

# JCAHO Boiler and Fuel SYSTEM REQUIREMENTS

(Which Codes Apply to Me?)

**W**hen it comes to the new JCAHO 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 of the kinds of rules that apply along with legally mandated testing requirements. The following hopes to guide you through some of the issues that are fuel and boiler system related that are contained 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 like 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 that'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. These men and women of mystery come to your place 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. Many times this inspection has nothing to do with the equipment that makes the fire in the boiler and controls pressures and temperatures. We have seen some pretty awful stuff that keeps getting passed 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 the kinds of issues identified in NFPA 85 or ASME CSD-1.

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 think you have a contractor doing this work, you had better review what is really being done to see that you are getting a complete review. We find less than half the contractors out there are really doing a full scope of CSD-1 testing. It should take a half day or longer per boiler to do 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 like 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 you will need to take to make sure you are in full compliance.

Also, remember code compliance is generally not retroactive and most codes change on cycles of every 3 to 5 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 boilers firing over 12,500,000 Btu's per hour input. Besides 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 by law in 26 states and also a number of other major municipalities throughout North America. It is becoming more and more popular everyday. It covers controls and safety devices for automatically fired boilers up to 12,500,000 Btu's per hour. It has a very detailed appendix that has information about testing of safety components, installation requirements for components on fuel trains, and training needed for operators.



## Some often overloaded 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 these. 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, it would be horrible and stupid to try and operate boilers with known safety defects. If you don't have repair parts, you could be down for a while 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 are a great thing if they are set properly. In many cases we find components on fuel trains and even very important purge timers not set properly. These kinds of conditions can render the safety controls useless.

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

The codes call for regular training of staff that operate and/or maintain boilers. This means getting them to know proper 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 the required low water cut off blowdown testing and cleaning along with verifying that safety relief valves work. Water related issues such as these are by far one of the highest reasons for boiler related accidents. Yet, they are simple issues to take care of once people are trained.

### Reducing Your Risk

The stepped up efforts regarding JCAHO facility related inspections, and better trained surveyors, is only one reason to be concerned. The bigger 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 vulnerable people jeopardized. Make sure you understand all of the very important fuel and boiler system safety rules that apply to you. You can find out more from each of the organizations mentioned at their websites, ([www.nfpa.org](http://www.nfpa.org) and [www.asme.org](http://www.asme.org)).



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