Presented by:

IAC – The Leading U.S. and International Baghouse OEM

4800 Lamar Ave
Mission, Kansas 66202
**Summation: APC (Baghouse) Fabric Filter Marketplace**

With the release, in 2011, of new, more restrictive dry particulate emission regulations by the EPA, such as Boiler MACT, CSAPR, and other, tighter EPA emissions mandates, it is incumbent on dry filtration media technology to keep pace with these new lower restricted dry particulate emission requirements.

A high-tech PTFE membrane supplier, TTG, Inc., has developed and supplies a state-of-the-art advanced filtration-efficiency, expanded PTFE filtration membrane. The TTG PTFE membrane can be laminated to a wide range of filtration substrates, such as Polyester; Acrylic; PPS (Ryton); Nomex; and Fiberglass filtration medias. A unique property of the TTG PTFE media is an enhanced ability to release the dust cake during baghouse pulse cleaning, which enables the filter bags constructed with the TTG PTFE membrane to run at a 2.0” to 2.5” w.c. lower differential pressure drop (DP) when compared to other traditional PTFE membrane constructed filter bags. Refer to the attached VDI test report in IAC’s brochure (page 11).

Recently, a leading OEM supplier of large gas volume baghouse systems stated, “It is not a difficult choice to make in selecting the TTG membrane filter bag as our filter media when I can be assured of achieving the new EPA-mandated 0.008 lbs/MMBtu dry particulate emission standard, and as a bonus our baghouse systems perform at a 2” to 3” w.c. lower differential pressure across the filter bags by simply replacing the current PTFE membrane bags with the new TTG PTFE membrane constructed filter bags?

Call IAC’s Glenn A. Smith, Jr. or email gsmith@iac-intl.com to discuss further PTFE membrane baghouse performance enhancement options.
TTG Membrane Technology

ePTFE Membrane on Glass

ePTFE Membrane Structure
TTG Inc Membrane Products CTQ’s For Proper Lamination

TTG Glass Laminate at 1000 X

TTG Glass Laminate at 2500 X
TTG Market Place Competitors

US East Coast Competitive Laminate at 1000 X

US East Coast Competitive Laminate at 2500 X
TTG Market Place Competition Microscope
Images of Lamination

Central US Laminate at 1500 X

Central US Laminate at 2500 X
TTG Off Shore Market Competition
Microscope Images of Lamination

Chinese Laminate at 1000 X

Chinese Laminate at 2500 X
Cross Section of an ePTFE Film

1000 X
ePTFE Membrane Technology
Improved dust cake management via fabric filter technology can control operating pressure over filter life.

Membrane Surface Filtration

Non Membrane Depth Filtration
## Baghouse Processed Materials

### COMBUSTION PROCESSES
- Co-Generation Facilities
- Soil Remediation Plants
- Incinerators

### CEMENT AND ROCK DUST
- Collectors Venting:
  - Kiln
  - Dock Unload
  - Clinker Cooler
  - Finish Mill
  - Hydrators
  - High Efficiency Separator
  - By-Pass
  - Dryer
  - Coal Mill
  - Raw Mill
  - Calciners

