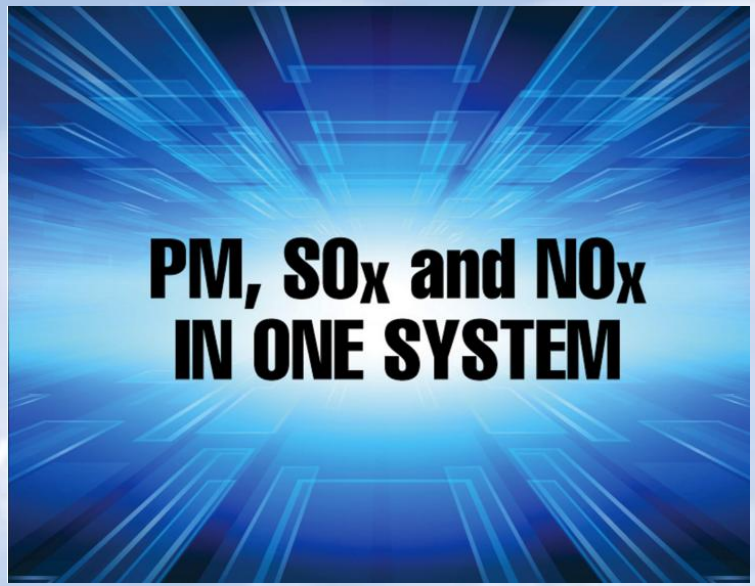
UltraCat

Catalytic Ceramic Filter Systems

Multi Pollutant Control



\+ O-HAPS
Dioxin
Heavy Metals

Rod Gravley
Technology Director

Kevin Moss
Business Development Director

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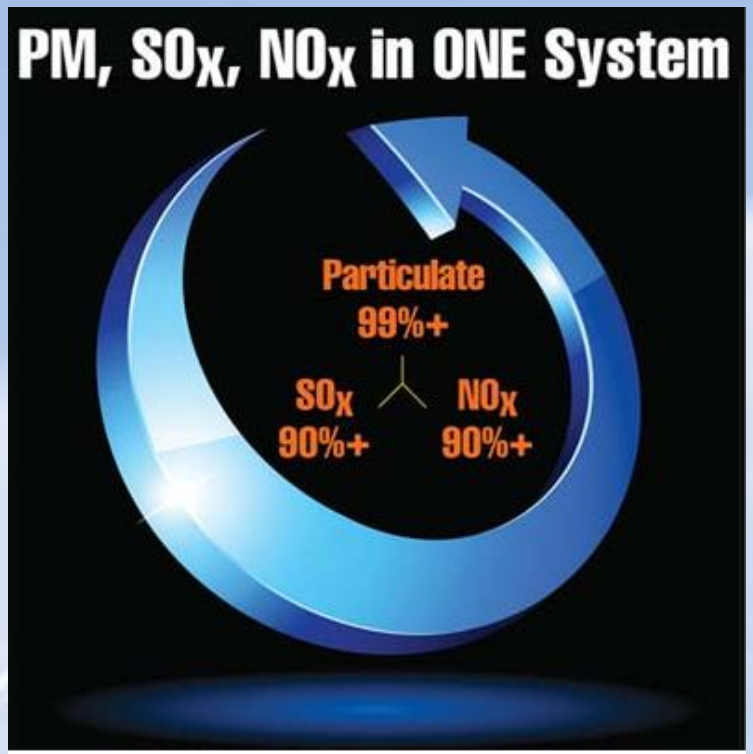
Filter Element

Types of Elements



Two types of filters….

