Q&A FOR THE NOVEMBER 2017 PUBLIC WEBINAR

SFC 11-30-17

Q: I thought that the purpose of the vent between the safety shutoff valves was to prove that fuel was not leaking into the furnace? Does the "ventless" fuel train meet NFPA 85?

A: You are absolutely right with your understanding of why a vent is placed between the two gas valves. In the case of the unitized gas trains with proof of closure switches on the valves and when combined with a Burner Management System (Programmer) which is equipped with a valve proving sequence and is electrically linked to these switches, and a gas pressure switch, there is no need for the vent. Yes, this system is in conformance with NFPA 85.

Q: Regarding boiler stack dampers, my boss used to say that with natural draft, "when a boiler is not being a boiler, it is being a chiller."

A: Well, your boss was right on that. When the boiler is not firing, and the stack is drawing negative pressure therefore naturally drawing ambient air in, its cooling the boiler down. A draft damper will negate this problem.

Q: Does the CB system integrate with DDC building controls as well as PLC (usually industrial) controls?

A: It does; however, depending on the “language” it is connecting to, a translator may be required to achieve compatibility.

Q: What happens if you have some pure oxygen that originates from a oxygen/nitrogen separation for the various fuels?

A: Natural gas has a small percentage of nitrogen in it, and of course, the combustion air contains about 78 percent nitrogen which by the way, is there for a “free ride,” doing nothing for the combustion process. As far as the free oxygen liberating is concerned, this is why burner design and furnace matching are so important. The fuel (gas or liquid) and air are violently mixed together for complete volatilization to occur and the furnace provides the Time for the chemical reaction to complete.

Q: Are there any studies to indicate the fuel savings by using the auto stack damper versus the cost?

A: At the present time we do not have any valid documentation to satisfy your specific question. The savings are there; however, the variables are so extreme it would be hard to specifically make claims. These variables include boiler size, boiler type, operating pressure/temperature, burner modulating conditions, vent outlet pressures, and ambient air conditions.

Q: A good many of the biofuels are highly corrosive, depending on the fuel feedstock. What have you seen in affecting burner condition & flame propagation and efficiency over time?

A: Our experience over the years has been very good with regard to handling the corrosiveness of the various biofuels and the ability to cleanly burn them without excessive damage to the pressure vessel (heat exchanger). I hasten to add though, these fuels need to be analyzed by the manufacturer in order to assure our valued customer they can be burned efficiently, reliably and SAFELY!

Q: Do you have a rule of thumb for the smallest boiler where O2 trim is feasible financially?

A: Probably 100 boiler horsepower and above gives you a good opportunity to receive a legitimate payback based on NPV (Net Present Value) and/or IRR (Internal Rate of Return).

Q: Is more or less excess air required typically for biofuel combustion? Is there a % increase/decrease to start with and start tuning from there?

A: It all depends on the fuel analysis giving us the chemical breakdown, its volatility and flash point. Normally, with standard fuels such as natural gas and #2 oil, we strive to hold 3% oxygen as much as we possibly can throughout the turndown with the excess air increasing as the burner fires in the lower ranges. The biofuel may require a higher excess air to properly volatize it while providing the safety we need. Remember too, for every 2% increase over the established benchmark, say it's 5% O2, we lose 1% in efficiency.

Q: What do you see as the typical paybacks?

A: This question cannot be answered without more specifics. The paybacks vary depending on the situation. We've seen paybacks as little as 3 months and as long as 5 years or more.

Q: For landfill/digester gas use, is siloxane a concern for the burner/boiler system?

A: This is an excellent question. Siloxanes are ubiquitous, and used in various applications with the predominance being in Cosmetic, and Food Industries. Problem is, when they end up in the landfill their constituents (silicon, oxygen and akane compound) volatize into the biogas. Then when the gas is combusted, silicon dioxide or sand is formed and deposited on the heating surfaces of the boiler reducing the heat exchange. The answer is again analysis of the fuel to determine the presence of siloxanes. Depending on the percentage, this may result in a lost opportunity to burn the gas.

Q: Have you ever burned hydrogen?

A: Yes, CB has had some experience burning this fuel, but it is extremely volatile with a low flash point and requires special engineering of the fuel delivering system and safety integration to assure it can be burned without incident.

Q: I have dual fuel firing now with natural gas, #2 oil and propane backup, why would I even consider more?

A: You're probably just fine unless it's time to consider some upgrades to improve overall combustion/boiler efficiency, impacting the fuel spend and, possibly improved reliability with a control upgrade.

Q: You mentioned matching the burner with the furnace. Why is that important?

A: For complete combustion you need time, temperature and turbulence. The burner design provides the temperature and turbulence, the furnace provides the time to complete the chemical reaction.

Q: What temperature do you heat #6 oil to get it to flow?

A: Normally about 180 deg. F equating to approximately 200 SSU (Universal Saybolt Seconds).

Q: Why would I burn natural gas over propane? Propane is more efficient and carries more BTU's per cubic foot!

A: Excellent point, it is more efficient and carries more heat per cubic foot. Assuredly, this will narrow the price difference between the two fuels (natural gas being cheaper/cubic ft.). However, propane requires onsite storage and a vaporizer if it is to be burned straight (maintenance considerations) and, the need to assure adequate and timely supply to avoid boiler downtime.

Q: We are thinking of upgrading to a PLC based platform for our boilers. Is it best to upgrade with one having the most memory capacity and add the options as we go?

A: It's all a matter of budget dollars and what you really need to accomplish. For instance, if the drivers are primarily reliability and safety there are limited packages available for a smaller investment to get what you need. In other words, if your intent is tightly focused, find the best value for the best price. However, if the drivers are many (Efficiency, Sustainability, Reliability & Safety) then a PLC platform with expanded memory is probably the best answer, adding options as the budget allows.

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