

McIlvaine “Hot Topic Hour”

July 17, 2014

Gas Turbine Emission Control

Presenter:

Dr. Greg Holscher

IBIDEN CERAM Environmental, Inc.

greg.holscher@ceram-usa.com

(913)239-9896

CERAM

IBIDEN

Products of Our Company

- **Catalytic Honeycombs**

- SCR (NO_x emission control)
 - Stationary Sources
 - Mobile Sources
- Oxidation (HC, VOC)
- Dioxin / Furan
- Mercury

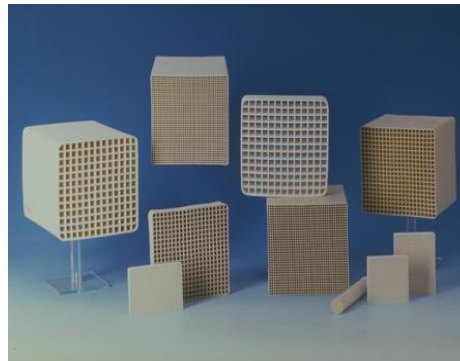


- **Catalytic Plate**

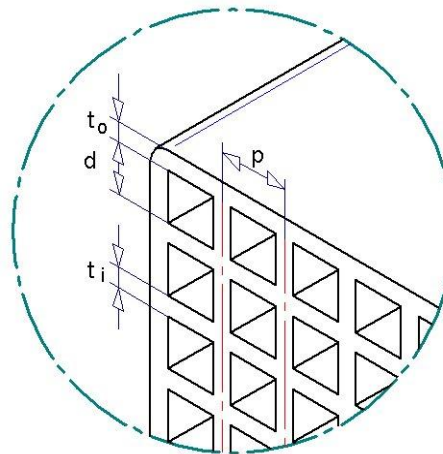
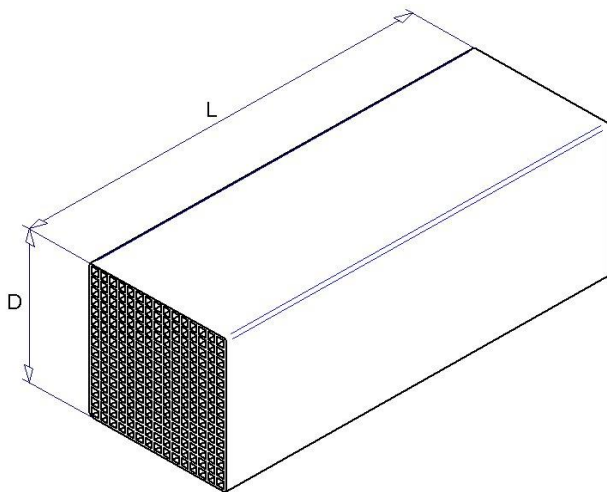
- SCR (NO_x and Hg)