UltraTemp Standard Filters
PM+SO2/HCl

UltraCat Catalyst Filters
NOx+PM+SO2/HCl

+ heavy metals, dioxin, CO and O-HAPS

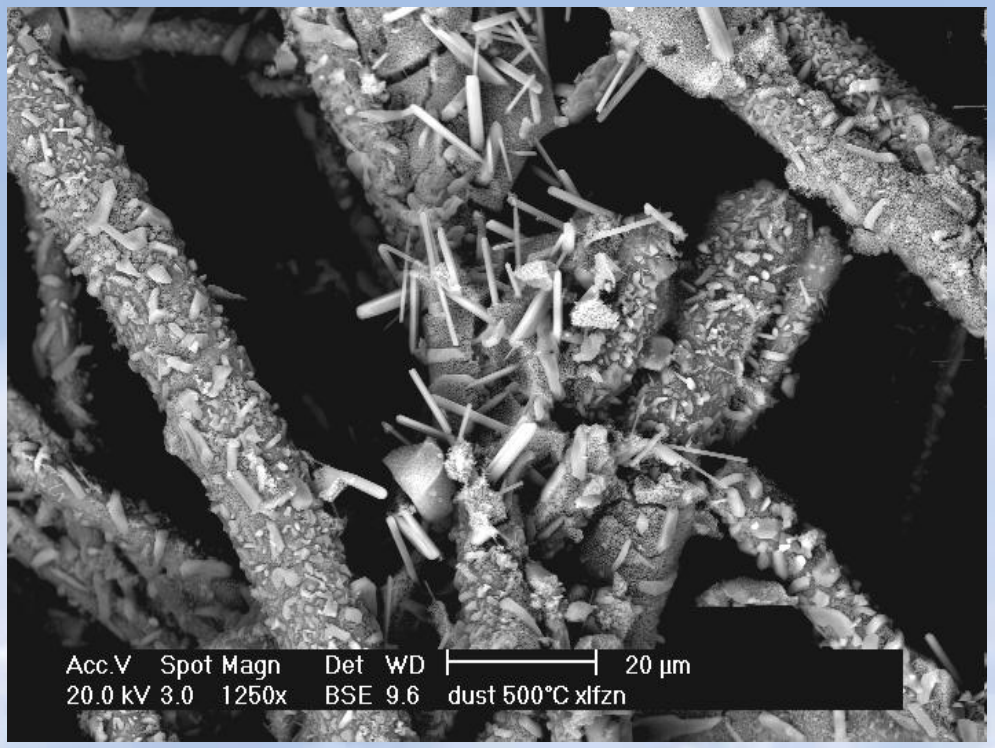
Filter Element

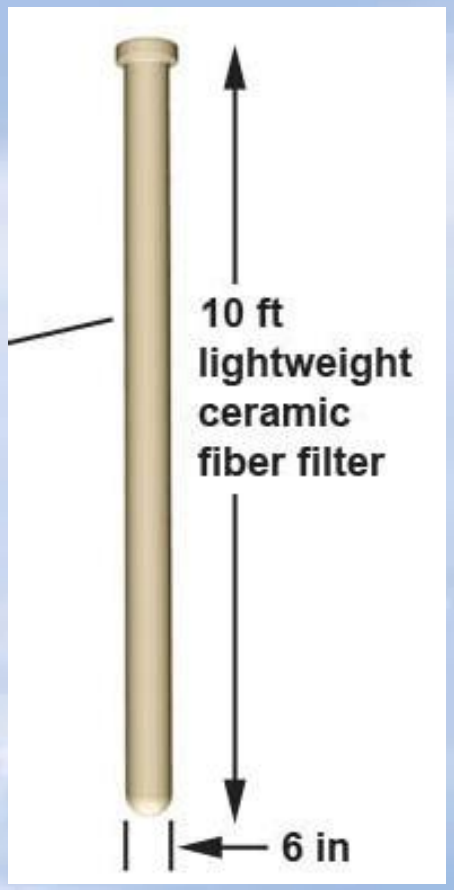
Development and Commercialization History

- Low density ceramic filters have been commercially used in a variety of industries since the 1980s.
- Catalytic imbedding was introduced in 2005.
- There have been over 400 commercial installations.
- Most installations are on some form of combustion process.

