REINHOLD ENVIRONMENTAL ®

2024 Reinhold/PCUG Round Table Presentation

Hosted by LG&E/KU and Co-hosted by Southern Co. and TVA

in The Marriott Resort Lexington Griffin Gate Hotel, Lexington, KY on June 24-25, 2024

2024 REINHOLD Round Table

June 24-25, 2024, The Marriott Resort Lexington Griffin Gate Hotel

Tuesday, June 25th
Meeting Time: 9:15 AM – 10:15 AM
Workshop 21 (Terrace Ballroom)
SCR O&M 101

by Jake Shelton with ACS/Cormetech

ACS Acoustic Cleaning Systems

CORMETECH.

SCR O&M 101

This session will address the causes of ash piling/plugged catalyst and the actions to overcome these issues. A holistic solution.

Operational Issues

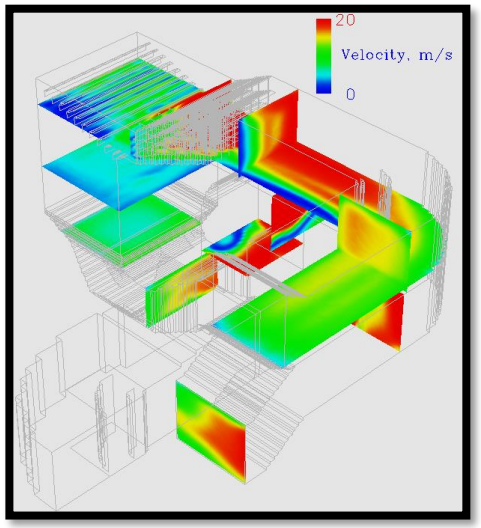
- Loss of DeNOx Potential
- Decreased Catalyst Life (Plugged, Poisoned & Erosion)
- Reduction in Mercury Oxidation
- Increased Manual Cleaning
- Higher Ammonia Usage & Slip
- Increased Pressure Drop
- Increased ID Fan Power Consumption

You can avoid reality, but you can not avoid the consequences of avoiding reality.

Ash Piling/Plugged Catalyst – 5 Main Reasons

In this session, we will address the 3 Reasons highlighted in yellow.

Poor Gas Flow & Ash Distribution

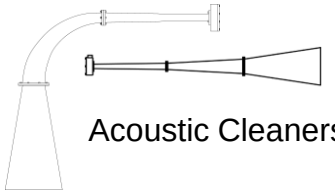


Improper Catalyst

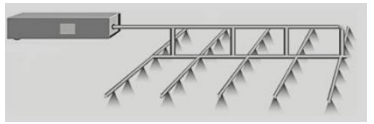
Popcorn Ash/LPA

Example of Popcorn Ash

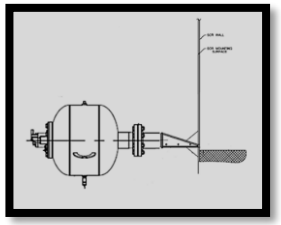
Poorly Maintained On-line Catalyst Cleaning Systems



