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Smart Solutions for Clean Air

Fine Tune Your Wood RTO/RCO

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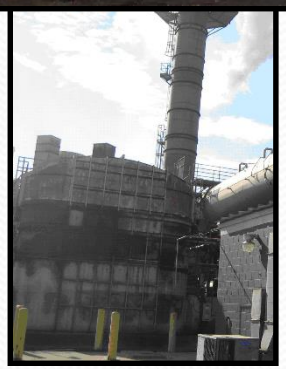
The Wood Industry has Utilized RTOs for over 20 Years

with a multitude of different designs:

- Odd Chambers
- Even Chamber
- Rotary Valves
- Poppet Valves
- **MCC RTO**



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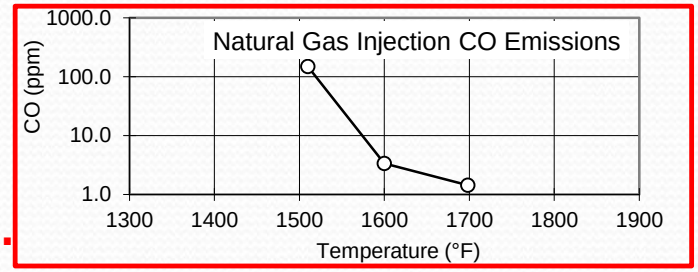
Many Wood RTO Designs have potential areas for improvement

1. **Excessive Energy Consumption due to**
   - poor air flow distribution
   - unbalanced mass flow & temperature
   - NGI verses **EES**
2. **Excessive CO emission with NGI .....**
   - Convert to a NGE and eliminate the increased purification temperature need to Reduce CO
3. **Failed heat exchange media ....**
4. **Particulate and condensable build up...**
   - Bake out
     - Potential fires
5. **Failed media support grids .....**
6. Others items.....



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Utilize MCC RTO Features For Energy Conservation with existing RTOs

AUTO THERMAL ALIGNMENT

- Adjusts the valve timing based on actual operating conditions to reduce energy consumption and will compensate for:
  - poor air flow and temperature distribution
  - unbalanced mass flow
- Reduces temperature swings and associated media support stress failures
- Provide 10 to 20 degree reduction in exhaust temperature with **Auto Thermal Alignment:**

  (10 ^{o}F)(1.08)(100,000scfm)($4/mmBTU)(7500 hr/yr)/(1,000,000) =

  $32,000 /yr to $64,000 / yr savings

Note:

- Not available for rotary valve RTOs
- PLC system must include a system timer
- If it is a **Wonderware system**, the company will need to provide a technical assistant in order to complete the programs changes under the license.