Filter Element

UltraCat Catalyst Filter: Structure and Size





Nano-bits of NOx, CO, VOC catalyst are embedded into the walls and adhere to the fibers.

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SCR Reaction

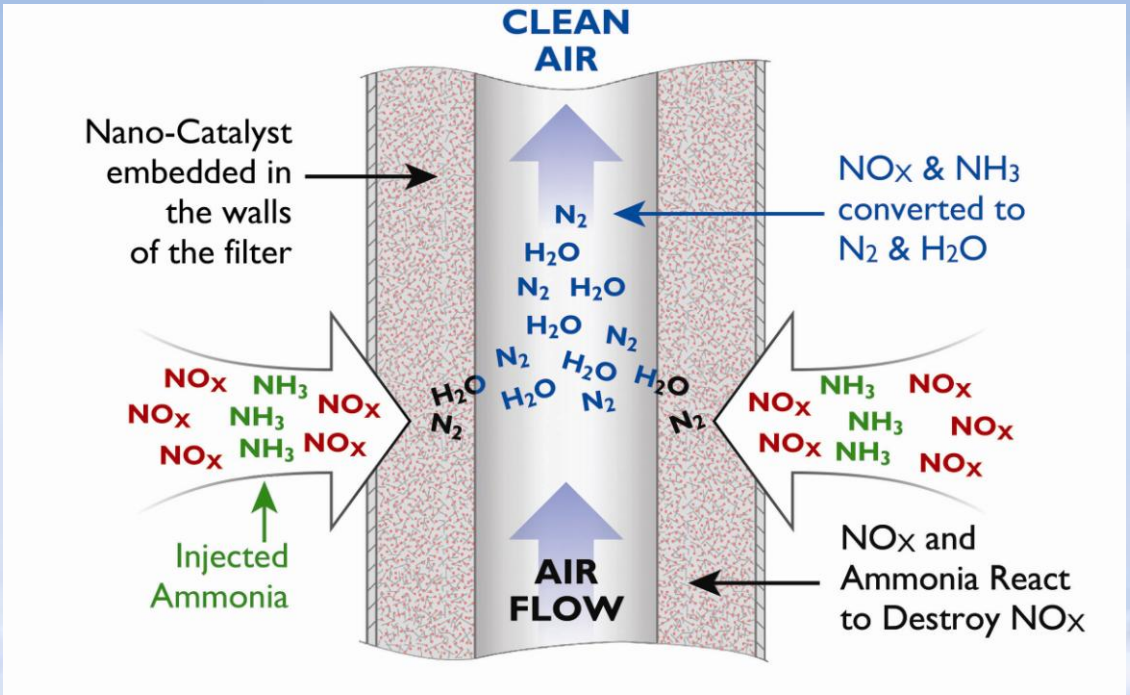
Selective Catalytic Reduction (SCR)

$$2NO_{gas} + 2NH_{3\ gas} + \tfrac{1}{2}O_{2\ gas} \xrightarrow{\text{CATALYST}} 2N_{2\ gas} + 3H_2O_{gas}$$

NOx is converted to the harmless basic constituents of our atmosphere, nitrogen and water vapor.

NOx Control

Catalyst Utilization



Utilization is 100%, compared to 15% for traditional SCR

Lower temperatures achieve higher removal efficiency--70-80% starting at 350 F, and over 90% approach 450 F. Traditional block SCR requires 650 F.

