

## Slide wire type modulation control on boiler?

I wish I had a dollar for every time I saw a boiler short cycle. Well, even a quarter would be great!

This is a common problem on watertube boilers that have a small water volume compared to firetube boilers. The small mass of water just doesn't store so much energy so a given amount of energy added means that the temperature or pressure increases rapidly.

Have you seen this? A boiler comes gets a call for heat. The burner goes to prepurge. The relatively cold air blowing through the boiler lowers the temperature (or pressure) quite significantly. The burner goes to ignition position, blowing cold air all the while. Ignition takes place and then after a few more seconds the burner control "releases" it to modulate. By the time that happens the temperature (or pressure) is quite a bit below the set point SO the burner modulates to high fire. The temperature rises and the burner starts to back off in its firing rate but. . .

Too late. The burner shuts off.

Oh well, there's always another cycle to try.

But the short cycling never ends.

Until the slide wire control is removed and a PID type unit is utilized.

The slide wire is what comes with virtually EVERY OEM burner. It is inexpensive and it meets the specification of the specifying engineer. The slide wire control is proportional only meaning that the signal supplied to the modulating motor is proportional to how far the measured value is compared to the set point. The slide wire control works great for valves and dampers but not for burners because a burner has a very narrow rangeability and takes a long time to react to a start signal.

If the slide wire was replaced by a PID type unit in the above boiler you would see that as soon as the burner began to modulate the control would recognize that the temperature is rising fairly rapidly. The control would not tell the motor to advance to higher firing rates. The PID control anticipates what the temperature will be if things don't change and then decides what to do. The PID control anticipates the affect of a change in firing range and makes decisions along those lines. It is a smart control. . . .

## POTENTIALLY

Unfortunately a PID control has to be properly tuned to work well. Improperly tuned and they can be much worse than the slide wire unit. Motor speed, filtering rate, proportional, integral, derivative values along with various alarms have to be set and configured.

We did a project in the early 80's where the slide wire control could not control the boiler outlet temperature within the TIGHT band that our client demanded. In spite of the burner manufacture's insistence that a PID control should not be used (because they never had used one), we installed them on each of the seven boilers. With no guidance for what values would be affective, we spent the necessary time to learn what changing each value did to the burner operation. We know how to set these controls so that they work WELL.

Unfortunately we still see that a lot of these controls are poorly tuned and offer little if any benefit to the owner.

We don't let that happen if we are aware of it.