

1323.0651 SECTION 6.5.1, ECONOMIZERS.

Subpart 1. **Economizers.** ASHRAE Standard 90.1, Section 6.5.1, is amended to read:

6.5.1 Economizers. Economizers are required on cooling systems having a fan system capacity of 3,000 cfm or greater. Economizers must meet the requirements of Sections 6.5.1.1 through 6.5.1.4.

Exceptions: Economizers are not required for the systems listed below.

(a) Systems that include nonparticulate air treatment as required by Section 6.2.1 of ASHRAE Standard 62.1.

(b) Where more than 25 percent of the air designed to be supplied by the system is to spaces that are designed to be humidified above 35 degrees Fahrenheit dew point temperature to satisfy process needs.

(c) Systems that include a condenser heat recovery system complying with Section 6.5.6.2.

(d) Systems that serve spaces with a sensible cooling load at design conditions, excluding transmission and infiltration loads, that is less than or equal to transmission and infiltration losses at an outdoor temperature of 60 degrees Fahrenheit.

(e) Systems expected to operate less than 20 hours per week.

(f) Where the use of outdoor air for cooling will affect supermarket open refrigerated display casework systems.

(g) The use of outdoor air cooling may affect the operation of other systems so as to increase the overall energy consumption of the building.

(h) Energy recovery from an internal/external zone energy recovery system exceeds the energy conserved by outdoor air cooling on an annual basis.

(i) The quality of the outdoor air is so poor as to require extensive treatment of the air.

Subp. 2. **High-limit shutoff.** ASHRAE Standard 90.1, Section 6.5.1.1.3, is amended to read:

6.5.1.1.3 High-limit shutoff. All air economizers shall be capable of automatically reducing outdoor air intake to the design minimum outdoor air quality when outdoor air intake will no longer reduce cooling energy usage. High-limit shutoff control types for specific climates shall be chosen from Table 6.5.1.1.3A, All Other Climates. High-limit shutoff control settings for these control types shall be those listed in Table 6.5.1.1.3B.

TABLE 6.5.1.1.3A High-Limit Shutoff Control Options for Air Economizers

Climate Zones	Allowed Control Types	Prohibited Control Types
6, 7	Fixed Dry Bulb Differential Dry Bulb Electronic Enthalpy ^a Differential Enthalpy Dew Point and Dry Bulb Temperature	Fixed Enthalpy
All	Fixed Enthalpy	

Note: ^aElectronic enthalpy controllers are devices that use a combination of humidity and dry bulb temperature in their switching algorithm.

TABLE 6.5.1.1.3B High-Limit Shutoff Control Settings for Air Economizers

Device Type	Climate	Equation	Required High-Limit (Economizer Off When): Description
Fixed Dry Bulb	7		
	6	$T_{OA} > 70^{\circ}\text{F}$	Outdoor air temperature exceeds 70°F
	All Zones	$T_{OA} > 65^{\circ}\text{F}$	Outdoor air temperature exceeds 65°F
Differential Dry Bulb	7	$T_{OA} > T_{RA}$	Outdoor air temperature exceeds return air temperature
Fixed Enthalpy	All	$h_{OA} > 28 \text{ Btu/lb}^a$	Outdoor air enthalpy exceeds 28 Btu/lb of dry air ^a
Electronic Enthalpy	All	$(T_{OA}, \text{RH}_{OA}) > A$	Outdoor air temperature/RH exceeds the "A" set point curve ^b
Differential Enthalpy	All	$h_{OA} > h_{RA}$	Outdoor air enthalpy exceeds return air enthalpy
Dew Point and Dry Bulb Temperature	All	$\text{DP}_{OA} > 55^{\circ}\text{F}$ or $T_{OA} > 75^{\circ}\text{F}$	Outdoor air dry bulb exceeds 75°F or outside dew point exceeds 55°F (65 gr/lb)

^aAt altitudes substantially different than sea level, the Fixed Enthalpy limit shall be set to the enthalpy value at 75°F and 50 percent relative humidity. As an example, at approximately 6,000 feet elevation the fixed enthalpy limit is approximately 30.7 Btu/lb.

^bSet point "A" corresponds to a curve on the psychometric chart that goes through a point at approximately 75°F and 40 percent relative humidity and is nearly parallel to dry bulb lines at low humidity levels and nearly parallel to enthalpy lines at high humidity levels.

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