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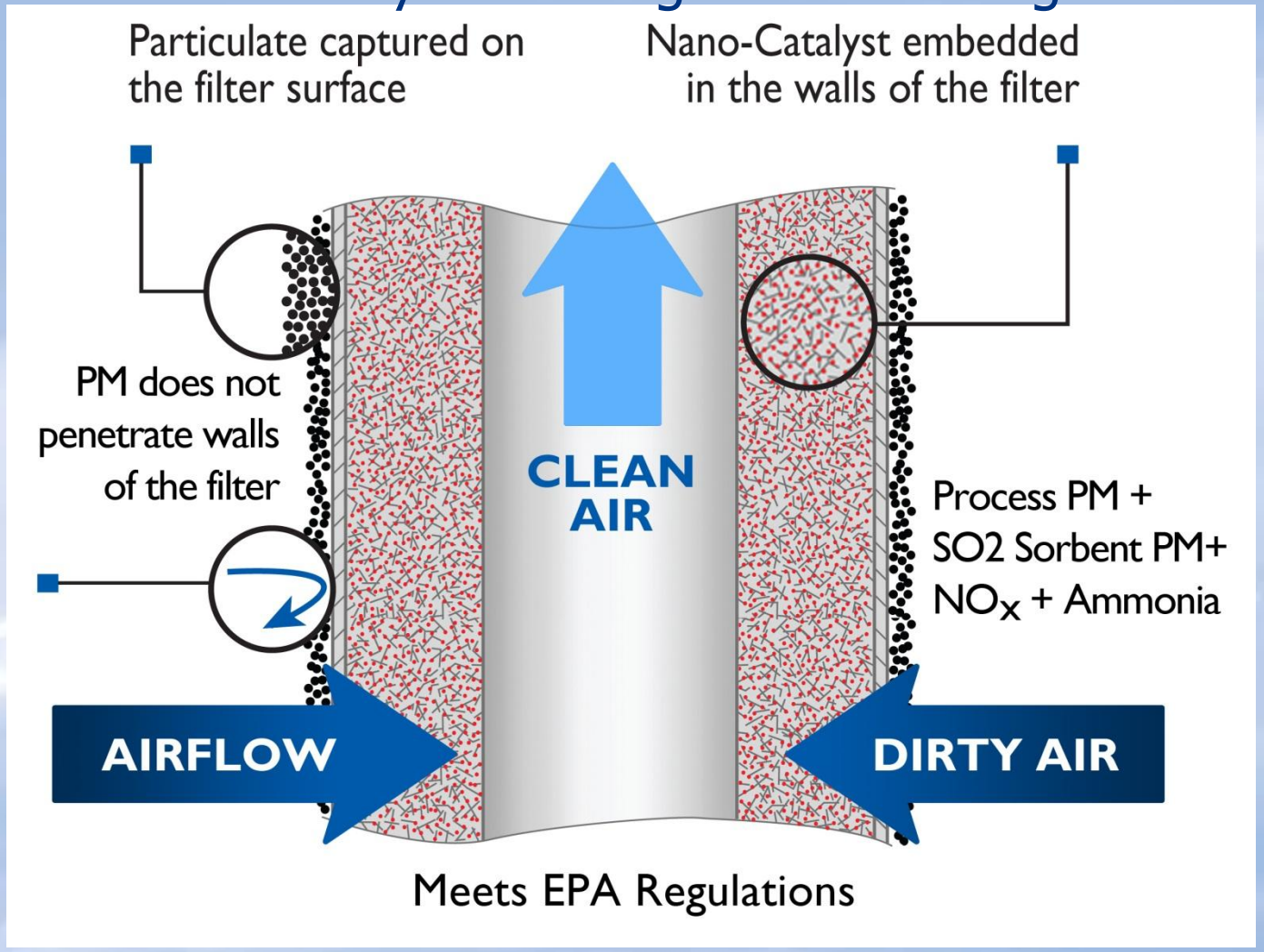
NOx Control

Protection from Catalyst Blinding and Poisoning



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Filter Element

Pressure Drop and Filter Life

- Initial pressure drop approx. 4 to 5 inch w.g.
- Typical increase of 5% to 10% D P per year
- Increased pressure drop triggers filter change-out, not catalyst deactivation or change in performance
- Fan typically has 12 inches w.g. D P
- Depending on power cost, change filters at 8 – 10” w.g.

