COL-MET ACADEMY

Today's Webinar: Powder Booth Selection and Guidelines
Powder Booth Selection and Guidelines

Presented By: Bill Van Buren
Regional Sales Manager
Three Main Business Segments:

1. Core / Catalog Equipment

2. Engineered Projects (EP)

3. RP Filtration Products
Powder Booth Selection and Guidelines

Presentation Overview:

• Function of a Powder Booth
• Types of Col-Met Powder Booths
• Powder Booth Sizing
• Other Consideration
  ✓ Environmental Rooms
  ✓ Air Movement
  ✓ Compressed Air Quality
  ✓ Grounding
  ✓ Filter Replacement
• Return On Investment
Function of a Powder Booth:

• Contain oversprayed powder.
• Provide for safe operating environment.
• Collect oversprayed powder for either reuse or disposal.
• Enhance application efficiency.
Powder Booth Selection and Guidelines

Powder Booth Operation:

• Powder containment is accomplished by drawing air produced by a fan with sufficient velocity through all the booth enclosure openings.

• The overspray powder and air mixture in the booth enclosure is drawn into the collection device where either filter(s) or a cyclone separates the powder from this contaminated air.

• Cleaned air is then directed through a final filter to remove any particulate before returning air to the plant.

• The overspray powder collected in the recovery unit is reclaimed and reprocessed into the system.

• This process may be as simple as collecting and discarding the recovered powder (referred to as spray to waste) or mixing the recovered powder with virgin powder and supplied back to the system to feed the powder application equipment (referred to as reclaim).

• Typically “Reclaimed” powder is blended with virgin powder before being applied to the product.
Powder Booth Selection and Guidelines

Powder Coating System

Recycle

The ratio of powder returned, (for reuse)

Non-Recycle

The ratio of powder collected, (not for reuse)
Two Types Of Recovery Systems

In order to capture overspray for reuse or disposal, it must first be recovered.

Cartridge Module Systems
Cartridge Filter Module is attached to the side or bottom of the booth

Cyclone System
Cyclone used as a separator with a cartridge module secondary filter
Cyclone separator utilizes centrifugal forces to separate hard powder particles from the air stream.
Types of Powder Booths:

- **Batch Powder Booths**
  - COL-MET PB Series: multi stage filtration
  - COL-MET RPB Series: cartridge filtration

- **Pass Through Powder Booths**
  - COL-MET EPB Series: cartridge filtration
Types of Powder Booths: COL-MET PB Series

- Batch style, entry level booth
- Low volume applications
- Basic controls (optional VFD)
- “Spray to waste”
- Multi-stage filtration
  1. Blanket filter
  2. Pocket filter
  3. Final filter
Types of Powder Booths: COL-MET RPB Series

- Batch style, entry level booth
- Low – Medium volume / production rates
- “Spray to waste” or reclaim of one color
- Powder collected below cartridge filter in pan
Powder Booth Selection and Guidelines

Types of Powder Booths: COL-MET RPB Series

- Multi-Stage Filtration
  - Cartridge Filter
  - Final Filter
- Controls: Nema 12, UL, ETL
  - Auto or manual filter pulse down
  - Magnehelic gauge for cartridge monitoring
  - VFD for fan motor
  - Pressure switch for final filter
## Powder Booth Selection and Guidelines

### Types of Powder Booths: COL-MET LPB Series

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Interior Dimensions</th>
<th>Exterior Dimensions</th>
<th>Total CFM</th>
<th>Filters</th>
<th>Fan Spec</th>
<th>Lights S&amp;G</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Width</td>
<td>Height</td>
<td>Length</td>
<td>Width</td>
<td>Height</td>
<td>Length</td>
</tr>
<tr>
<td>LPB-05-05-03-00-S</td>
<td>5'-0&quot;</td>
<td>5'-0&quot;</td>
<td>3'-0&quot;</td>
<td>5'-3&quot;</td>
<td>8'-4&quot;</td>
<td>5'-8&quot;</td>
</tr>
</tbody>
</table>

![Front Elevation](image1.png)

![Right Elevation](image2.png)