Acoustic Cleaners



Rake Style Sootblowers



Air Cannons

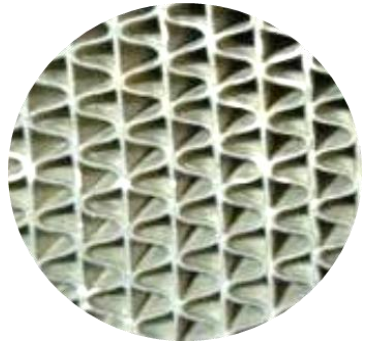
Inadequate Offline Catalyst Cleaning

Catalyst Types

Extruded Honeycomb
Standard Ceramic, square openings

Plate
Catalyst Coatings on Mechanical Substrates

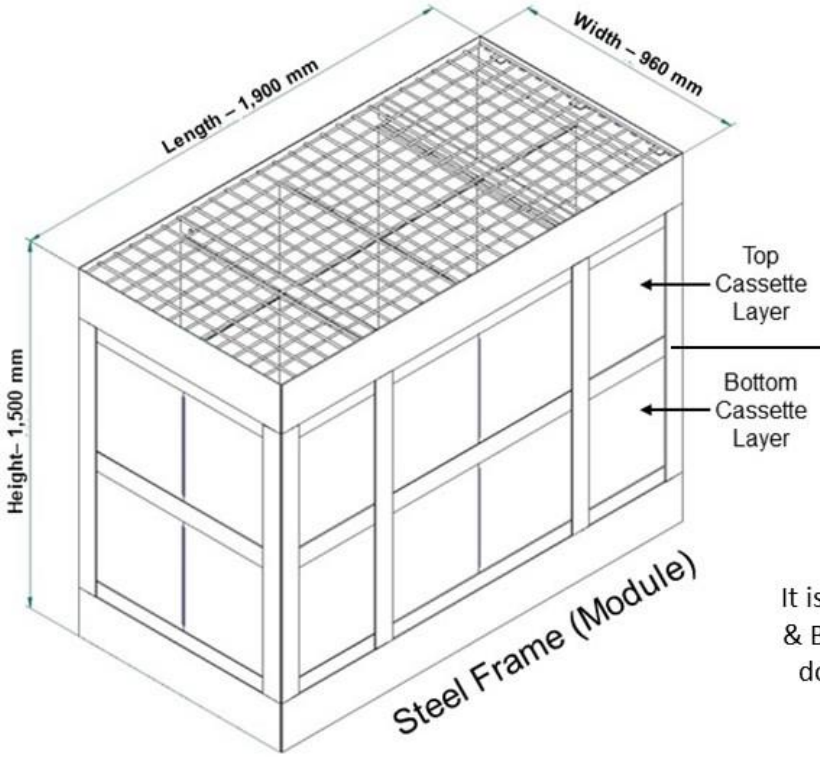
Extruded Plate (aka DustBuster™)
Advanced Ceramic, rectangular openings



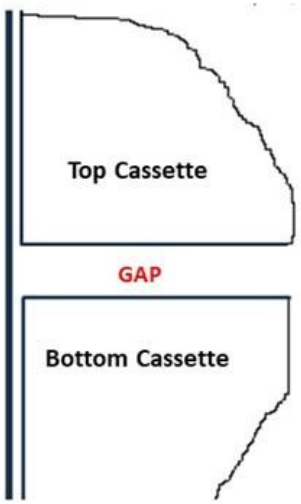
Corrugated
Catalyst with coating

Industry Trends – Plate Style Catalyst

Plate
Catalyst Coatings on Mechanical Substrates



Closeup View



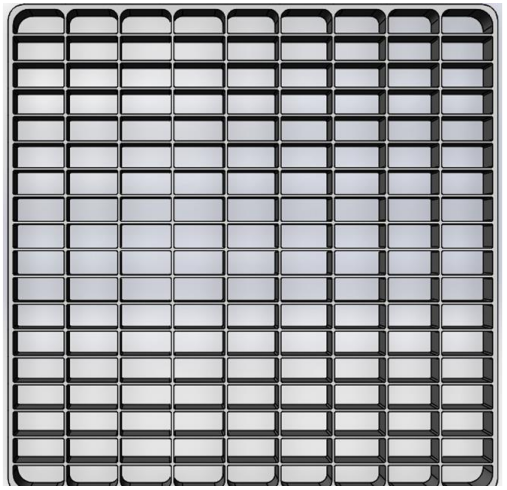
It is difficult to prevent ash from settling in the gap between Top Cassette & Bottom Cassette. The energy from the online catalyst cleaning systems do not re-entrain the ash in this area. Removing the ash from this area with typical offline catalyst cleaning methods is also challenging

Many plants are converting from 5.7 mm plate catalyst to 7 mm plate catalyst. Some plants have also gone from the typical two (2) cassettes in a module to a single cassette in a module.