5 – 10 years filter life

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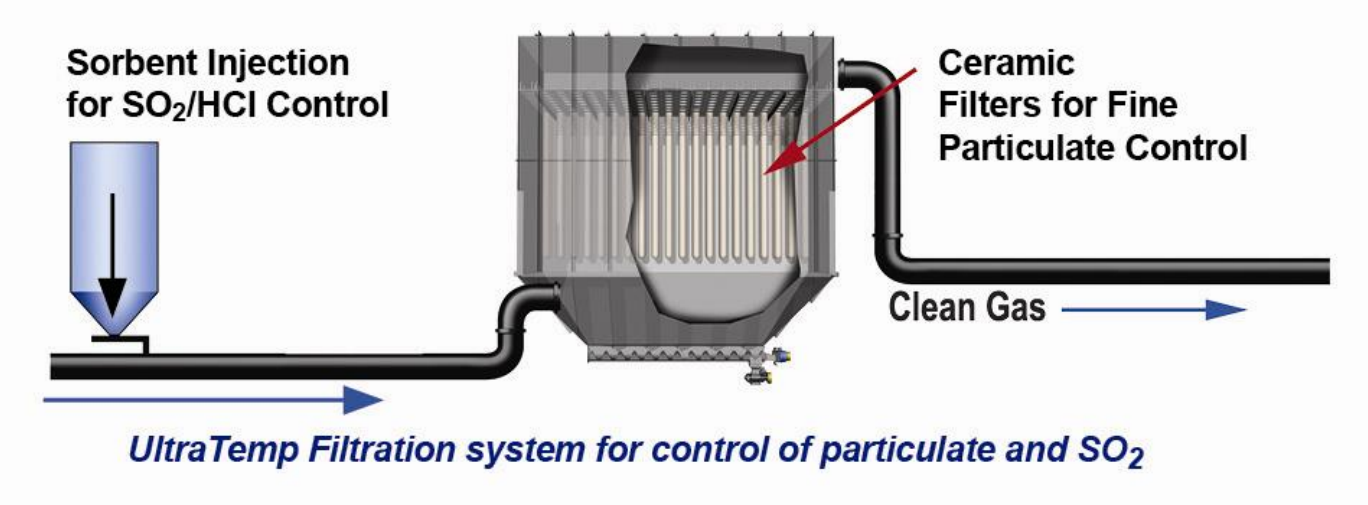
Control Method – Dry Sorbent Injection (DSI)

- Both calcium (lime) and sodium-based sorbents used

  Sorbacal SP by Lhoist has over twice the surface area and pore volume that ordinary hydrated lime