![Plan View](image3.png)
Powder Booth Selection and Guidelines

Types of Powder Booths: COL-MET EPB Series

- Pass through booth
- High production rates
- 3 standard sizes
- E-Light LED Lighting
- “Spray to waste” or reclaim
- Multiple booths or collectors can be used to meet color change needs
Types of Powder Booths: COL-MET EPB Series

- Multi-Stage Filtration
  - Cartridge Filter
  - Final Filter
- Controls: Nema 12, UL, ETL
  - Auto or manual filter pulse down
  - Magnehelic gauge for cartridge monitoring
  - VFD for fan motor
  - Pressure switch for final filter
Powder Booth Selection and Guidelines

Types of Powder Booths: COL-MET EPB Series

• Single Booth
  • Always on-line
  • Spray to waste or reclaim
  • Color change, system down

• Dual / Multi-Booth
  • Booth moved on/off-line
  • Spray to waste or reclaim
  • Color change time minimal
Types of Powder Booths: COL-MET EPB Series

- Wedge collector design
Powder Booth Selection and Guidelines

Types of Powder Booths: Pass Through
## COL-MET Powder Booth Summary

<table>
<thead>
<tr>
<th>3 Stage filtration (PB)</th>
<th>Reclaim (RPB)</th>
<th>Pass Through (EPB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low production</td>
<td>Medium Production</td>
<td>High Production</td>
</tr>
<tr>
<td>No reclaim</td>
<td>Reclaim capabilities of one color</td>
<td>Reclaim and multiple Color change capable</td>
</tr>
<tr>
<td>Higher Maintenance costs (Filters)</td>
<td>Reduced Maintenance costs</td>
<td>Reduced Maintenance costs and high production</td>
</tr>
<tr>
<td>Entry level users</td>
<td>Entry level users and experienced users</td>
<td>Experienced users with multiple colors</td>
</tr>
<tr>
<td>Manual applications</td>
<td>Manual applications</td>
<td>Automatic and/or manual application capabilities</td>
</tr>
<tr>
<td>No VFD (less control of air flow)</td>
<td>VFD included (Precise air flow control)</td>
<td>VFD included (Precise air flow control)</td>
</tr>
</tbody>
</table>
Sizing Powder Booths: Batch System

- It is desirable to have 3 - 5’ of working area around the product for operator movement.

- Air velocity at the product should be between 80 -120 LFPM.

- Face Opening: 8'H x 10'W = 80 sq.ft.

  - 80 sq.ft. x 80 fpm face velocity = 6,400 cfm
  - 100 fpm face velocity = 8,000 cfm
  - 120 fpm face velocity = 9,600 cfm
Sizing Powder Booths: Pass Through

- Total air flow required to contain powder in any booth:

  \[ \text{Total Opening Area} \times \text{Face Velocity Through all Openings} \]

- Conveyor Slot (20’ X 4”): \(6.7 \text{ ft}^2\)
- Part Opening (6’ X 3’ X 2): \(36 \text{ ft}^2\)
  Include each end of booth
- Gun Slots (7.5’ X 4” X 4): \(10 \text{ ft}^2\)
  4 slots on this booth
- Operator Opening (2.5’ X 4’ X 2): \(20 \text{ ft}^2\)
  One on each side

- Total of all openings: \(72.7 \text{ ft}^2\)
Sizing Powder Booths: Pass Through

- 72.7 \text{ Ft}^2 \text{ opening} \times 80 \text{ fpm face velocity} = 5,816 \text{ cfm}
- 72.7 \text{ Ft}^2 \text{ opening} \times 100 \text{ fpm face velocity} = 7,270 \text{ cfm}
- 72.7 \text{ Ft}^2 \text{ opening} \times 120 \text{ fpm face velocity} = 8,724 \text{ cfm}
- 72.7 \text{ Ft}^2 \text{ opening} \times 150 \text{ fpm face velocity} = 10,905 \text{ cfm}

Additional Guidelines:

- Part Clearance at booth openings
  - 6” (minimum) all sides
- Part Hook Length
  - 36” (minimum) from part to conveyor rail
Other Considerations: Environmental Room