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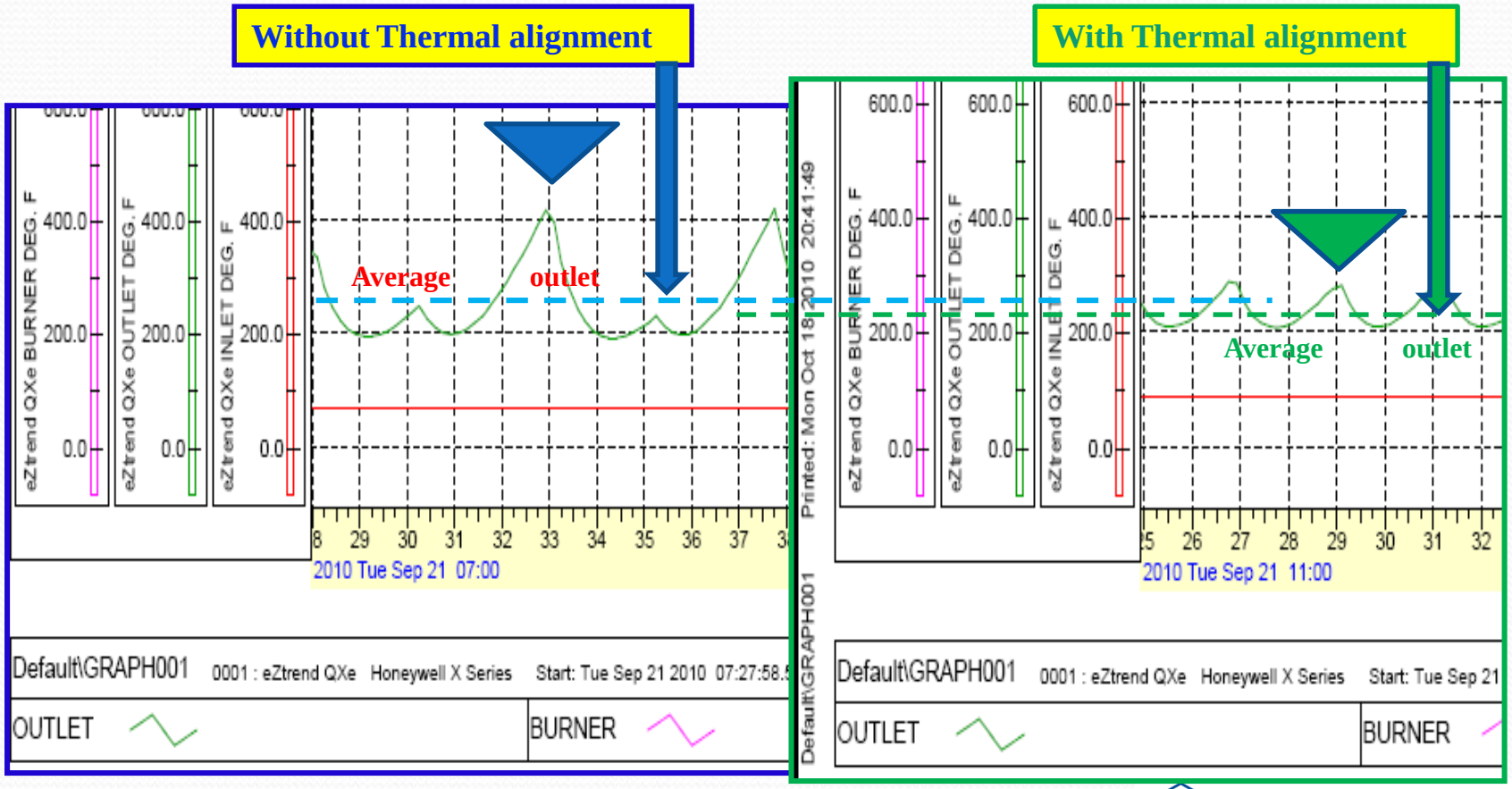
Actual AUTO THERMAL ALIGNMENT

95 -96% TER RTO with thermal alignment ~ 10 -20 ºF lower average outlet temperature



