



## Precision Combustion Control

### *New control system for ICM Thermal Oxidizers reduces natural gas usage*

The existing combustion controls on Thermal Oxidizers in your ICM Energy Center do not incorporate combustion air flow measurement in the design, making precise fuel/air ratio control difficult.

ICM's new Precision Combustion Control System adds air flow measurement and new safety features to more precisely control combustion as well as save energy.

### **Solutions for all sizes of plants**

It is fairly simple to measure air flow in 44 MGY or 55 MGY plants, but much more difficult in 110 MGY plants due to the air duct design coming from the cooling drum. We have an air flow measurement solution for each plant size now which has allowed a new control design.

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### **Precision gas control**

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With combustion air flow measurement, we can now control the fuel/air ratio precisely, which will reduce gas usage. Having the air flow measurement enables using a lead/lag control system where combustion air flow will lead gas flow (increase first) when there is a demand increase and the air flow will lag gas flow (decrease last) when there is a demand decrease. This provides excess air during times of transition for added safety. This is the "gold standard" for combustion control and is the ISA (International Society for Automation) recommended design.

The new system also changes from controlling the combustion rate using temperature to controlling it using steam pressure. When a steam demand change occurs, it will be measured first by a change in steam header pressure, so using pressure is a more responsive method of boiler/HRSG control. However, the HRSG furnace is also a T.O., so there is a temperature control override for those instances where plant run rate may be significantly reduced by some temporary problem and the furnace temperature could fall below the prescribed limit for VOC destruction.

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### **How it works**

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The temperature controller will take over for the pressure controller to maintain the minimum temperature. When the production problem is fixed and the run rate goes back up, the system will switch back to pressure control. These changes from pressure to temperature and back to pressure are bumpless and automatic, requiring no operator intervention. It is possible that if the system is on temperature control for an extended period due to low steam demand, there could be excess steam generation. To handle this possibility, there is a pressure control loop to vent steam when necessary to prevent over-pressurizing the system. There is a silencer on the steam vent to control noise. Venting is expected to be rarely needed.

To further increase optimization, there is an oxygen sensor in the exhaust gases downstream of the economizer coils to automatically trim excess oxygen to the minimum safe level. Again, this is automatic with no operator intervention required. By automatically controlling excess oxygen, the system will reduce fuel usage since unnecessary air will not be heated and sent up the stack.



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### Safety first

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A new safety feature is an opacity meter, which will measure smoke. If a failure occurs in the system and there is not enough air to burn all the fuel, it will produce smoke. The opacity meter can measure smoke at levels hardly visible to the human eye so it can quickly detect this problem and trip the gas valves shut to prevent a possible explosion. This meter will also be installed downstream of the economizer coils.

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### Payback in less than a year

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We have analyzed data from 10 ICM-designed plants of all sizes which confirm the need for better efficiency. The degree of inefficiency varies significantly from plant to plant. However, in all cases, installing the new control system would have a payback from 6 to 12 months. We would be happy to look at your plant data to determine the payback period for your plant.

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### Contact us for pricing and more information

Learn more about this and other services ICM offers to make your plant safer and more efficient. Call our customer service team today.

**877.456.8588**

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