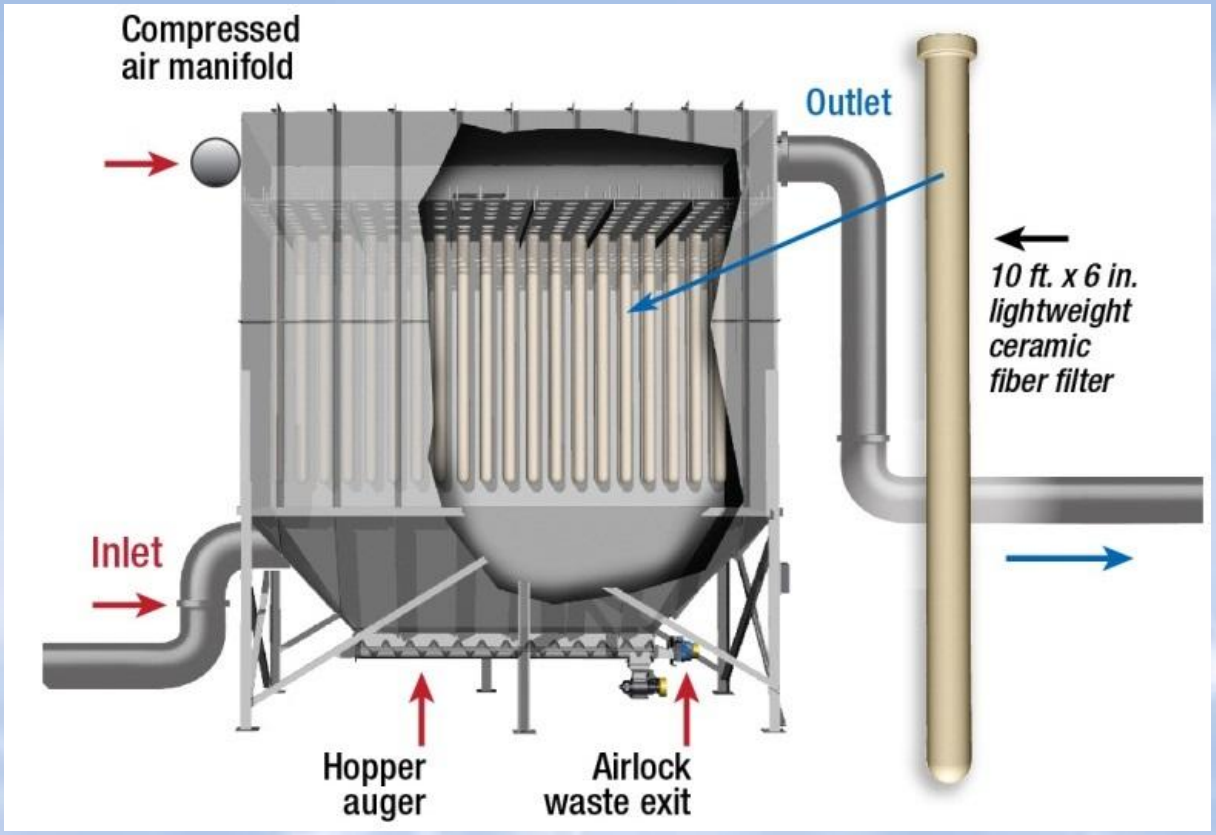
- Operating temperatures 350 F – 1600 F
- 90% or better for SO2, SO3, and HCl possible



