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606.5.1.1.1, 606.5.1.1.2, 606.5.1.1.3, Table 606.5.1.1.3(1), Table 606.5.1.1.3 (2), 606.5.1.1.4, 606.5.1.2.1, 606.5.1.2.2, 606.5.1.2.3, 606.5.1.2.4, 606.5.1.1, 606.5.1.2

Proponent: Brenda Thompson, Chair, representing Sustainability, Energy and High Performance Code Action Committee (SEHPCAC@iccsafe.org)

Revise as follows:

606.5.1.1 Air economizers. Air economizers shall be designed in accordance with ~~Sections 606.5.1.1.1 through 606.5.1.1.4~~. the *International Energy Conservation Code.*

~~**606.5.1.1.1 Design capacity.** Air economizer systems shall be capable of modulating outdoor air and return air dampers to provide up to 100 percent of the design supply air quantity as outdoor air for cooling.~~

~~**606.5.1.1.2 Control signal.** Economizer dampers shall be capable of being sequenced with the mechanical cooling equipment and shall not be controlled by only mixed air temperature.~~

~~**Exception:** The use of mixed air temperature limit control shall be permitted for systems controlled from space temperature, such as single-zone systems.~~

~~**606.5.1.1.3 High-limit shutoff.** Air economizers shall be capable of automatically reducing outdoor air intake to the design minimum outdoor air quantity when the outdoor air intake will not reduce cooling energy usage. High-limit shutoff control types for specific climates shall be chosen from Table 606.5.1.1.3(1). High- limit shutoff control settings for the Table 606.5.1.1.3(1) control types shall be as specified in Table 606.5.1.1.3(2).~~

~~**TABLE 606.5.1.1.3(1)**~~
~~**HIGH-LIMIT SHUTOFF CONTROL OPTIONS**~~
~~**FOR AIR ECONOMIZERS**~~

~~CLIMATE ZONES~~	~~ALLOWED CONTROL TYPES~~	~~PROHIBITED CONTROL TYPES~~
~~1B, 2B, 3B, 3C, 4B, 4C, 5B, 5C, 6B, 7, 8~~	~~Fixed dry bulb Differential dry bulb Electronic enthalpy[a] Differential enthalpy Dew-point and dry-bulb temperatures~~	~~Fixed enthalpy~~
~~1A, 2A, 3A, 4A~~	~~Fixed enthalpy Electronic enthalpy[a] Differential enthalpy Dew-point and dry-bulb temperatures~~	~~Fixed dry bulb Differential dry bulb~~
~~All other climates zones~~	~~Fixed dry bulb Differential dry bulb Fixed enthalpy Electronic enthalpy[a] Differential enthalpy Dew-point and dry-bulb temperatures~~	~~—~~

~~a. Electronic enthalpy controllers are devices that use a combination of humidity and dry-bulb temperature in their switching algorithm.~~

TABLE 606.5.1.1.3(2)
HIGH-LIMIT SHUTOFF CONTROL SETTING FOR AIR ECONOMIZERS

DEVICE TYPE	CLIMATE ZONE	REQUIRED HIGH LIMIT (Economizer off when)	
		Equation	Description of equation
Fixed dry bulb	1B, 2B, 3B, 3C, 4B, 4C, 5B, 5C, 6B, 7, 8	T_{OA} > 75°F	Outdoor air temperature (T_{OA}) is greater than 75°F
	5A, 6A, 7A	T_{OA} > 70°F	Outdoor air temperature (T_{OA}) is greater than 70°F
	All other zones	T_{OA} > 65°F	Outdoor air temperature (T_{OA}) is greater than 65°F
Differential dry bulb	1B, 2B, 3B, 3C, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7, 8	T_{OA} > T_{RA}	Outdoor air temperature (T_{OA}) is greater than return air temperature (T_{RA})
Fixed enthalpy	All	h_{OA} > 28 Btu/lb[a]	Outdoor air enthalpy (h_{OA}) is greater than 28 Btu/lb of dry air[a]
Electronic enthalpy	All	(T_{OA}/RH_{OA}) > A	Outdoor air temperature (T_{OA}) divided by RH_{OA} is greater than the "A" setpoint curve[b]
Differential enthalpy	All	h_{OA} > h_{RA}	Outdoor air enthalpy (h_{OA}) is greater than return air enthalpy (h_{RA})
Dew-point and dry bulb temperatures	All	DP_{OA} > 55°F or T_{OA} > 75°F	Outside dew point (DP_{OA}) is greater than 55°F or Outdoor air dry bulb (T_{OA}) is greater than 75°F

