published in 1986 by the American Society of Agricultural and Biological Engineers titled "Design of ventilation systems for poultry and livestock shelters" defined a draft as "air speeds in excess of 29.5 to 59 feet per minute." A definition with this level of precision makes nice lecture material for freshman veterinary students but leaves calf raisers looking for something more tangible. Most ventilation professionals today have

universally accepted 60 feet per minute as a draft threshold for pre-weaned calves during times of cold weather.

Today, ventilation professionals have sensitive air speed meters that can be used to measure air speeds and volumes. The two most common air speed meters are the hot wire style (Picture 1) and the windmill style (Picture 2). Once a ventilation system is installed in a barn, walk

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A hot wire-style air speed meter is used to measure air speed and volume from a positive-pressure tube.



A windmill-style air speed meter is used to measure air speed.

Photos courtesy of Crystal Creek.

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around the barn and measure the air speeds at different points in the barn. Thoroughly checking air speeds may reveal drafty areas or dead spots in the barn. If the ventilation system has multiple settings, test the air speeds at the same points throughout the barn at each setting. By knowing the air speed at the calf level associated with different ventilation system settings, the calf manager can provide fast cooling air flow when calves are under heat stress or draft-free fresh air when calves are experiencing cold stress.

Drafts and thermoregulation

Heat loss happens through three processes. They are:

- 1 Conduction
- 2 Convection
- 3 Radiation

A draft is a current of moving air that can increase heat removal rates through the convective process. If you burn your finger on a stove, you will probably blow on it. Why? Because we inherently know that by increasing air speeds over a surface, we can cool the object faster. Moving air has the ability to strip heat off objects. This is the key to understanding drafts as they relate to calves – and all livestock, for that matter. In the case of cold

weather, drafts are to be avoided because they will exacerbate cold stress. But in the case of hot weather, the convective properties of drafts can help calves stay cool.

Young calves have a thermoneutral zone of 50°F to 78°F where they burn no additional calories to maintain body temperature. This means that when temperatures dip below 50°F, calves begin to burn calories to stay warm and, above 78°F, they burn calories in metabolic cooling processes.

Simply put, when it is above 78°F, calves can benefit from a draft to assist in heat abatement. When it is below 50°F, calves should not be exposed to air speeds greater than 60 feet per minute in order to prevent excess convective heat loss. There is a gray area about how to ventilate for temperatures between 50°F and 78°F. Science has yet to pin down an ideal air speed versus ambient temperature relationship. Until that day comes, calf raisers are left to use their experience to guide their decision-making process.

Additional benefits of properly managed drafts

During hot summer weather, drafts on calves can have benefits beyond heat abatement. Some calf raisers have reported a 50% reduction in bedding during summer months when using a high-speed (drafty)

ventilation system because the fast air helps keep the bedding dry for longer periods of time.

Fly pressure can also be reduced with drafty ventilation systems in the summer. Flies do not like to be in a draft. Experience has shown if calves can reside in a stream of air moving roughly 176 feet per minute (2 miles per hour) or greater, flies will often avoid the calf to avoid the associated draft.

The idea of regulating air speeds based on ambient temperature now leads to bigger questions. Does your calf barn ventilation system allow you to change the speed of air at the calf level along with changing ambient temperatures? Can it easily move back and forth between fast cooling air and slow, draft-free air based on outside temperature, especially during times of seasonal transition like the spring and fall when days are hot and nights are cold?

In the future, before proclaiming all drafts are bad for young calves, remember: It is not the air speed but rather the air speed in relation to the ambient air temperature that determines if it will have a helpful or harmful effect on calf health. Ventilation systems that allow the calf raisers to adjust air speed at the calf level based on temperature will help calves remain healthy in the face of changing weather conditions. ↗

Key take-home points

- Although often misunderstood, drafts are not always detrimental for pre-weaned calves.
- When outside temps dip below 50°F, prevent drafts on pre-weaned calves.
- When temps are over 78°F, air speeds of 2 miles per hour or greater can have positive effects on calf health.
- During warm weather, drafts can assist with reducing fly pressure on calves and help bedding stay drier.



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