

Proposal Summary



Process Steam #1 Flash Steam Recovery

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Measure Description

A process boiler is a type of boiler with a capacity (rated maximum input) of 300,000 British Thermal Units per hour (Btu/h) or more that serves loads other than space conditioning and service water heating related to human occupancy.

This proposed code change would require all newly installed process boilers with capacities at or above 10 million Btu/h (MMBtu/h) that are served by a pressurized deaerator to recover and route flash steam from blowdown to the deaerator or another steam load. The requirement would apply to all new process boilers, including replacement boilers and boilers in additions to existing facilities.

There are two proposed exceptions to the requirement:

1. Boiler systems where high-pressure condensate is returned to the deaerator without being flashed (dropped to atmospheric pressure).
2. Boiler systems where the linear distance from the boiler to the serving deaerator is greater than or equal to 100 feet.

All boilers qualifying for one of the exceptions must indicate either the installation of a pressurized condensate return system or the linear distance from the boiler to the serving deaerator in the construction documents according to the exception they are pursuing.

Table 1 summarizes the scope of the proposed code change.

Table 1: Scope of Proposed Code Change

An "X" indicates the proposed code change is relevant.

Building Type(s)	Building Type(s)		Construction Type(s)	Construction Type(s)	
		single family		X	new construction
		multifamily		X	additions
	X	nonresidential		X	alterations

Type of Change	X	mandatory	Updates to Compliance Software	X	no updates
		prescriptive			update existing feature
		performance			add new feature
Third Party Verification	X	no changes to third party verification			
		update existing verification requirements			
		add new verification requirements			

Justification for Proposed Change

When steam condensate is dropped to a pressure lower than its saturation (boiling-point) pressure, a fraction of it vaporizes, or flashes, into what is known as “flash steam.” Most sites vent flash steam to the atmosphere, resulting in significant fuel, water, and chemical losses. Many steam system design options are available to recover and repurpose flash steam for useful heating to serve low-pressure loads, such as the deaerator, instead of using high-pressure live boiler steam for the same purpose. Flash vessels capture flash steam and allow it to be piped to various applications.

Flash steam recovery has been listed in Department of Energy (DOE) literature as a best practice since at least the early 2000s, and the DOE has five steam tip-sheets for different flash steam recovery methods. This proposed code change originated from discussions with California-based consulting engineers from strategic energy management programs and the DOE Industrial Assessment Center program.

To the Statewide CASE Team’s knowledge, flash steam recovery requirements have not been proposed in previous code cycles. In 2013, Title 24 first adopted requirements for process boilers. In 2022, Title 24 adopted requirements for strainers and fault detection and diagnostics in steam trap assemblies.

Requiring flash steam recovery would save fuel, water, and chemicals. This measure is expected to save approximately 1% of baseline boiler system fuel use. In addition, the requirement would reduce water and the associated chemicals used for water treatment, as the flash steam is no longer vented to the atmosphere and its condensate can be returned to the boiler plant. Ancillary benefits include improved plant safety and improved public perception through reduction of steam plumes.

Data Needs / Information Requests

The Statewide CASE Team is seeking the following information to inform the code change proposal. Data may be provided anonymously. To participate or provide information, please email Emma Conroy emmaconroy@2050partners.com directly and copy info@title24stakeholders.com.

- Major limitations or barriers to flash steam recovery
- Factors that impact flash steam recovery cost-effectiveness
- Flash steam applications, system sizes, and operating pressures for California facilities
- Prevalence of flash steam recovery projects in new construction, addition of new steam capacity, or steam system retrofits
- Typical per-unit makeup water costs, boiler water treatment costs, and wastewater costs in California
- California market growth rate for new construction of process steam systems.
- California rate for retrofit of process steam systems

Draft Code Language

1.1 Guide to Marked Up Language

The proposed changes to the Standards and Reference Appendices are provided below. Changes to the 2025 documents are marked with [blue underlining](#) (new language) and [strikethroughs](#) (deletions).

1.2 Title 24, Part 1

There are no proposed changes to Title 24, Part 1.

1.3 Title 24, Part 6

SECTION 100.1 – DEFINITIONS AND RULES OF CONSTRUCTION

Section 100.1(b) – Definitions: Recommends new or revised definitions for the following terms:

FLASH STEAM is water vapor that is generated when condensate is dropped to a pressure lower than its saturation pressure, which then vaporizes a fraction of the liquid in a process called flashing.

PRESSURIZED CONDENSATE RETURN is a steam condensate return system that continuously operates at a pressure above 15 psig during normal operation and is not

vented to atmosphere. The system contains liquid condensate and any associated steam vapor that may be present in the piping.

SUBCHAPTER 3 – NONRESIDENTIAL, HIGH-RISE RESIDENTIAL, HOTEL/MOTEL OCCUPANCIES, AND COVERED PROCESSES-- MANDATORY REQUIREMENTS

SECTION 120.6 – MANDATORY REQUIRMENTS FOR COVERED PROCESSES

120.6(d) Mandatory requirements for process boilers.

4. Any newly installed process steam boilers with capacities at or above 10 MMBtu/h that have or are connected to a system with a pressurized deaerator are required to recover and route flash steam from blowdown to the deaerator or another steam load.

Exception 1 to 120.6(d)4: Newly installed process steam boiler systems where high-pressure condensate is returned to the deaerator without being flashed (dropped to atmospheric pressure).

Exception 2 to 120.6(d)4: Newly installed process steam boiler systems where the linear distance from the boiler to the serving deaerator is greater than or equal to 100 feet.

1.4 Reference Appendices

There are no proposed updates to the Non-Residential Appendices.