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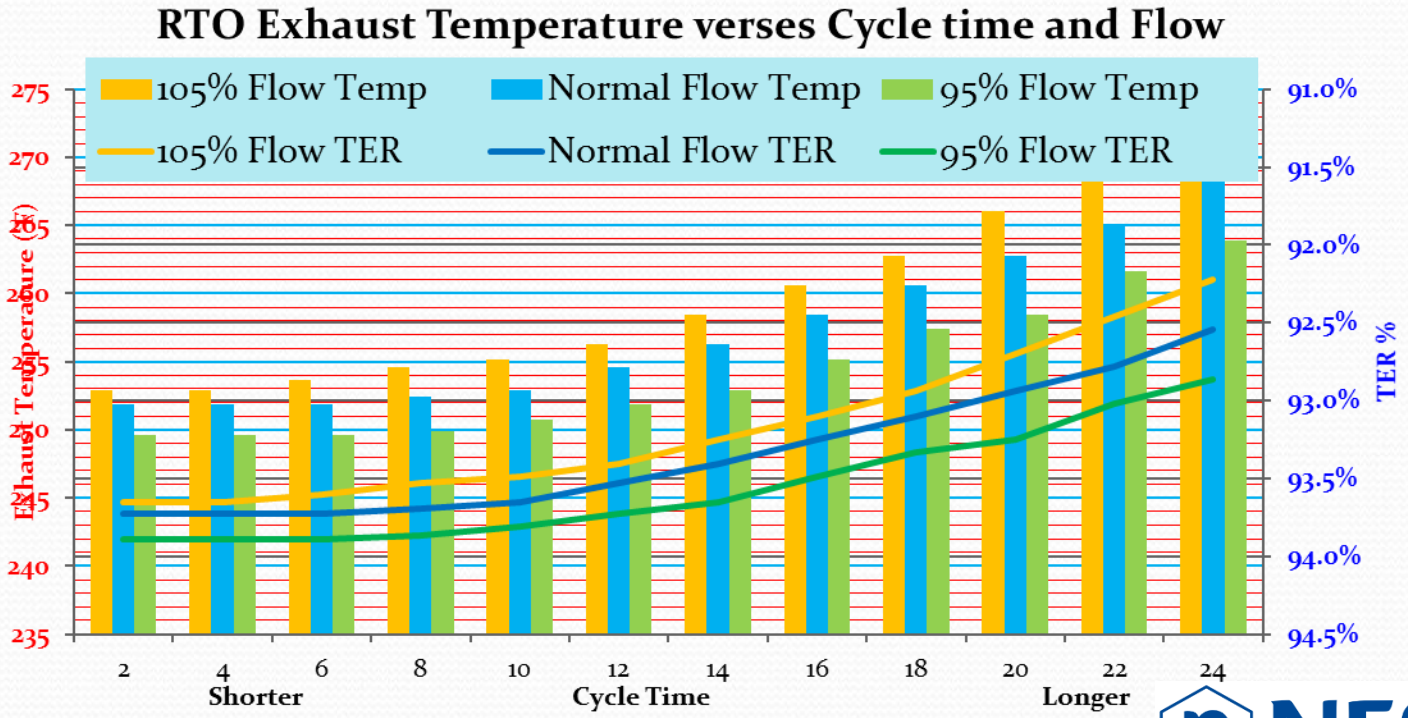
Valve Cycle Timing

- Changes in process flow will affect thermal efficiency and can be compensated with valve cycle timing adjustments.
- Minimum cycle time needs to be established to insure minimum destruction removal efficiency (DRE) is maintained.



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Improve NGI Operation with a Energy Enhancement System (EES)

- **15 to 25% Fuel Savings on Wood applications**

- Reduced CO emissions ...(more uniform NG/Air mixture)
- Reduces burner flame contact and high temperature NOx generation
- Eliminates or minimizes imbalance in RTO mass flow, providing steadier flow control
- More uniform heat distribution through the media beds (reduced CO)
- Intrinsic Safety Control System
  - Meets FM (6-11) Burner Management Controls, ...< 25% LEL mixture
  - Optional secondary LEL control
- RTO Interlock

