

FACT SHEET

CATEGORIZING – UNFIRED BOILER OR PROCESS STEAM GENERATOR

Extending your internal inspections to 72 months

To date, all applications to the state of California that Intertek has been involved with have been successful, allowing customers to extend their internal inspections to 72 months.



GOAL: Categorizing as an Unfired Boiler or Process Steam Generator Technical Inspection & Audit

If a fired boiler or process steam generator can be shown to be categorized as an unfired boiler, per the Cal/ OSHA requirements, then the internal inspection interval may be extended to 72 months.

Companies interested in recategorizing their boilers and process steam generators as unfired are required to produce a risk engineering analysis that includes 11 items (Cal/ OSHA Circular Letter PV-2006-01).

We have provided engineering support to these companies for three of those tasks:

- Determine whether the boiler can be “dry fired” during any operation scenario.
- If the boiler can be “dry fired”, then calculate the time-to-failure.
- During both normal operation and “dry firing”, address creep, spheroidization, and graphitization.

STATE OF CALIFORNIA

Department of Occupational Safety and Health (DOSH) Requirements

California Code of Regulations, Title 8, Subchapter 2, “Boiler and Fired Pressure Vessel Safety Orders”, contains Article 5, Section 770, “Boilers Subject to Annual Inspection”, which governs the inspection of boilers.

According to Subsection (b), “The Division, upon individual application from petroleum companies, chemical plants, public utilities or other industries considered by the Division as having superior preventive maintenance and examination programs, may grant a maximum interval of thirty-six (36) months between internal inspections of fired boilers.”

This subsection defines a fired boiler “as one whose temperature input can cause metallurgical damage to the boiler...” In addition, it states that “For boilers other than fired boilers, the Division may grant a maximum of seventy-two (72) months between internal inspections, provided the temperature input cannot cause metallurgical damage.”

In Subsection (4), it states that “For boilers and process steam generators where metallurgical damage may occur, the Division may categorize the boiler or process steam generator as unfired upon acceptance of a risk engineering analysis submitted by the owner of the boiler to the Division.”



UNFIRED BOILER OR PROCESS STEAM GENERATOR



Dry-Firing Analysis

The term "dry firing" is defined as either the complete loss of or a severe reduction in fluid flow through the tubing or pressure vessel while the unit continues to operate for some period.

Intertek reviews drawings, operating data, and other documentation to develop conservative "dry firing" scenarios which bound actual operation. These scenarios are then used to:

- Calculate the damage accumulated during operation.
- Calculate the additional damage that is caused by these "dry firing" scenarios.
- Determine the impact of the "dry firing" on remaining creep life, spheroidization, and graphitization of the tube microstructure.
- Determine whether the tubing or pressure vessels are at risk of yielding or bursting during both normal operation and the postulated "dry firing" scenarios.

As part of the review of dry firing scenarios, Intertek looks at operating conditions (normal operation, abnormal operation, normal shutdown and normal startup) to determine if excessive temperatures or low flows/ levels occur.

Estimates of tube temperatures are made to determine the maximum temperatures and possible creep damage during these operating conditions.

The types of boilers and steam generators that have been analyzed include:

- Hydrogen Reforming Flue Gas Waste Heat Boiler Steam Generators, Steam Drums, Steam Separators and Steam Superheaters
- Regenerator Flue Gas Waste Heat Boiler Steam Generators and Steam Drums
- Sulfur Recovery Unit Claus Waste Heat Boilers and Sulfur Condensers
- Sulfur Recovery Unit Reaction Furnace Radiant and Convective Sections
- Waste Heat Boilers

FOR MORE INFORMATION

web.aim-eng@intertek.com

intertek.com/aim