• CLARCOR Industrial Air is a technology oriented organization specializing in the design and manufacture of high performance filter elements and systems

• Well-established in the air filtration industry
  – Comprised of 4 well-organized high functioning organizations
  – BHA, Altair, Clark Filter, United Air Specialists

• Advanced technology and innovation leader in the air filtration space

• Broad and profitable product portfolio
Filtration Solutions

Gas Turbine Inlet
Gas Turbine Inlet systems and filters for Power Generation and Oil & Gas customers.

Industrial Filtration
Baghouse / Cartridge filters and solutions for Industrial customers.

Membranes
Specialty fabrics and microfiltration products.
Anatomy of a Cartridge Collector

- Dirty Air Inlet
- Bin-vent Section
- Tube Sheet
- Venturi
- Hopper Section
- Clean Air
- Exhaust
- Access Door
- Leg Section
Media Efficiencies

![ASHRAE 52.2 MERV Rating Chart]

- Cellulose: 7
- Cellulose/Poly: 10
- Spunbond Poly: 11
- Polyglass: 12
- UltraWeb®: 13
- ProTura®: 15
- NexGen SB: 15
- SB PTFE: 16

Minimum Efficiency Reporting Value
All layers of media exposed to dirt
Particles become **trapped** between layers
Not easily pulsed clean
Surface Loading

Dust cake forms on surface of media
Easily pulsed clean

Air Flow

Nanofiber

Media

Dust Particulate

Nanofiber
Nanofiber Technology

600X SEM magnification

10,000X SEM magnification
Benefits:

Extended filter life = Lower Cost of Ownership

Lower labor costs

Fewer filter changes required

Less handling required by shipping/receiving

Reduce the need for on site storage

Lower disposal costs

No need for frequent filter cleaning/recycling
Pulse Jet Collector

Access Door

Compressed air header

Dirty gas inlet

Inlet baffle

Blowpipe

Fabric filter

Support cage

Hopper

Clean gas outlet
Typical Filters
Tubesheet or Cell Plate

- The steel plate with holes to which the open ends of the bags are connected
- Separates the clean side from the dirty side of the baghouse
Grain Loading

The amount of particulate by weight in a given volume of air, usually specified in grains/cubic foot (or grams/cubic meter)

\[
1 \text{ lb (0.454 kg)} = 7000 \text{ grains} \\
1 \text{ kg} = 15,432 \text{ grains}
\]
Air-to-Cloth Calculations

Air-to-cloth ratio = ACFM ÷ total filter area

Total # filters x sq/ft per filter = total filter area
Magnehelic* Gauge

*Trademarks are property of their respective owners
Differential Pressure

- Pressure difference between two points in a dust collection system
- Typically measure across a tube-sheet in inches of water column

Instruments used to measure DP are:
- U-tube manometers
- Magnehelic* Gauges
- Photohelic* Gauges
- Pressure Transducers

*Trademarks are property of their respective owners
**Inch of Water**

- A unit of pressure equal to the pressure exerted by a column of liquid water one inch high at standard conditions (70 degrees at sea level)
- Usually expressed as inches in water gauge (w.g) or water column (w.c)
Common Problems in Pulse Jets:

- **Fine Particle Emissions**
  - Particulate bleed through of conventional felts
  - Aggressive design – high filtration velocities

- **High Differential Pressure – Loss of Airflow**
  - High air-to-cloth ratios
  - Poor cleaning mechanism efficiency
  - Extra drag across filter due to primary dust cake.
Common Problems in Pulse Jets:

- **Abrasion Failure**
  - Filters located in direct line of inlet gas stream

- **Difficult Installation – Bottom Load**
  - Extra downtime to handle multiple and bulky components
  - Accurate installation of multiple filter components

- **Aggressive Cleaning Cycles**
  - Accelerated pulse cleaning causes premature flex failure
High DP/Loss of Airflow

Static pressure vs. air volume

- 14” (356mm)
- 12” (305mm)
- 10” (254mm)

Potential for increased airflow

80+/- % of designed capacity

Designed capacity
Questions?

Thank You