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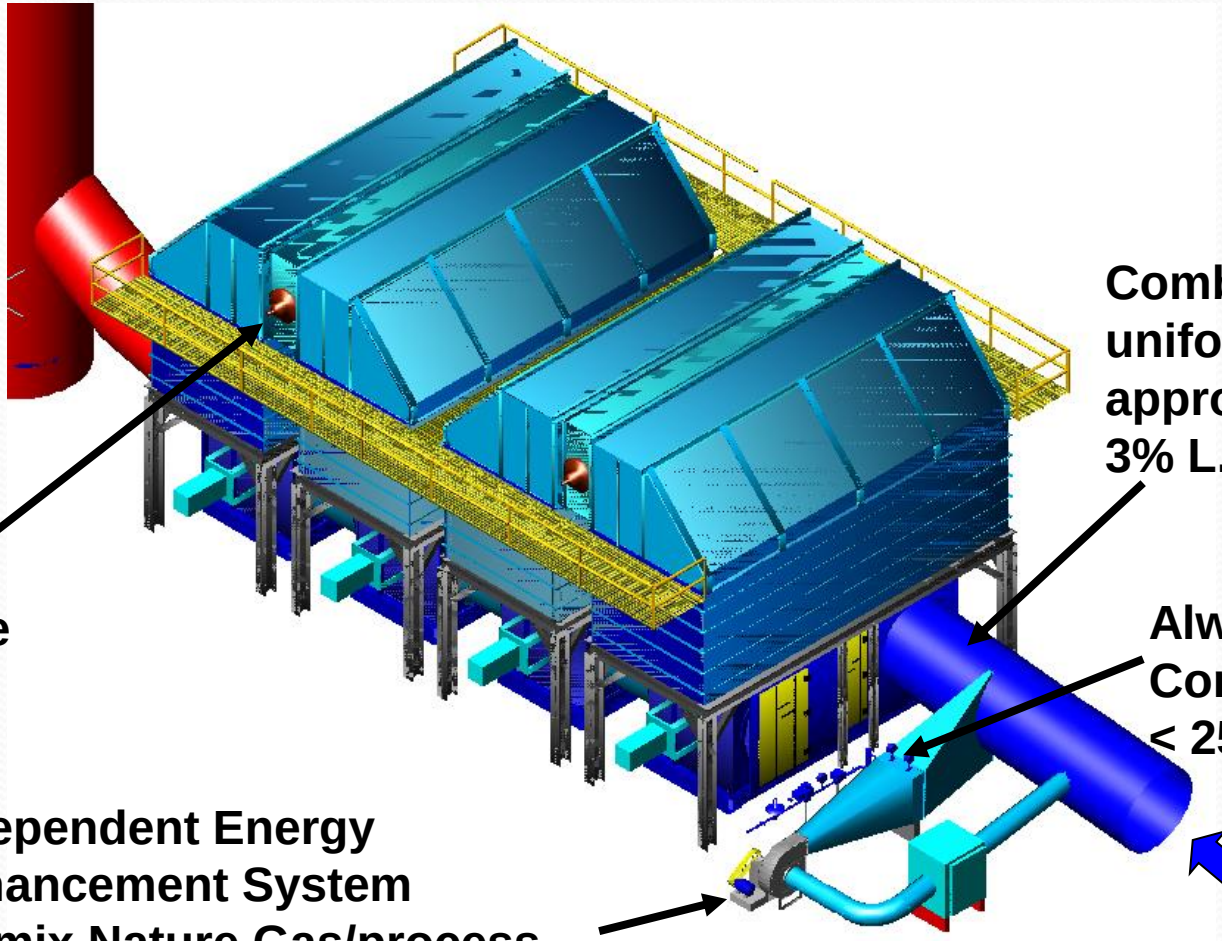
Natural Gas Enhancement (NGE)



Burners
on low fire
or pilot

Combined inlet
uniform mixture
approximately
3% L.E.L.

Always
Controlled to
< 25% L.E.L.

Independent Energy
Enhancement System
Premix Nature Gas/process

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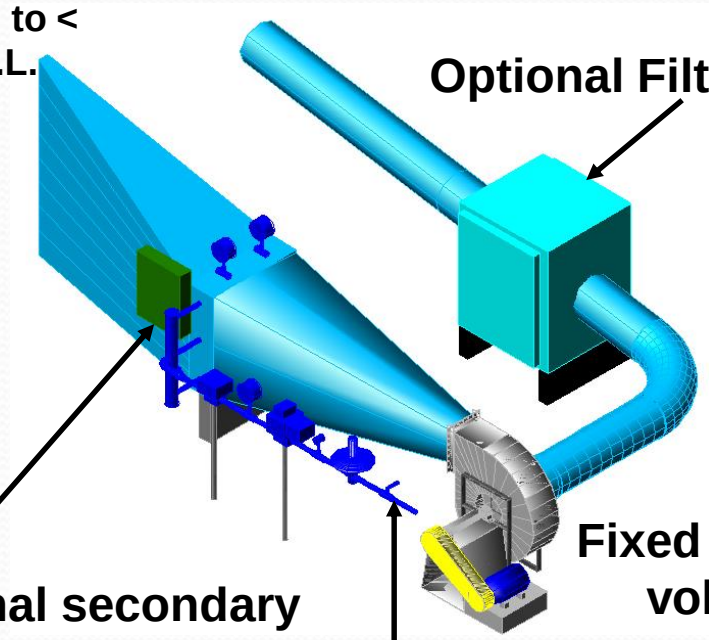
Energy Enhancement System (EES)

Mixture always controlled to < 25% L.E.L.