### FOOD/PHARMACEUTICAL
- Sugar
- Dried Milk & Eggs
- Protein
- Food Additives
- Pill Coatings

### PAINT/PIGMENTS
- Carbon Black
- Toner
- TiO2
- Cosmetics

### METALS
- Ferro Alloy
- Foundry
- Battery Manufacturers
- Secondary Zinc Smelters
- Steel
- Lead Smelters

### CHEMICAL
- Soaps
- Herbicides/Pesticides
- Detergents
- Fertilizers

### PLASTICS/SPRAY DRYERS
- PVC
- Polypropylene
- Polyester
- Polystyrene
- Polyethylene

### Utility Boilers

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**IAC**

**INDUSTRIAL ACCESSORIES COMPANY**
US EPA ETV Data to Support PM 2.5 Particulate Emissions

**TTG VDI results of filtration fabrics comparative to W.L. Gore & Donaldson**

<table>
<thead>
<tr>
<th>Verification Parameters</th>
<th>Polyester</th>
<th>Fiberglass</th>
<th>Fiberglass</th>
<th>Fiberglass</th>
<th>Utility Fabric</th>
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</thead>
<tbody>
<tr>
<td>PM 2.5 g/dscm</td>
<td>&lt;0.000167 g/dscm</td>
<td>&lt;0.000167 g/dscm</td>
<td>&lt;0.000167 g/dscm</td>
<td>0.000021 g/dscm</td>
<td>&lt;0.000167 g/dscm</td>
</tr>
<tr>
<td>(gr/dscf)</td>
<td>(&lt;0.0000073)</td>
<td>(&lt;0.0000073)</td>
<td>(&lt;0.0000073)</td>
<td>(&lt;0.0000009)</td>
<td>(&lt;0.00000073)</td>
</tr>
<tr>
<td>Total mass, g/dscf</td>
<td>&lt;0.000167 g/dscm</td>
<td>&lt;0.000167 g/dscm</td>
<td>&lt;0.000167 g/dscm</td>
<td>0.000021 g/dscm</td>
<td>&lt;0.000167 g/dscm</td>
</tr>
<tr>
<td>(gr/dscf)</td>
<td>(&lt;0.0000073)</td>
<td>(&lt;0.0000073)</td>
<td>(&lt;0.0000073)</td>
<td>(&lt;0.0000009)</td>
<td>(&lt;0.00000073)</td>
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<tr>
<td>Average residual pressure drop, cm w.g. (in w.g.)</td>
<td>1.93 cm (0.76)</td>
<td>1.91 cm (0.77)</td>
<td>2.45 (0.96)</td>
<td>3.47 (1.37)</td>
<td>2.25 (0.89&quot;)</td>
</tr>
<tr>
<td>Initial residual pressure drop, cm w.g. (in w.g.)</td>
<td>1.91 cm (0.76)</td>
<td>1.90 cm (0.76)</td>
<td>2.36 (0.93)</td>
<td>3.31 (1.30)</td>
<td>2.19 (0.88&quot;)</td>
</tr>
<tr>
<td>Residual pressure drop increase, cm w.g. (in w.g.)</td>
<td>0.05 cm (.02)</td>
<td>0</td>
<td>0.18 (0.07)</td>
<td>0.30 (0.12)</td>
<td>.05 cm (.02&quot;)</td>
</tr>
<tr>
<td>Filtration cycle time</td>
<td>325 seconds</td>
<td>318 seconds</td>
<td>251 seconds</td>
<td>136 seconds</td>
<td>301 seconds</td>
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<tr>
<td>Mass gain of test sample filter, g (gr)</td>
<td>0.12 grams</td>
<td>0.14 grams</td>
<td>0.09 (1.39)</td>
<td>0.11 (1.65)</td>
<td>0.13 grams</td>
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<tr>
<td>Number of cleaning cycles</td>
<td>86</td>
<td>87</td>
<td>87</td>
<td>159</td>
<td>71</td>
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<tr>
<td>Perm after Testing</td>
<td>5.05</td>
<td>4.14</td>
<td></td>
<td></td>
<td>4.28</td>
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</table>
• TTG Inc. testing was conducted at ETSI in accordance with ASTM Test Method D6830-02 and with the test specifications and conditions as detailed in Generic Verification Protocol for Baghouse Filtration Products (BFP) developed by the Air Pollution Control Technology Verification Center (APCTVC) which is part of the U.S. EPA’s Environmental Technology Verification (ETV) Program and is operated in partnership between RTI and EPA.

■ A 6.0” diameter fabric filter sample is challenged with a standard dust (particulate matter) under simulated baghouse conditions at specified rates for air and dust flow. The test consists of three test runs. Each run consists of three sequential phases or test periods during which dust and gas flow rates are constantly maintained to test specification. The test phases are:

■ A conditioning period consisting of 10,000 rapid pulse filtration cycles (every 3 seconds).

■ A recovery period to allow the test sample to recuperate from rapid pulsing where the filter is pulsed only when the differential pressure reaches 4” w.c.