- **Non-Catalytic Honeycombs**

- Heat Storage Media (RTOs)
- Casting Filters

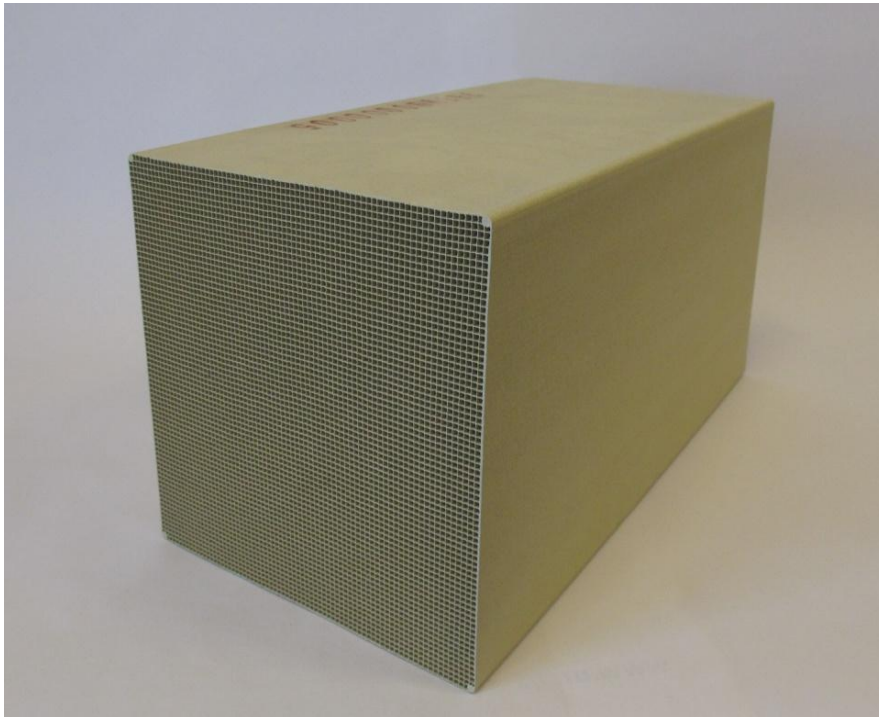


Selection of Catalyst Geometry



Type	Cells n x n	Pitch mm	Normalized Specific Surface Area	Free Cross Section %
35 / 4.2	35 x 35	4.2	1.00	74.1
40 / 3.7	40 x 40	3.7	1.14	73.4
50 / 3.0	50 x 50	3.0	1.43	73.3
60 / 2.5	60 x 60	2.5	1.75	78.0
75 / 2.0	75 x 75	2.0	2.20	79.0

Catalyst for Gas Turbines



75 x 75 Cells Gas Catalyst

- Free cross sectional area: 79 %
- Low pressure drop
- Low catalyst volume
- Flexible catalyst module arrangement
- Total flexible module design for optimal assembly of HRSG cross section

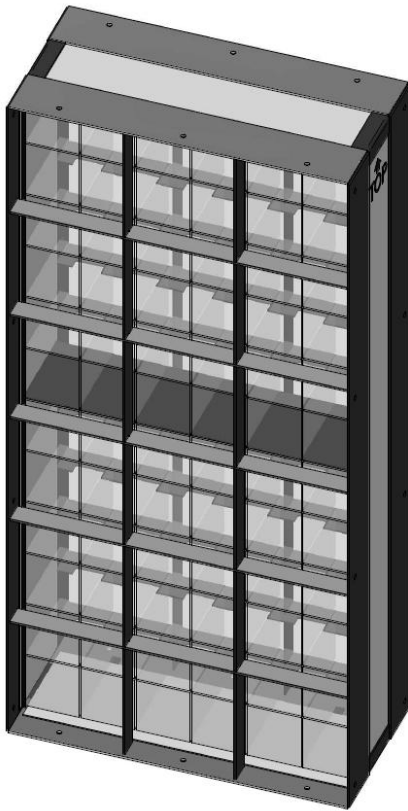
Temperature Range for Different Types of CERAM Catalyst

	Min Temp (F)	Max Temp Continuous (F)	Max Temp Short Term (F)
Example 1	400	≤ 830	≤ 850
Example 2	530	≤ 900	≤ 930
Example 3	720	For gas: ≤ 1000 For oil: ≤ 900	For gas: ≤ 1020 For oil : ≤ 920

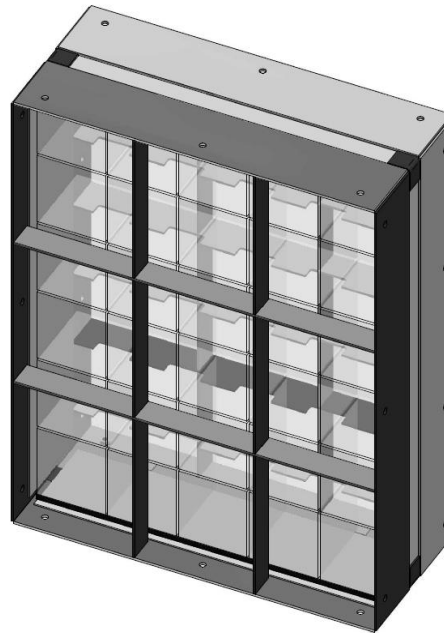
- Site Specific Catalyst Designs (No Standard Formulations)