UltraTemp Filtration system for control of particulate and SO_2

Filter Systems

Single Housing Configuration



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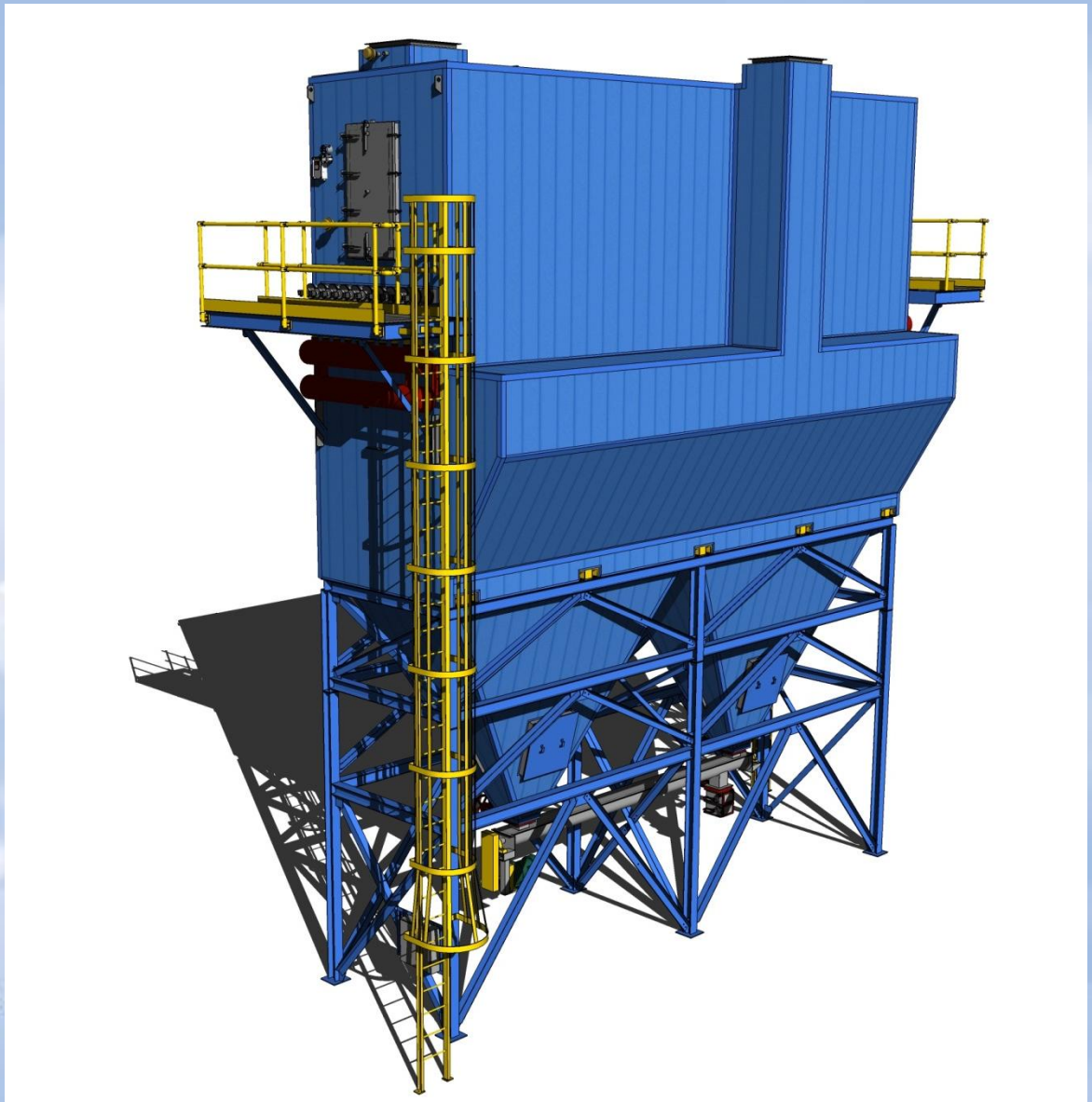
UltraCat Module with Multiple Hoppers & External Screw



