

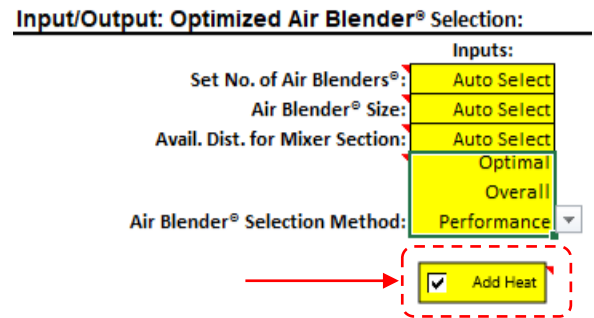
Challenge

The presence of air stratification and resulting low limit freeze-stat trips cause the premature abandonment of economizer operation as outside temperatures drop below 40°F (4.4°C). **The most effective and predictable way to reduce stratification is the use of a mixing device.** It is important to identify a mixing strategy which shortens the overall mixing length and ensures the mixed air temperature can reach a targeted setpoint.

Solution

In many AHU applications, a heating coil upstream of the freeze stat will add heat to the mixed return air/outdoor air to maintain a supply air temperature setting from the AHU. This control scheme can be adopted when a high % of outdoor air is needed for ventilation. This added heat increases the temperature of the entire mixed air stream including the coldest temperatures in the plenum. **Taking this additional heat into account, the Air Blender can be applied with less required downstream distance.**

Blender Products Inc. has increased the functionality of the Air Blender selection tool to take advantage of applications with this added heat! Simply click on/off the “Add Heat” button and see how the downstream distance is impacted.



The various operating modes for an AHU are highlighted in **Figure 1**. The plot shows various plenum temperatures (e.g., mixed air temperature, minimum temperature) as a function of outdoor air (OA) temperature with a Series IV Air Blender (AB) installed. This AHU has a minimum OA requirement of 30%, thus introducing cold air (OA temps <15°F) into the mixing section can trigger nuisance freeze-stat trips. However, when the mixed air temperature falls below the 55°F supply air setpoint, heating is required and the minimum temperature is maintained above the 37°F threshold.

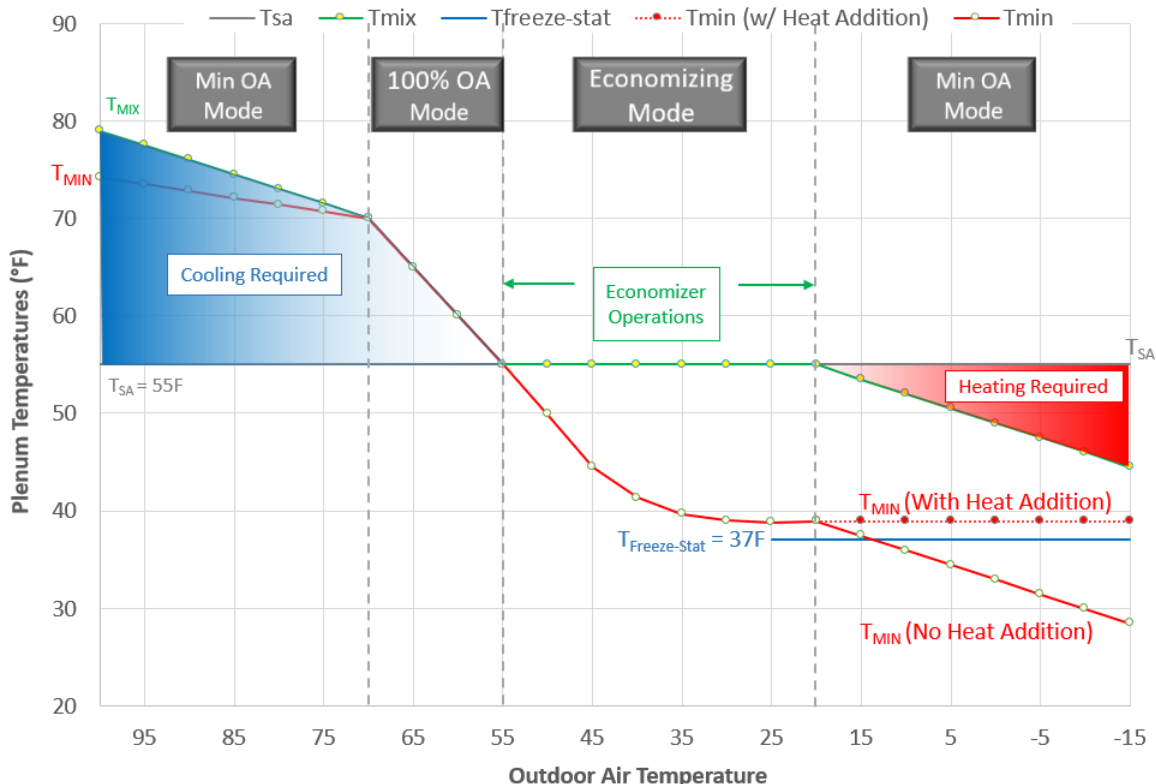


Figure 1. Air Temperature Stratification as a Function of Downstream Mixing Distance (AB Series IV)