Configure to Different Module Geometries to Fit New or Existing Reactors

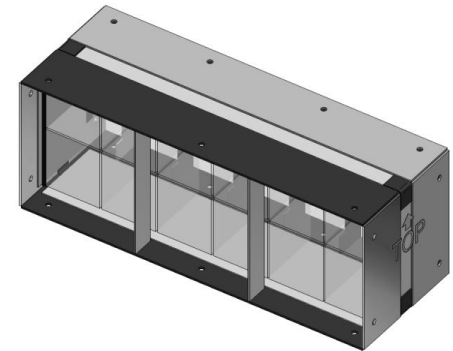
12 x 6 Module Type



6 x 5 Module Type



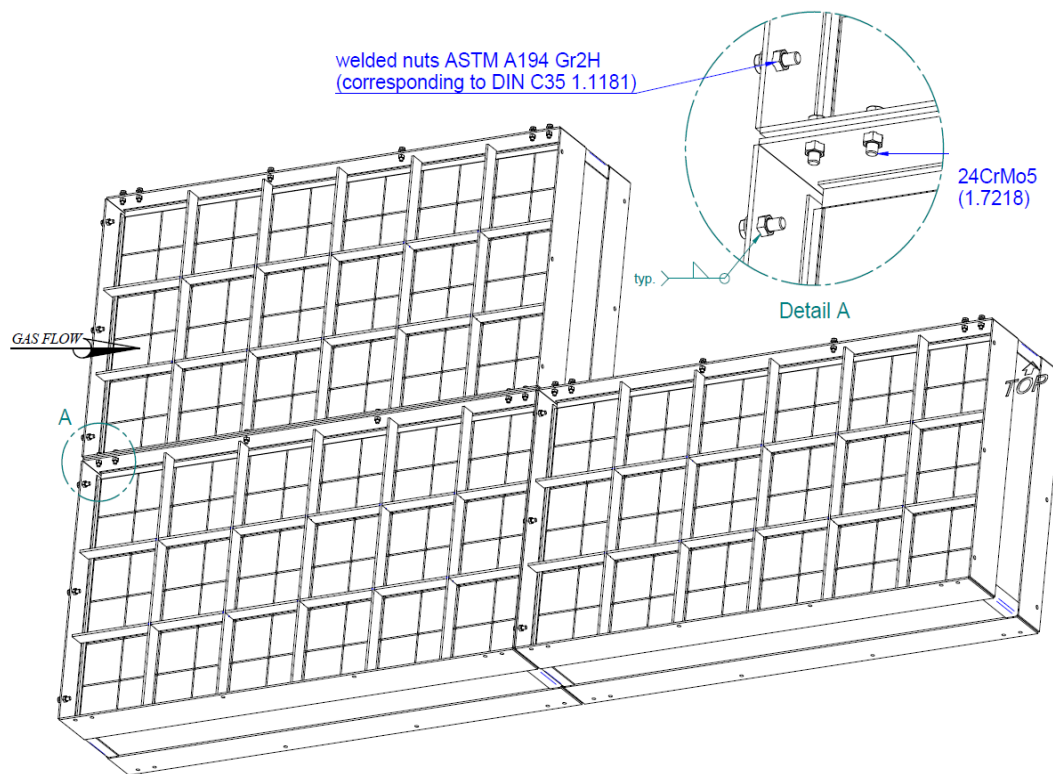
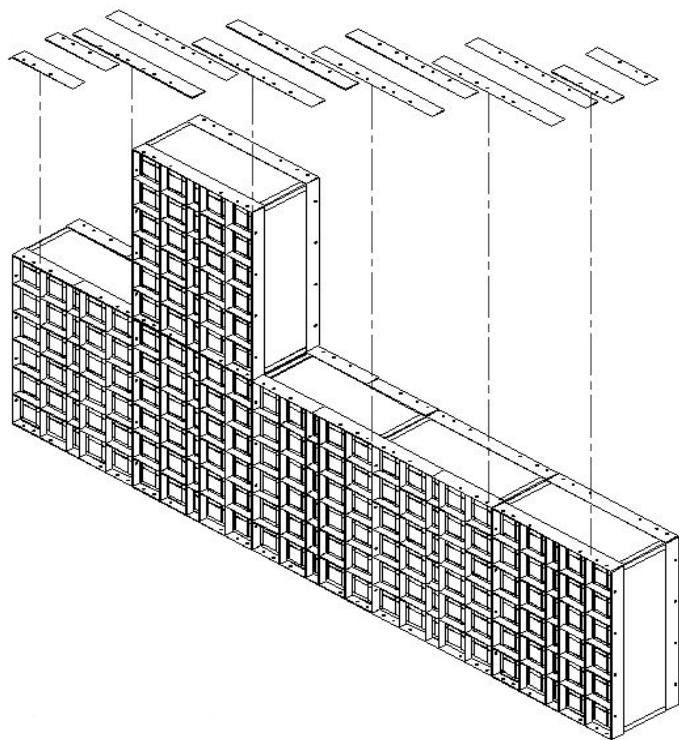
6 x 2 Module Type