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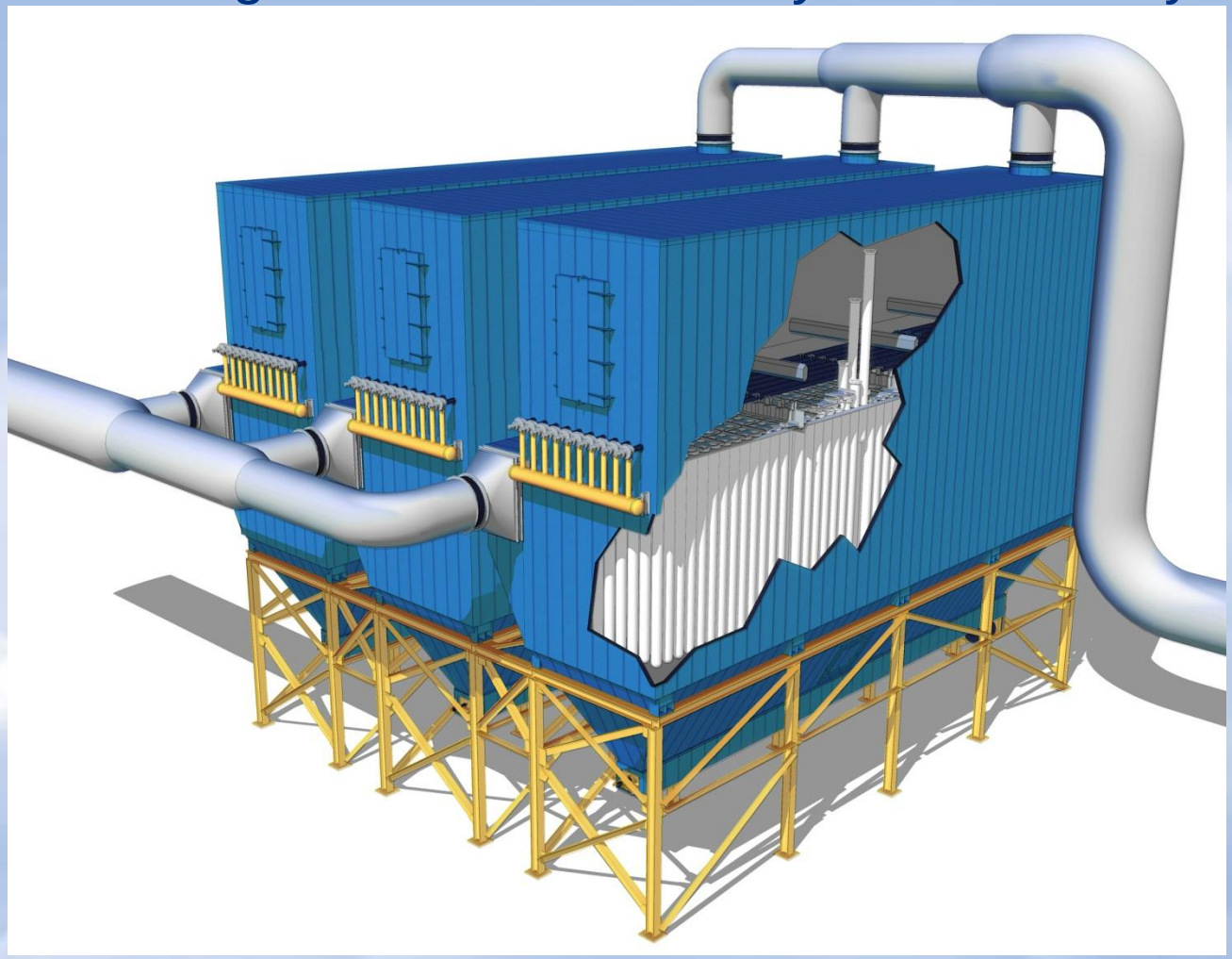
Multiple Housing Installs for Flexibility, Redundancy



With 3 or more modules, if a module needs to be serviced, the other modules are designed to temporarily operate at higher pressure with minimal change in performance.

Filter Systems

Examples of Multiple Housings for Large Flows

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Filter Element

Current Applications

Combust/Incinerate

- Glass Furnaces
- Solid Fuel Boilers
- Ceramic production
- Cement NESHAP
- Carbon Black
- Chemical Waste
- Medical Waste
- Radioactive Waste
- Munitions Destruct
- Petrochem Sludge
- MSW, Scrap Tires

Chemicals & Minerals

- Alumina Refining
- Calcium Carbide Production
- Activated Carbon production
- Catalyst Production
- Silica Production
- Fine Chemicals Production
- Sulphuric Acid Production

Metallurgical

- Aluminium Smelting
- Metal Recovery
- Material Drying
- Tin Smelting
- Lead Smelting
- Nickel Refining
- Foundries
- Copper Smelting
- Steel Making

Summary: UTF, UCF advantages

- Lower initial cost because of all-in-one capability
- Lower total operating cost than a train of equipment
- Lower cost of long-term ownership
- Flexibility, simplicity of design, operation, maintenance
- Unsurpassed PM removal
- Low temp NOx removal, dioxin and O-HAP destruction
- SO2 & HCl removal, mercury options
- Performance guarantees
- Backed by Tri-Mer's 50 years of service and reliability

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Technology Leader
air pollution control

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THANK YOU !

PM, SO_x and NO_x IN ONE SYSTEM

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