



Robert Bean, R.E.T.
Registered Engineering Technologist
Building Construction Engineering

Coast2Coast Comfort Report



Special Report

Jeffrey C. May, B.A., M.A.
<http://www.jmhi.com/>



Comforting Your Mind, Body & *Soles*

Boilers

By Jeffrey C. May, B.A., M.A



J. May Home Inspections, Inc.
for a home inspection that is an education

It's summer and I'm thinking about heat, not the kind outside but the kind you're interested in when you buy a house, central heat. Last week, a seller, risking the sale, threatened to throw me and the buyer out of a house for firing up the boiler; however, as a member of the American Society of Home Inspectors (ASHI), I must operate the heating system, even if it's the middle of the summer and intolerably hot. Years ago, before central heat, the only way to heat a room was to have either a fireplace or stove there. Fire for heating requires fuel and before central heat, fuel- usually either coal or wood- had to be brought to each room to be burned. Eventually, someone had the great idea of doing all the dirty combustion in the basement; then, the only problem was how to get the heat upstairs. There are two basic kinds of heating systems- some heat air and others heat water in the basement- but the basic idea is using air, steam or water to transport the heat upstairs. Anything that heats air is a furnace; anything that heats water is a boiler. This article is about boilers. Please do not refer to combustion equipment that heats water as a "furnace;" a furnace and a boiler are about as similar as a truck and a bus. Both have combustion engines, but one moves people, the other things.

Jeffrey C. May is author of "My House is Killing Me! The Home Guide for Families with Allergies and Asthma" (2001) and co-author of "The Mold Survival Guide: For Your Home and For Your Health" (2004), both from Johns Hopkins University Press, which will also be publishing "My Office is Killing Me!" in 2006.

“Often on a home inspection, buyers are surprised to find there are rooms in houses without heat sources, or radiators that do not heat up, but the most serious danger with all combustion heating systems is spillage of combustion fumes from the boiler into the house.”

In some boilers, the water is actually boiled to steam, in which case hot vapor, called steam, carries the heat to the radiators. In most boilers, the water is heated but it never boils; hot water, not steam, is circulated to the radiators. If the heated water is pumped, the system is called "forced hot water heat;" if it circulates on its own by convection, the system is called "gravity hot water." (Gravity systems are no longer installed because large diameter pipes and huge, old fashioned radiators are required.)

Most new heating systems today use forced hot water boilers, but big radiators are no longer used. Instead, the water is circulated through baseboard convectors. These are long sections of "fin tube" in sheet metal enclosures near the floor that heat the room air as it passes over the tubing. When a hot forced hot water boiler fires up in the winter, the baseboards convectors heat up almost immediately, as soon as the boiler water passes through. Radiators, because they are heavier, take longer to heat up, but also retain their heat longer.

In hot water systems, all the pipes are completely filled with water (unless gas gets trapped inside and then they make gurgling noises); in steam systems, the pipes are filled with air when the heat is off. When the thermostat calls for heat in a steam system, it may take several minutes for the water to boil. Then it may take several more minutes for the "steam" (water vapor) to push all the air out of the radiators. To vent this air, most residential steam radiators have a shiny air vent, about 2" high, at the side opposite the shut-off valve. If an air vent on a steam radiator is clogged, the air inside can't be displaced by steam and the radiator is always cold. Never paint an air vent; you may clog it! As soon as hot steam enters an air vent, the vent is supposed to close. If the air vent is stuck open, steam pours out of the vent continuously and drains water from the boiler. This moisture can also cause a host of other problems in the house. Clogged or leaking air vents should be replaced; they cost less than \$10 in any hardware store and can be installed in minutes. Home inspectors who are members of the American Society of Home Inspectors (ASHI) and follow the ASHI Standards of Practice must check that there is heat to every "habitable room." Often on a home inspection, buyers are surprised to find there are rooms in houses without heat sources, or radiators that do not heat up, but the most serious danger with all combustion heating systems is spillage of combustion fumes from the boiler into the house. Although checking for spillage of combustion products is not part of the ASHI Standards, most better home inspectors check combustion equipment for spillage. Spillage of combustion

products from oil burning equipment is associated with fuel odors and black stains at walls and ceilings, or around the boiler. Spillage of combustion products from gas burning equipment is often not noticeable and may be associated with the release of carbon monoxide gas, the "silent killer."

Products from burning fuel consist, among others, of a mixture of gases such as water vapor, carbon dioxide and unburned or partially burned fuel, in addition to carbon monoxide. Combustion gases from oil burners always contain soot; soot is less common in the combustion products from gas burners and, if present, is usually a sign of a problem. No combustion products should be released from any heating equipment. These gases are all supposed to enter a vent pipe which is connected to a chimney or metal flue pipe that exhausts to the exterior, usually above the roof. It is not uncommon to find boiler interiors clogged with rust and minerals, or to find rusted or loose vent piping, or even blocked chimney flues. Often, these conditions are uncovered on home inspections just after the boiler has supposedly been "cleaned" by a heating company technician. Although chimney flues and vent pipes and boiler interiors are often inaccessible, whenever possible, these should be checked during your home inspection. A professional home inspector will carry mirrors and a combustible gas detector for inspecting combustion equipment; if there is ever a question about the safety of combustion equipment, the home inspector should recommend further investigation by a qualified heating technician prior to the purchase and sale.

Most home buyers are intimidated by the heating system, and replacing a boiler or furnace always seems like an unthinkable task. Most often, cost is the biggest factor in the buyer's fear. Heating systems wear out like cars; I have never understood why people who replace a car every year or two for \$10,000 or \$20,000 dollars can't imagine spending \$3,000 to \$4,000 to replace a dying boiler. Just because you can't show off your new, red boiler is no reason to let an energy hog linger in the basement of your home. If it's time, be safe and replace.

From "JUST PROPERTY"

Jeffrey May (M.A. organic chemistry, Harvard University) is founder and principal of J. May Home Inspections, Inc. located in Cambridge, MA.

.....
1522 Cambridge Street • Cambridge, MA • 02139-0039
Phone • 617.354.0152, jeff@jmhi.com, © 2004 Jeffrey C. May



The Home Owners Guide to Indoor Comfort Quality answers your questions on how to create the perfect indoor environmental conditions for your families health, wellness and comfort.

www.healthyheating.com

Words of Wisdom

"I have never understood why people who replace a car every year or two for \$10,000 or \$20,000 dollars can't imagine spending \$3,000 to \$4,000 to replace a dying boiler. Just because you can't show off your new, red boiler is no reason to let an energy hog linger in the basement of your home. If it's time, be safe and replace." Jeffrey May