Bolted Catalyst Module Assembly

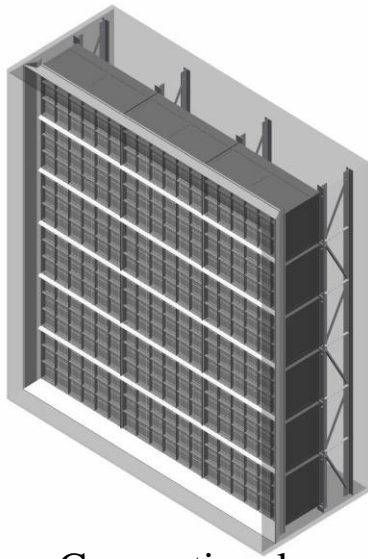
Bolted Connections

Connecting Plates



Pressure Drop Optimized Catalyst Arrangement

POCA V-Type



Conventional Arrangement

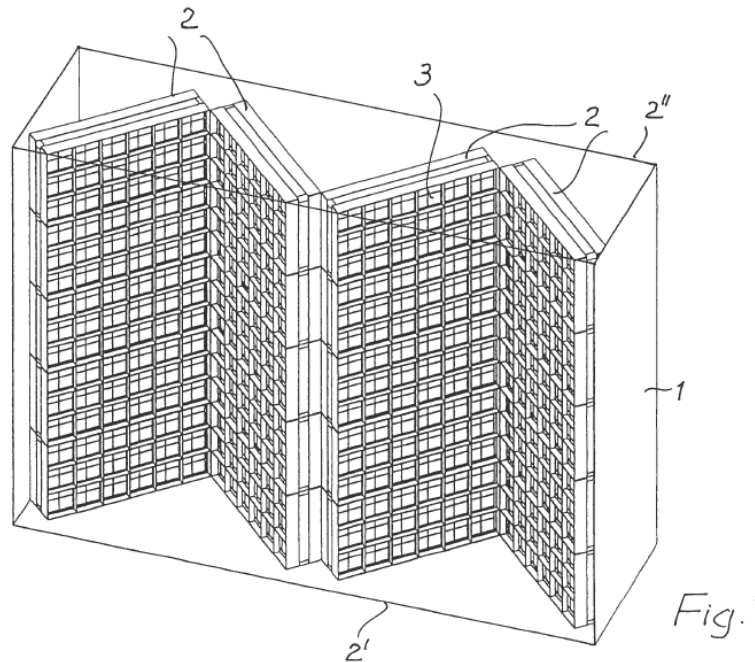
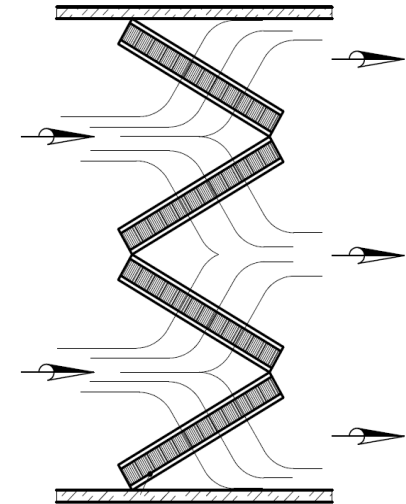


Fig.1



- CFD Indicates ΔP Decreases $\approx 35 - 55\%$ Compared to Conventional Arrangement

- Dependent on...

- ◆ Module angle installation
- ◆ Reactor depth
- ◆ Flow correction needs

Reduced ΔP Will Increase Power Output