Industry Trends – Extruded Style Catalyst

Extruded Honeycomb
Standard Ceramic, square openings

Extruded Plate (aka DustBuster™)
Advanced Ceramic, rectangular openings



Opening Size = 7.4 X 15.6 mm

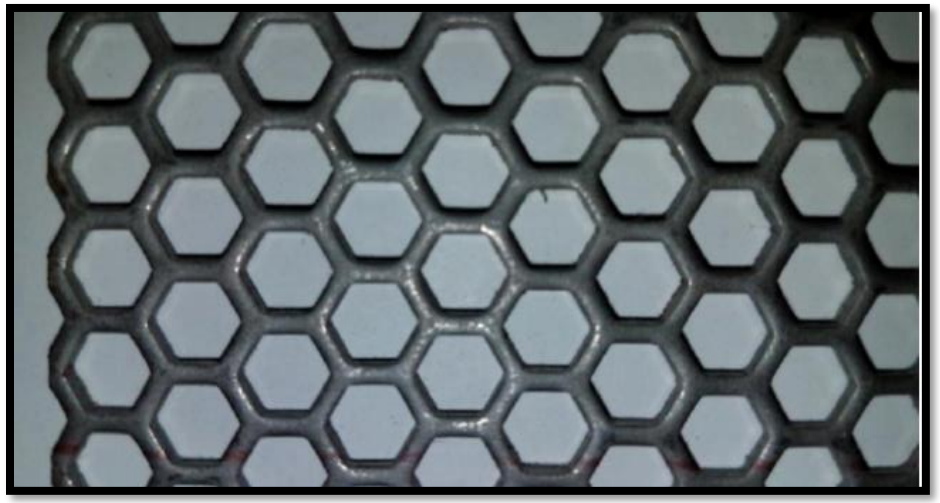
Opening Size = 4.9 X 24.2 mm

In recent years, plants have been purchasing the extruded plate (DustBuster) catalyst more frequently than the extruded honeycomb catalyst. The DustBuster catalyst is extremely ash tolerant.