For SI: °C = [(°F) - 32]/1.8, 1 foot = 304.8 mm, 1 British thermal unit per pound = 2326 J/Kg.
a. At 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 6000 feet elevation the fixed enthalpy limit is approximately 30.7 Btu/lb.
b. Setpoint "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

606.5.1.1.4 Relief of excess outdoor air. Systems shall provide a means to relieve excess outdoor air during air economizer operation to prevent over-pressurizing of the building. The relief air outlets shall be located to avoid recirculation of the relief of air into the building.

606.5.1.2 Water economizer systems for HVAC equipment. Water Economizer systems for heating, ventilating and air-conditioning (HVAC) equipment shall be designed in accordance with Sections 606.5.1.2.1 through 606.5.1.2.4. the *International Energy Conservation Code.*

606.5.1.2.1 Design capacity. Water economizer systems shall be capable of cooling supply air by indirect evaporation and providing up to 100 percent of the expected system cooling load at outdoor air temperatures of 50°F (10°C) dry bulb/45°F (7.2°C) wet bulb and below.

Exception: Systems in which a water economizer is used and where dehumidification requirements cannot be met using outdoor air temperatures of 50°F (10°C) dry bulb/45°F (7.2°C) wet bulb, shall satisfy 100 percent of the expected system cooling load at 45°F (7.2°C) dry bulb/40°F (4.4°C) wet bulb.

606.5.1.2.2 Maximum pressure drop. Precooling coils and water-to-water heat exchangers used as part of a water economizer system shall have a water-side pressure drop of less than 15 feet of water column (44 835 Pa) including the control valve or a secondary loop shall be created so that the coil or heat exchanger pressure drop is not seen by the circulating pumps when the system is in the normal cooling noneconomizer mode.

606.5.1.2.3 Integrated economizer control. Economizer systems shall be integrated with the mechanical cooling system and shall be capable of providing partial cooling whether or not additional mechanical cooling is required to meet the remainder of the cooling load.

~~**606.5.1.2.4 Economizer heating system impact.** Heating, ventilating and air-conditioning (HVAC) system design and economizer controls shall be so that economizer operation does not increase the building heating energy use during normal operation.~~

> ~~**Exception:** Economizers on variable air volume (VAV) systems that cause zone level heating to increase because of reduction in supply air temperature.~~

Reason: This proposal was submitted by the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The SEHPCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance International Codes with regard to sustainability, energy and high performance as it relates to the built environment included, but not limited to, how these criteria relate to the International Green Construction Code (IgCC) and the International Energy Conservation Code (IECC). This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. In 2012 and 2013, the SEHPCAC has held six two-day open meetings and 50 workgroup calls, which included members of the SEHPCAC as well as any interested parties, to discuss and debate proposed changes and public comments. Related documentation and reports are posted on the SEHPCAC website at: http://www.iccsafe.org/cs/SEHPCAC/Pages/default.aspx.

The provisions in the International Energy Conservation Code for 2015 that regulate economizers have been significantly revisedand made more stringent. Section 606.5.1 specifies when HVAC systems do, and do not, need to be provided with economizers. Section 606.5.1.1 provides installation standards for air economizers; Section 606.5.1.2 provides installation standards for water economizers. The details of these sections are not as comprehensive as the similar standards provided in the 2015 IECC. This proposal would maintain the requirements and exceptions for economizers, but then refers the code user to the IECC for the requirements of the two types of economizers. The text to be deleted includes deleting tables 606.5.1.1.3(1) and (2).

Cost Impact: Will not increase the cost of construction. As this change removes requirements which would be in conflict with the IECC, there is no cost increase created by this change. If there is a cost increase it occurred with the change in standards in the IECC.

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