Optional Filter

Optional secondary back up LEL Control

Fixed air flow volume

Re-use Existing NGI Nature Gas train

Typical EES

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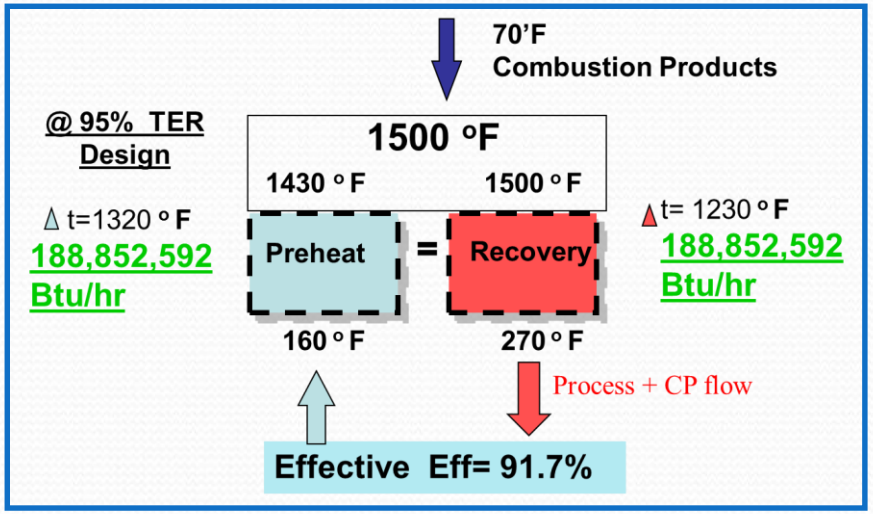
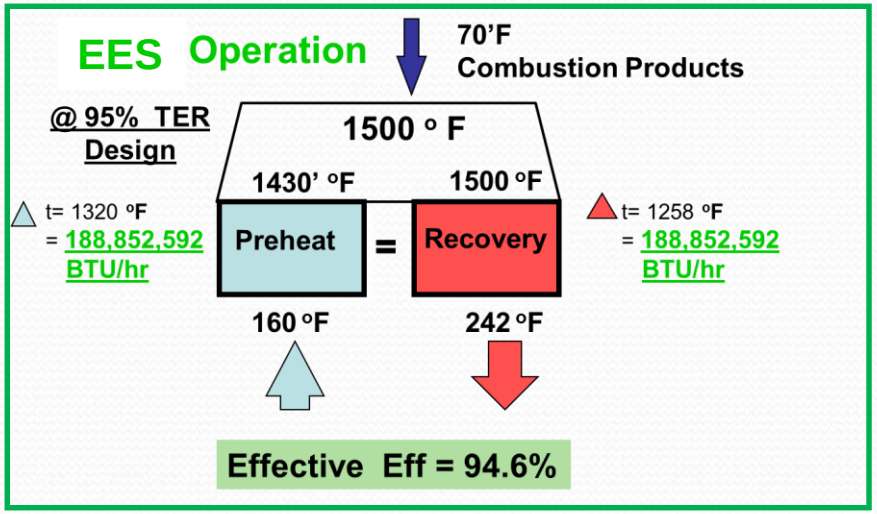
Energy Enhancement System (EES)

Based on $4/mmBTU and 7,500 hrs/yr 100,000 wSCFM Process

Operating SAVINGS $112,000/yr





Operating Fuel Cost =$420,000/yr.

Operating Fuel Cost =$308,000/yr.

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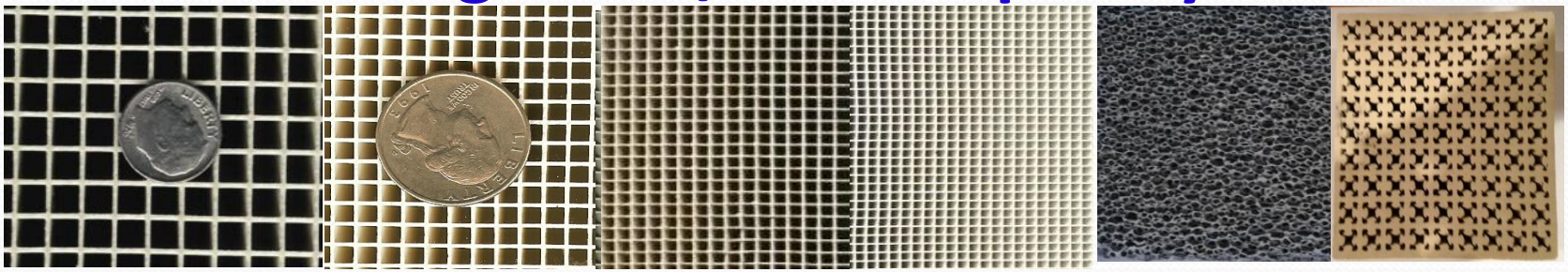
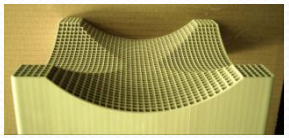
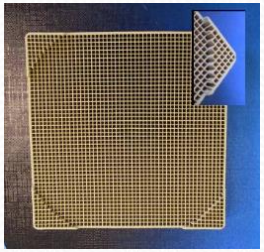
Specific media design for each application
Single and/or multiple layers