■ A 6-hour performance test period, consisting of normal filtration cycles, during which measurements for particulate emissions are determined by gravimetric measurement of the particulate matter that passes through the sample.
# IAC Representative DSI Installations

<table>
<thead>
<tr>
<th>Plant</th>
<th>Unit</th>
<th>MW</th>
<th>Pollutant</th>
<th>DSI Location</th>
<th>Sorbent</th>
<th>Date</th>
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<tbody>
<tr>
<td>OG&amp;E; Sooner Station</td>
<td>Unit 1</td>
<td>550</td>
<td>SO2</td>
<td>AH Inlet</td>
<td>Trona; SBC</td>
<td>Nov-11</td>
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<tr>
<td>Constellation Energy</td>
<td>Crane 2</td>
<td>200</td>
<td>HCL</td>
<td>AH Inlet &amp; Outlet</td>
<td>Trona; Hydrated Lime</td>
<td>Sep-11</td>
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<tr>
<td>Constellation Energy</td>
<td>Wagner 2</td>
<td>130</td>
<td>HCL</td>
<td>AH Inlet &amp; Outlet</td>
<td>Trona; Hydrated Lime</td>
<td>Aug-11</td>
</tr>
<tr>
<td>Constellation Energy</td>
<td>Wagner 3</td>
<td>325</td>
<td>HCL</td>
<td>AH Inlet &amp; Outlet</td>
<td>Trona; SBC</td>
<td>Aug-11</td>
</tr>
<tr>
<td>OG&amp;E; Sooner Station</td>
<td>Unit 1</td>
<td>550</td>
<td>SO2</td>
<td>AH Inlet</td>
<td>Trona; SBC</td>
<td>Jul-11</td>
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<tr>
<td>GRE, Stanton Station</td>
<td>Unit 1</td>
<td>188</td>
<td>SO2</td>
<td>AH Inlet</td>
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<tr>
<td>Luminant, Sandow Station</td>
<td>Unit 4</td>
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<td>SO3</td>
<td>AH Inlet</td>
<td>MgO</td>
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<td>130</td>
<td>Hg &amp; SO2</td>
<td>AH Inlet &amp; Outlet</td>
<td>PAC; Trona</td>
<td>Apr-09</td>
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<tr>
<td>Constellation Energy</td>
<td>Wagner 3</td>
<td>325</td>
<td>Hg &amp; SO2</td>
<td>AH Inlet &amp; Outlet</td>
<td>PAC; Trona; SBC</td>
<td>Apr-09</td>
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<tr>
<td>Temple Inland</td>
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<td>Steam SO3</td>
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<tr>
<td>GRU; Deerhaven Gen. Sta.</td>
<td>Unit 2</td>
<td>238</td>
<td>As</td>
<td>Coal Belt Feed</td>
<td>Pebble Lime</td>
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<td>Heron Lake Bio Energy,</td>
<td>Steam SO2</td>
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<td>Trona</td>
<td></td>
<td>Nov-08</td>
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<tr>
<td>Constellation Energy</td>
<td>Wagner 3</td>
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<td>AH Inlet &amp; Outlet</td>
<td>PAC; Trona; SBC</td>
<td>Apr-08</td>
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<tr>
<td>Constellation Energy</td>
<td>Crane 1</td>
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<td>HCL</td>
<td>AH Inlet &amp; Outlet</td>
<td>PAC</td>
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<td>Lincolnway Energy</td>
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<td>AH Inlet</td>
<td>Trona</td>
<td></td>
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<td>Red Trail Energy, LLC</td>
<td>Steam SO2</td>
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<td>AH Inlet</td>
<td>Trona</td>
<td></td>
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<tr>
<td>Constellation Energy</td>
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<td>130</td>
<td>Hg</td>
<td>AH Outlet</td>
<td>PAC</td>
<td>May-07</td>
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<tr>
<td>Constellation Energy</td>
<td>Wagner 3</td>
<td>325</td>
<td>Hg</td>
<td>AH Outlet</td>
<td>PAC; Trona; SBC</td>
<td>May-07</td>
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<tr>
<td>Constellation Energy</td>
<td>Crane 1</td>
<td>200</td>
<td>Hg</td>
<td>AH Outlet</td>
<td>PAC</td>
<td>May-07</td>
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<tr>
<td>Corning</td>
<td>N/A</td>
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<td>HCL &amp; HF</td>
<td>N/A</td>
<td>Hydrated Lime</td>
<td>Nov-04</td>
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<td>Wabash Alloys</td>
<td>Dickson, TN</td>
<td>N/A</td>
<td>HCL</td>
<td>Baghouse Inlet</td>
<td>Enviroblend</td>
<td>Jul-01</td>
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<tr>
<td>Wabash Alloys</td>
<td>Cleveland, OH</td>
<td>N/A</td>
<td>HCL</td>
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<td>Enviroblend</td>
<td>Jul-01</td>
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<tr>
<td>Wabash Alloys</td>
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<td>HCL</td>
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<td>Enviroblend</td>
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<tr>
<td>Wabash Alloys</td>
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<tr>
<td>Excel Energy; Red Wing</td>
<td>Unit 2</td>
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<td>Boiler</td>
<td>Limestone</td>
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<tr>
<td>Excel Energy; Red Wing</td>
<td>Unit 1</td>
<td>N/A</td>
<td>SO2</td>
<td>Boiler</td>
<td>Limestone</td>
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### IAC Intermediate “M-Pulse” Baghouse Installations

