

# JCAH Boiler and Fuel System Requirements

## (What Codes Apply to Me?)

### Safety Note

When it comes to the new JCAH emphasis on facilities issues, don't overlook life safety code issues that refer to your fuel systems and boilers. Many hospital facility managers don't understand all the rules that apply along with legally mandated testing requirements. The following has been designed to guide you through issues that are fuel and boiler system-related within the National Fire Protection Association's (NFPA) Life Safety Code (NFPA 101), the National Fuel Gas Code (NFPA 54), and the boiler and combustion systems hazard codes such as NFPA 85 and the American Society of Mechanical Engineer's (ASME) CSD-1. NFPA 101 includes NFPA 54 by reference which then identifies the requirements of NFPA 54 to be part of NFPA 101 (see section 2.2).

When it comes to boilers and fuel systems you might be one of these people that thinks, "Hey, someone calling themselves a boiler inspector was just here and we got a certificate to keep operating, I guess there's one thing I don't have to worry about". You might also think you have things covered with a local contractor who says they are doing the required tests on safety components. Let us explain the hidden dangers in both of these scenarios.

### **Who are these Boiler Mystery Men (Inspectors?) and what do they do?**

Only about half the states in the US have boiler laws. Where boiler laws exist, states hire and/or designate inspectors to act on their behalf to enforce their boiler laws. They come to your site for a quick once over to see that you appear to be following whatever boiler laws that state or jurisdiction has. In most cases the effort is aimed solely at the pressure vessel or metal vessel that contains the water and/or steam.

In most cases this inspection has nothing to do with the equipment that makes the fire in the boiler and controls pressures and temperatures. Often, they issue a pass certificate simply because the pressure vessel looks fine. The people who inspect your boilers look at things for about 15 to 30 minutes per boiler unless it is coming down and being opened up for an internal. If this happens it might take a couple of hours. They do a great job at what they do but they typically have little or no training related to fuel systems and controls and are not there to look after NFPA 85- or ASME CSD-1-related issues.

In some states ASME CSD-1 applies. This means that jurisdictional inspectors would have the charge to ask for evidence that you are doing annual safety component testing. They don't do the testing and the evidence required varies by the individual inspector and/or the practices in that state.

Even if you believe you have a contractor doing this work, you should review what is really being done to see that you are getting a complete review. We find that less than half of contractors perform the full scope of CSD-1 testing. It should take a half day or longer per boiler to conduct proper CSD-1 testing. There are over 25 items in the appendix of the CSD-1 document that should be considered for testing and/or evaluation.

If there's ever an issue such as an explosion or fire and someone gets injured, it is doubtful that ignorance of the law will help you. In the end you need to know which codes apply to you and what steps to take to make sure you are in compliance.

Also, remember, code compliance is generally not retroactive and most codes change on cycles of every three to five years. This doesn't mean that many of the changes are not great ideas and things you should do anyway.

**National Fuel Gas Code (NFPA 54)**

This code details all requirements for the installation of natural gas fired equipment, piping systems, combustion air, and proper flue or vent installation. Some often overlooked issues include:

**A. Natural gas system shut offs not accessible/ or operable.**

The code says that shut off valves must be within 6' of the floor and must be close to the fuel train. It also says that valves must be serviced regularly. We find 10% of all main fuel shut off valves seized in position and another 60% that leak in the closed position. Most are lubricated plug valves which require the injection of a special sealant annually. Imagine your site with a gas piping problem and no way to get the gas off. Sure surveyors look to see valves or to ask if you know where they are, but can they be closed? Not so if they haven't been sealed regularly.

**B. No gas piping drip legs or strainers.**

The code calls for piping systems to have a means to remove rust, scale and piping debris. This is usually done with piping sections called drip (or dirt) legs. In most cases strainers are also installed in the gas line to filter out debris that can render safety components useless.