Structured media -cells per inch (CPI) 25, 32, 40 ,43 density, foam & special

- high surface area –
- low pressure drop





Special media

- Increased air distribution
- Particulate management
- Increased heat exchange

Random media various shapes and sizes

- lower surface area
- higher pressure drop-
- higher mass

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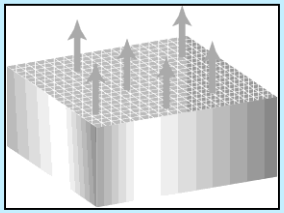
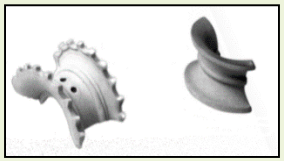
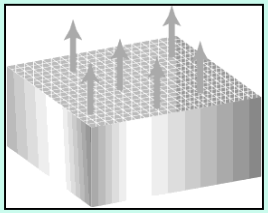
Increased Capacity and/or Energy Savings with a media change

100,000 dSCFM Flow	 Structured	 Random	 Structured
Thermal Eff (%) balanced mass flow	95.4%	95.1%	96.3%
Bed sized (~sq ft)	250	250	250
Depth (ft)	4	8.5	5
Volume (cu ft)	2200	4675	2800
Total mass - Weight (lbs)	116,900 ~ (40% lighter) Reduce cold face failures	187,000	148,800 (~ 20% lighter)
Total Surface area (sq ft)	876,600 (250% greater)	350,600	1,115,600
Media Required HP	112 (56% less HP)	256	142 (45% less)

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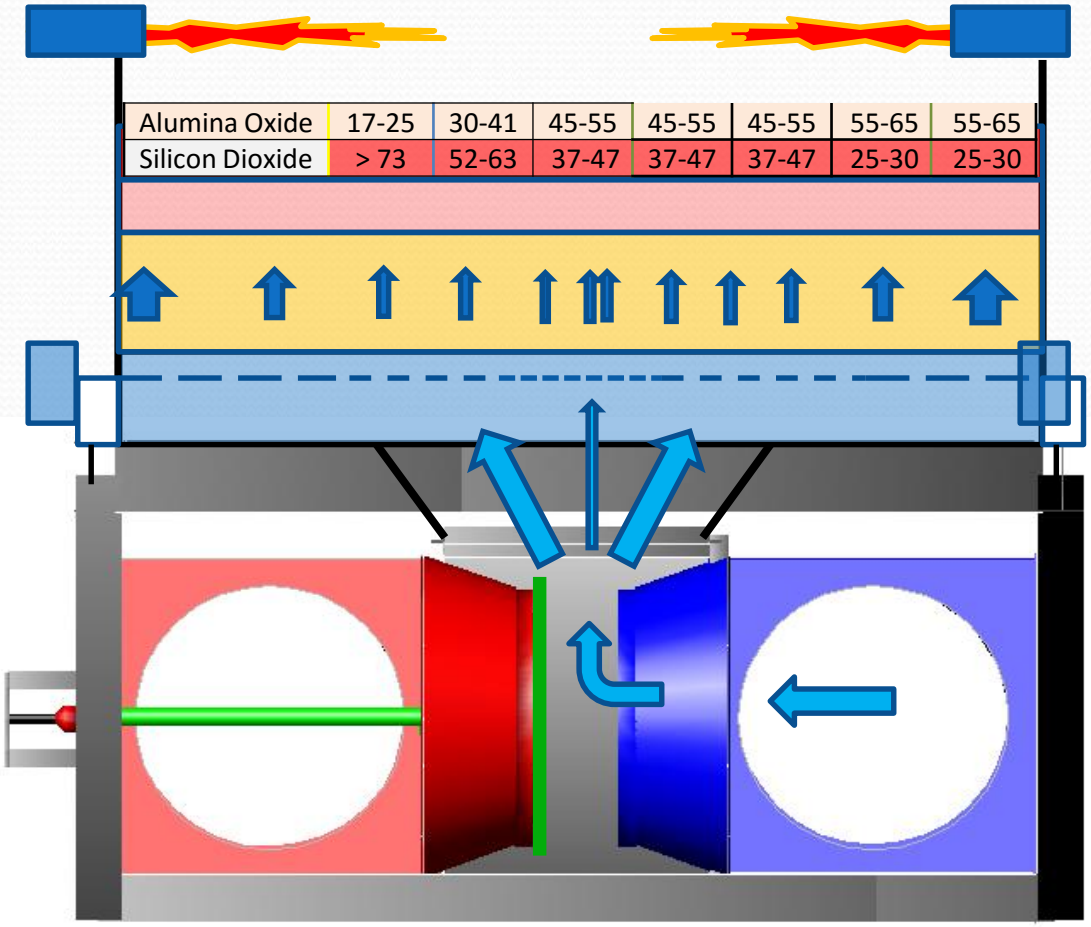
Improve Air Flow Distribution with a cold face nozzle Distributor

