UltraCat
Catalytic Ceramic Filter Systems
Multi Pollutant Control

PM, $SO_x$ and $NO_x$
IN ONE SYSTEM

+ O-HAPS
Dioxin
Heavy Metals

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

Selective Catalytic Reduction (SCR)

\[ 2\text{NO}_{\text{gas}} + 2\text{NH}_3_{\text{gas}} + \frac{1}{2}\text{O}_2_{\text{gas}} \rightarrow 2\text{N}_2_{\text{gas}} + 3\text{H}_2\text{O}_{\text{gas}} \]

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

Protection from Catalyst Blinding and Poisoning

Particulate captured on the filter surface

Nano-Catalyst embedded in the walls of the filter

PM does not penetrate walls of the filter

Airflow to Clean Air

Process PM + SO2 Sorbent PM + NOx + Ammonia

Meets EPA Regulations
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
Acid Gas Control

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
Filter Systems

Single Housing Configuration

Compressed air manifold

Outlet

10 ft. x 6 in. lightweight ceramic fiber filter

Inlet

Hopper auger

Airlock waste exit

100 YEARS
UltraCat Module with Multiple Hoppers & External Screw
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
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
THANK YOU!

PM, SO\textsubscript{x} and NO\textsubscript{x} IN ONE SYSTEM

www.tri-mer.com