<table>
<thead>
<tr>
<th>Location</th>
<th>Equipment Type</th>
<th>ACFM</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lincolnway Energy, NV, IA</td>
<td>Coal Fired Boiler</td>
<td>220,000</td>
<td>400F</td>
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<tr>
<td>Corn Products, LP Goldfield, IA</td>
<td>Coal Fired Boiler</td>
<td>220,000</td>
<td>400F</td>
</tr>
<tr>
<td>Red Trail, ND</td>
<td>Coal Fired Boiler</td>
<td>220,000</td>
<td>400F</td>
</tr>
<tr>
<td>Heron Lake Bio Energy, MN</td>
<td>Coal Fired Boiler</td>
<td>220,000</td>
<td>400F</td>
</tr>
<tr>
<td>Caterpillar, Mapleton, IL</td>
<td>Foundry Melt Shop</td>
<td>240,000</td>
<td>250F</td>
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<tr>
<td>Nucor Steel-Blytheville, AR</td>
<td>LMF and Meltshop</td>
<td>200,000</td>
<td>250F</td>
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<tr>
<td>Drake Cement, Drake, AZ</td>
<td>Raw Mill / Kiln</td>
<td>206,000</td>
<td>482F</td>
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<tr>
<td>Drake Cement, Drake, AZ</td>
<td>Clinker Cooler</td>
<td>98.100</td>
<td>392F</td>
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<tr>
<td>Nucor Steel, Decatur, AL</td>
<td>Electric Arc Furnace</td>
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<td>250F</td>
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### IAC Intermediate “M-Pulse” Installations in India

<table>
<thead>
<tr>
<th>Company</th>
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<th>Temperature</th>
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<tbody>
<tr>
<td>Dalmia Cement Ltd.</td>
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<td>194F</td>
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<tr>
<td>Krupp Polysius India Ltd.</td>
<td>Kiln / Raw Mill</td>
<td>80,046</td>
<td>464F</td>
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<tr>
<td>Birla / Satna Cement</td>
<td>ESP Conversion</td>
<td>40,023</td>
<td>203F</td>
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<tr>
<td>Birla / Satna Cement</td>
<td>ESP Conversion</td>
<td>22,366</td>
<td>203F</td>
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</table>
### IAC Representative Hi-Pulse Baghouse Installations

- **Ashgrove Cement, Springfield, MO**  
  - Lime Kiln  
  - 30,000 ACFM  
  - 400°F
- **Cemex, Louisville, KY**  
  - Clinker Hot Tank  
  - 25,000 ACFM  
  - 400°F
- **IAT Incineration, Richmond, WA**  
  - Medical/Bio-Waste  
  - 5,000 ACFM  
  - 500°F
- **Carbo Ceramics, Toomsboro, GA**  
  - Lime Kiln  
  - 20,000 ACFM  
  - 500°F
- **Carbo Ceramics, Portland, OR**  
  - Lime Kiln  
  - 20,000 ACFM  
  - 425°F
- **BMH/James Hardie, Nashville, AR**  
  - Gypsum Dryer  
  - 120,000 ACFM  
  - 400°F
- **Phila Electric, Eddystone, PA**  
  - Magnesium Oxide  
  - 225,000 ACFM  
  - 450°F
- **PPG, Lake Charles, LA**  
  - Glass Furnace  
  - 35,000 ACFM  
  - 480°F
- **Continental Carbon, Ponca City, OK**  
  - Carbon Black Reactor  
  - 20,000 ACFM  
  - 500°F
- **Ashgrove Cement, Springfield, MO**  
  - Lime Kiln  
  - 30,000 ACFM  
  - 400°F
- **IAC Representative Hi-Pulse Baghouse Installations**

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**Image**: Hi-Pulse Baghouse System Diagram
Contact Information

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