**C. Combustion air inadequate/not interlocked.**

Air for combustion must be supplied in sufficient quantities to make for complete combustion without sooting or flames being too fuel rich. The code calls out requirements for louvers and fans that might be supplying this air. It identifies the specific sizes required and the fact that motorized louvers and fans need to be interlocked to burner controls.

**Boiler and Combustion Systems Hazards Code (NFPA 85) – Boilers over 12,500,000 Btu/hr input**

This code identifies installation requirements for boiler fuel trains and safety controls for boiler firing over 12,500,000 Btu's per hour input. Beside installation issues, it covers training required of operators and regular testing required of safety systems.

**Controls and Safety Devices for Automatically Fired Boilers (ASME CSD-1) – Boilers up to 12,500,000 Btu/hr input**

ASME CSD-1 has been adopted as law in 26 states and also a number of other major municipalities throughout North America. It is becoming more and more popular every day. It covers controls and safety devices for automatically fired boilers up to 12,500,000 Btu's per hour. It includes a detailed appendix that has information about testing of safety components, installation requirements for components on fuel trains, and training needed for operators.

Frequently overlooked issues related to boilers and hot water heaters include:

**A. Safety interlock testing not being done correctly or completely.**

The codes call for regular and annual testing of all safety interlock controls. The appendices of both documents have relevant information about testing requirements. This kind of work is best done when you can afford to have the boiler being tested off line. Remember, you need to be working with someone who has access to spare components to make repairs if something is found wrong. If not, remember it would be a grave mistake to operate boilers with known safety defects. If you don't have repair parts, you could be down waiting for repairs.

**B. Fuel train automatic shut off valves not being tightness tested or leak checked.**

Fuel trains have automatic shut off valves that the codes call out to be leak checked at least annually. This requires special knowledge of these valves and how they are wired to make the testing possible.

**C. Safety component settings and purge times not documented.**

Safety components need to be set properly. In many cases we find components on fuel trains and even important purge timers not set properly. These conditions can render the safety controls useless.

Honeywell Combustion Safety is a part of Honeywell Thermal Solutions, an industry leader in commercial and industrial combustion solutions. Honeywell Combustion Safety, formerly known as CEC Combustion Safety, has been in business since 1984. With engineers and staff members that sit on Code committees such as NFPA 56, NFPA 85, NFPA 86, and NFPA 87, our inside expertise is integrated within all of our practices, and our global reach ensures that customers around the world are kept safe. Honeywell offers testing and inspections, engineering & upgrades/ retrofits, gas hazards management, training, and field services for all industrial facilities and different types of fuel fired equipment. By assisting organizations and their personnel with the safe maintenance and operation of their combustion equipment, Honeywell aims to save lives and prevent explosions while increasing efficiency and reliability of combustion equipment.

#### **D. Operators lacking training and awareness of hazards.**

The codes call for regular training of staff that operate and/or maintain boilers. This means familiarizing them with start-up/shutdown procedures, understanding how fuel trains work, knowing preventive maintenance requirements, and most importantly, recognizing hazard warning signs like delayed light offs.

#### **E. Low water cut off and safety relief valve testing not being done regularly.**

We find very few sites doing required low water cut off blowdown testing and cleaning, along with verifying that safety relief valves work. Water related issues like these are a key factor in boiler related accidents. Yet, they are simple issues to address once people are trained.

#### **Reducing Your Risk**

The stepped-up efforts of JCAH facility-related inspections, and better training of surveyors, is only one reason to be concerned. The larger reason is that fuels and boiler systems only give you one chance to be safe. When they have a problem, like a fire and/or an explosion, there could be many people affected. Make sure you understand the fuel and boiler system safety rules that apply to you. You can find out more from: [www.nfpa.org](http://www.nfpa.org) and [www.asme.org](http://www.asme.org).

#### **For more information**

Learn more about Honeywell Combustion Safety, contact [info@combustionsafety.com](mailto:info@combustionsafety.com), visit [www.combustionsafety.com](http://www.combustionsafety.com) or contact your Honeywell Sales Engineer.

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