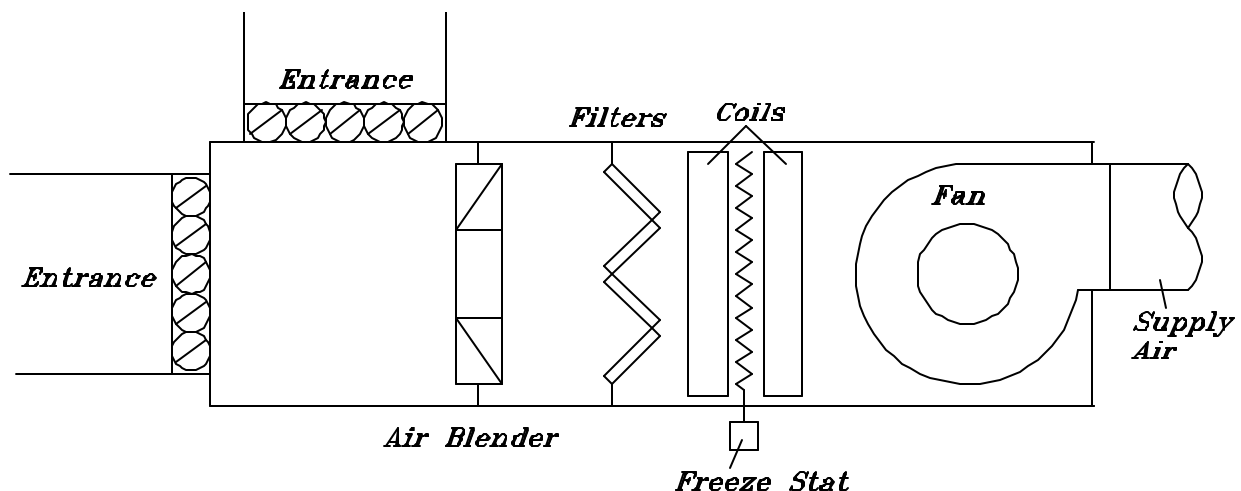


Value Engineering and Air Mixers: Are They Worth It?

The goal with this article is to bring to light several considerations that should be made before “value engineering” the static mixers out of a system. Static mixers are typically applied on HVAC systems for one of the following reasons: protect against freeze-stat trips and frozen coils, ensure proper economizer operation, minimize sensor errors, and aid in outdoor air distribution.

In spite of these benefits, the need to reduce front-end costs can lead to a decision to eliminate the mixers from the project. However, at an averaged installed cost of around \$0.10/CFM, the Air Blender[®] mixer is not a significant front-end cost. Further, the operational benefits and energy savings of applying a mixer typically results in a payback of less than one year.

One reason to include an Air Blender in the unit design is to provide coil freeze protection and to eliminate freeze stat trips. Keeping a unit running while maintaining the proper amount of outside air during cold outside temperatures is a difficult challenge. This fact is further exaggerated in larger units pushing larger capacities of air. However the application of an Air Blender mixer can significantly improve an air handling unit’s ability to operate consistently and efficiently at cooler outside air temperatures in economizer operation.



To owners who are concerned with front-end cost, this might seem trivial. But to building operators the inclusion of an Air Blender mixer can make the difference between a normal system operating as designed year round and a system with shut down potential and control issues every day during the winter months. Common perception is freeze stat trips only at extreme cold outside air temperatures (10°F and below). Further, it is believed that to avoid the shutdown the operator can program the heating coil valve to open and warm the air above the freeze stat trip settings. However, more commonly, freeze-stat trips are more problematic on a 30°F day when the unit is trying to maintain economizer mode. At a minimum, freeze stats tripping in these conditions will force economizer operation to be abandoned, thereby resulting in significantly higher energy cost to operate the air handling unit. In addition, the building operator often makes additional adjustments such as reducing outside air percentage below the design minimum or opening access doors. Neither of these options desirable to maintain the ASHRAE Standard 62 requirements.

These problems/issues can be dramatically reduced if not eliminated by the Air Blender mixer. This product not only increases the reliability of the unit by eliminating these headaches but also allows the unit to run per the original designed sequence of operations. Energy usage is dramatically reduced as a result of economizer operation continuing. Further the headaches of these nuisance freeze stat trips is eliminated and the system is significantly more reliable.

An additional benefit of the Air Blender mixer is its ability to minimize sensor errors. Significant energy can be realized if accurate temperature control is taking place in the air handling unit. Sensor errors occur when stratified air adversely effects the sensors ability to get a true reading of the mixed air temperature, which in turn effects the performance of the control system. The Air Blender mixer significantly reduces temperature differentials in the air handling unit and provides for more even velocities on control sensing equipment, thereby dramatically reducing sensor errors that occur within the DDC system.

Another significant benefit of the Air Blender mixer is to aid in distributing the appropriate amount of outside air to the intended occupied space(s). Perhaps the most difficult part of ASHRAE 62 is ensuring that the outdoor air gets thoroughly mixed with the return air to maintain occupant comfort standards. Since there are no products on the market to verify the quality of air delivered to a space, the problem is often not realized until the occupants start complaining. The costs associated with corrective measures and potential owner liability are significant. The small cost of a mixer compared to these cost suggests the value of the mixer outweighs its

Obviously everything that is included in the initial design of a building has a purpose to improve the quality of the system performance and ease of maintenance. The goal of value engineering is to reduce the cost of a system without reducing the functionality. However, the elimination of a mixer typically represents a minimal front-end savings with a significant reduction in functionality and a significant increase in energy usage. The next two editions of this newsletter will examine specific examples of air handling units operating with and without an Air Blender mixer. These studies will further demonstrate that the small upfront costs of the Air Blender mixer is greatly outweighed by the benefits it provides.