Industry Trends – Catalyst Module Screens

Mesh Wire Screen

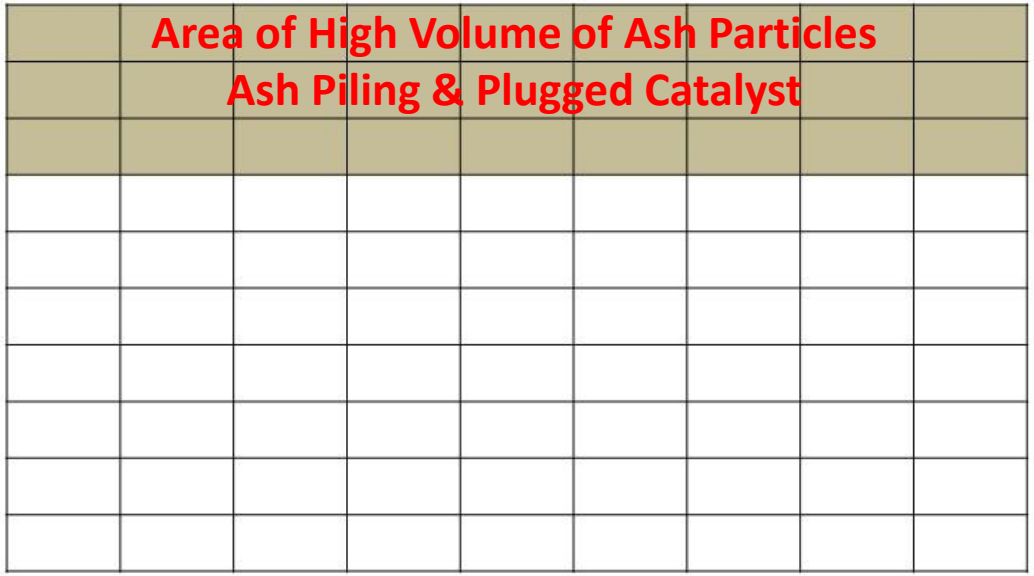
Perforated Plate Screen



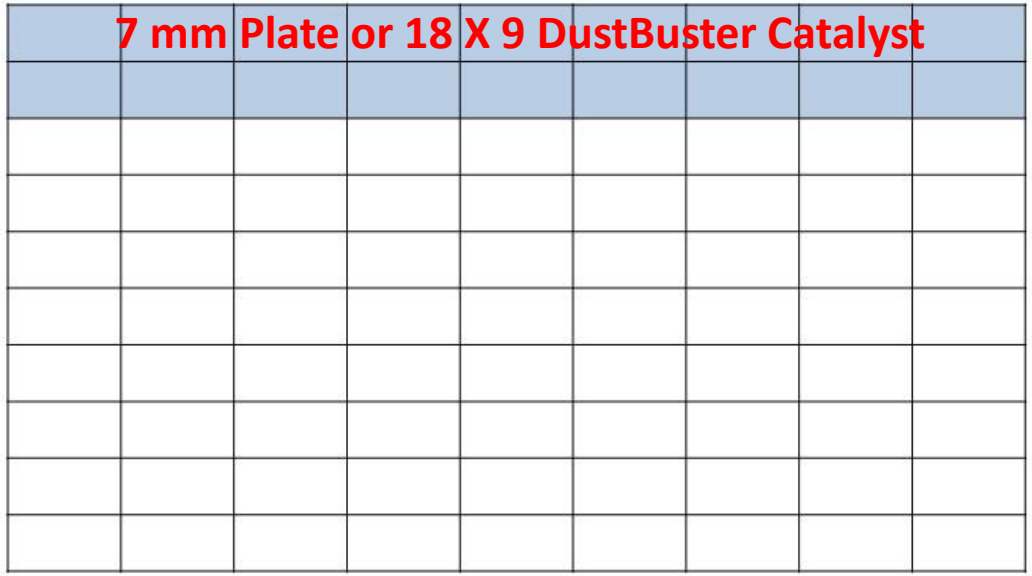
Like dirt gets trapped in steel wool and carpet, ash particles cling to the mesh wire screens.
The smooth surface of a perforated plate screen has less surface area for the ash particles to cling.
Perforated plate screens have proven to improve the performance of online catalyst cleaning systems.

Industry Trends – Hybrid Catalyst Installations

Front Wall – Wall Closest to the Boiler



Front Wall – Wall Closest to the Boiler



The illustrations are plan views of a catalyst layer. On this layer, a higher volume of ash particles are dropping along the front wall. The catalyst is being overwhelmed by the volume of ash particles resulting in ash piling and plugged catalyst. The illustration on the right is an example of a Hybrid Catalyst Layer. The 1st & 2nd rows of catalyst modules along the front wall are fitted with the most ash tolerant catalyst, such as 7 mm plate or 18 X 9 DustBuster Catalyst. The remaining rows are filled with catalyst with a greater DeNOx potential, such as 5.7 mm plate or 26 X 6 DustBuster Catalyst.

SCR Inspection & Offline Catalyst Cleaning

Step 1: Dirty Inspection

Perform an as-found inspection of the flow rectifier/turning vanes and all catalyst layers. Take pictures & document ash piling.

Step 2: Vacuum the Flow Rectifier/Turning Vanes & all Catalyst Layers

This includes lifting the screens and vacuuming down to the catalyst.

Step 3: Intermediate Inspection

Look for areas of plugged catalyst. Consider using a secondary catalyst cleaning process if there is a high volume of plugged catalyst.

Step 4: Implement Secondary Catalyst Cleaning & Re-Vacuum

Air Lancing, Dry Ice Blasting, IMPULSE Cleaning & Vibration Cleaning

Step 5: Clean Inspection

Take pictures & generate a pluggage map for all layers.

Secondary Offline Catalyst Cleaning – Dry Ice Blasting

Dry Ice Blasting Video

Secondary Offline Catalyst Cleaning – Vibration Cleaning

Vibration Video

Secondary Offline Catalyst Cleaning – IMPULSE Cleaner

IMPULSE Video

Thank You for Attending