NESTEC DESIGN

- Symmetrical Center media bed entry & exit
- Contour valve entry
- Over sized valves
- Central Expanded valve to media transition
- Media entry nozzle distributor
- Multi-layer media
  - High alumina (for fly ash)
- Multi-burner control
  - Larger units



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Additional MCC RTO installed and proven features

To help reduce the operating costs on both new and **existing RTO** units.

- **Hotter inlet valve surfaces** to minimize/eliminate condensable build up on the valve
- **Forced draft fan** verses induced draft
- **96% thermal energy recovery** (TER) design, **a 20% reduction in fuel** over a 95% (TER)
- Combustion air on ratio control
- 99+% destruction removal efficiency (DRE)
- RCO Catalyst - (Non or minimal Fly Ash Applications)

- **Annual tuning/inspections to optimize RTO performance and efficiency**
  - **Identify potential fine tuning and/ improvement**

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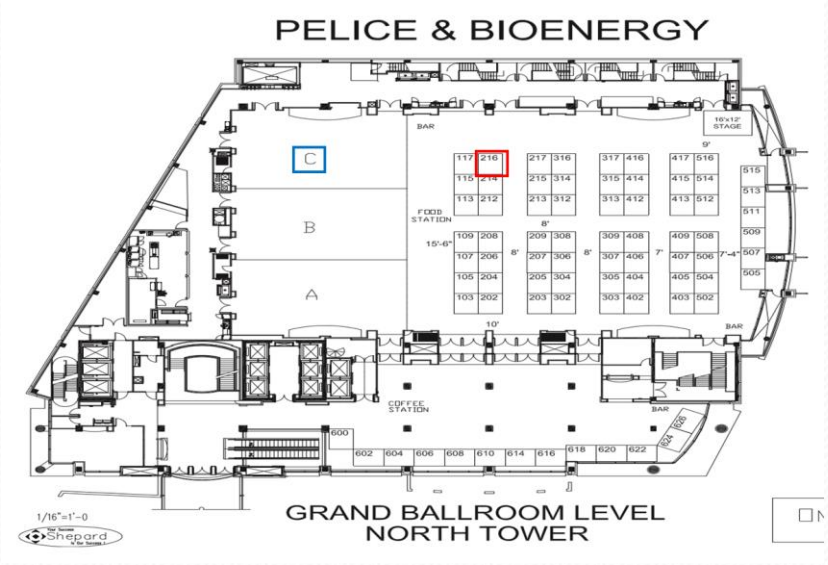
Booth # 216



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