

Proposals Based on ASHRAE 90.1-2016 – Waterside Economizer

Draft Code Language

Last Updated: March 2017

1. INTRODUCTION

The California Statewide Utility Codes and Standards Team actively supports the California Energy Commission in developing revisions to the 2019 California Building Energy Efficiency Standards (Title 24, Part 6). Our joint intent is to achieve significant energy savings through the development of reasonable, responsible, and cost-effective code change proposals for the 2019 Title 24 code change cycle.

The Statewide Utility Team is proposing code change for waterside economizer which were implemented into the ASHRAE 90.1 2016 code language.

The requirements for waterside economizers were revised for ASHRAE 90.1-2016 and provide more explicit requirements for waterside economizer, including:

- Requiring integrated waterside economizer;
- Limitation on pressure drop of heat exchangers used for waterside economizing;
- Cooling towers must return to standard operation when not running economizer; and
- Economizer requirement for chilled water systems that don't use large air handling units (affects passive "without fan" systems above a certain capacity).

This measure seeks to add the above requirements to Title 24, Part 6. Additional language meant to take advantage of California's relatively dry-summer climate and increase the number of waterside economizer hours is also included. A maximum system approach which allows the system to run in full economizer mode at 49°F wet-bulb, compared to the previous requirement of 45°F wet-bulb is proposed.

The Statewide Utility Team is requesting feedback on the draft code language presented in this document. Input we receive will inform the code change proposal that the Statewide Utility Team will be proposing to the California Energy Commission in April 2017.

To provide feedback, please email us at info@title24stakeholders.com or contact the measure lead at:

Stefan Gracik

510-663-2070

sgracik@integralgroup.com

For more information about the California Statewide Utility Codes and Standards Team's 2019 Title 24, Part 6 advocacy efforts, and the latest information on this code change proposal please visit: www.title24stakeholders.com.

2. DRAFT CODE LANGUAGE

The proposed changes to the Standards, Reference Appendices, and the ACM Reference Manuals are provided below. Changes to the 2016 documents are marked with underlining (new language) and ~~strikethroughs~~ (deletions).

2.1 Standards

2.1.1 *Waterside Economizer*

Edit the following in SECTION 140.4 – PRESCRIPTIVE REQUIREMENTS FOR SPACE CONDITIONING SYSTEMS:

(e) **Economizers.**

1. Each cooling air handler that has a design total mechanical cooling capacity over 54,000 Btu/hr, or chilled water systems with a total capacity, minus the capacity of fan units with air economizers, greater than capacities listed in Table 140.4-D, shall include either:
 - A. An air economizer capable of modulating outside-air and return-air dampers to supply 100 percent of the design supply air quantity as outside-air; or
 - B. A water economizer capable of providing 100 percent of the expected system cooling load as calculated in accordance with a method approved by the Commission, at outside air temperatures of ~~50°F~~ 54°F dry-bulb and ~~45°F~~ 49°F wet-bulb and below.

Add the following to SECTION 140.4 – PRESCRIPTIVE REQUIREMENTS FOR SPACE CONDITIONING SYSTEMS:

7. Systems that include a water economizer to meet Section 140.4(e) shall include the following:
 - A. Maximum Pressure Drop. Precooling coils and water-to-water heat exchangers used as part of a water economizer system shall either have a water-side pressure drop of less than 15 ft. of water, 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 (non-economizer) mode.
 - B. Heat Rejection Fan Energy Impact. Heat rejection for water economizers shall be configured such that:
 - i. no added heat-rejection fan energy is used when the water economizer is not in operation, or
 - C. Economizer systems shall be integrated with the mechanical cooling system and be capable of providing partial cooling even when additional mechanical cooling is required to meet the remainder of the cooling load. Controls shall not false load the mechanical cooling system by limiting or disabling the economizer or by any other means, such as hot gas bypass, except at the lowest stage of mechanical cooling.

TABLE 140.4-D CHILLED WATER SYSTEM COOLING CAPACITY FOR WHICH AN ECONOMIZER IS REQUIRED

<u>Climate Zones</u>	<u>Total Building Chilled Water System Capacity, Minus Capacity of Cooling units with Air Economizers</u>	
	<u>Building Water-Cooled Chilled Water Systems</u>	<u>Air-cooled Chilled Water Systems or District Chilled Water Systems</u>
<u>15</u>	<u>≥ 960,000 Btu/h (280 kW)</u>	<u>≥ 1,250,000 Btu/h (365 kW)</u>
<u>1,2,3,4,5,6,7,8,9 10,11,12,13,14</u>	<u>≥ 720,000 Btu/h (210 kW)</u>	<u>≥ 940,000 Btu/h (275 kW)</u>
<u>16</u>	<u>≥ 1,320,000 Btu/h (385 kW)</u>	<u>≥ 1,720,000 Btu/h (505 kW)</u>

2.2 Reference Appendices

There are no proposed changes to the Reference Appendices.