- Control parameters
  - Temperature 60 – 80 degrees F
  - Humidity 40 – 60% RH
  - Dirt and contaminants minimized
- Benefits of controlled environment
  - Fluidization
  - Powder flow & material handling.
  - Application charging
    - Faraday application
    - Impact fusion
    - First pass transfer efficiency
Other Considerations: Cross Drafts < 60 FPM
Col-Met Cartridges provide with RPB an EPB series booth:

- Height: 52.00"
- Outside diameter: 12.74"
- Filter Media Area: 397 ft²
  - 2.5 Air to Cloth Ratio
  - 1,000 CFM per filter

Filter “Seasoning”

- Is it required? Yes / No?
- 80/20 blend, Cellulose / Polyester
Filter Seasoning?

- New powder cartridges will allow for a more aggressive air flow which in some cases may cause damage to the new filters.
- The best way to “season” Col-Met Cartridge filters is to utilizing the incorporated VFD to slow down the linear air flow from 120 / 100 LFPM to 65 LFPM face velocity which will assure proper filter loading.
- Be sure to maintain factory blow down settings on the cartridge collector. **DO NOT** turn off the blow down process while pre-loading or seasoning filters.
Powder Booth Selection and Guidelines

Other Considerations: Clean / Dry Air

• It is the end-user's responsibility to provide clean and dry air to the powder booth.
  ✓ A Refrigerated or Desiccant Style Air Dryer Must be dedicated to the powder booth and powder application equipment.
  ✓ After Air Dryer you need coalescing filter package to removes oil and large particulate.
  ✓ This is the most common issue for powder system failure.

• If your customer does not designate a proper air dryer and filter coalescing system to the Col-Met Powder Booth and the system is damaged by moisture or oil the Col-Met Warranty is void.
Ground is measured in mega ohm's

✓ Only a mega-ohm meter can be used to measure this.

✓ A MULTIMETER CANNOT PROPERLY ACCOMPLISH THIS! It does not have sufficient energy to overcome contact resistance.

✓ “Ground” is considered good at 1 mega ohm or less of resistance between part and true earth ground (NFPA Requirement)
# Powder Booth Selection and Guidelines

## Return On Investment

<table>
<thead>
<tr>
<th>Booth Style</th>
<th>Filtration</th>
<th>Production Rate</th>
<th>Reclaim</th>
<th>Color Change</th>
<th>Price Point</th>
<th>Volume Applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>PB Series</td>
<td>3-Stage</td>
<td>Low Volume</td>
<td>No Spray to Waste</td>
<td>No Spray to Waste</td>
<td>$</td>
<td>??</td>
</tr>
<tr>
<td>RPB Series</td>
<td>Cartridge Fixed Module</td>
<td>Low - Medium Volume</td>
<td>Yes Single Color</td>
<td>No Spray to Waste</td>
<td>$$</td>
<td>??</td>
</tr>
<tr>
<td>EPB Series</td>
<td>Cartridge Removable Module</td>
<td>Medium - High Volume ConveyORIZED</td>
<td>Yes Single or Multiple Color</td>
<td>Yes With Replaceable Module</td>
<td>$$$</td>
<td>??</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Volume Applied / Week (lbs)</th>
<th>10</th>
<th>50</th>
<th>100</th>
<th>200</th>
<th>400</th>
<th>800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume Applied / Year (lbs)</td>
<td>500</td>
<td>2,500</td>
<td>5,000</td>
<td>10,000</td>
<td>20,000</td>
<td>40,000</td>
</tr>
<tr>
<td>Cost Per Pound ($)</td>
<td>$3.50</td>
<td>$3.50</td>
<td>$3.50</td>
<td>$3.50</td>
<td>$3.50</td>
<td>$3.50</td>
</tr>
<tr>
<td>First Time TE (%)</td>
<td>60%</td>
<td>60%</td>
<td>60%</td>
<td>60%</td>
<td>60%</td>
<td>60%</td>
</tr>
<tr>
<td>Waste Powder (lbs)</td>
<td>200</td>
<td>1,000</td>
<td>2,000</td>
<td>4,000</td>
<td>8,000</td>
<td>16,000</td>
</tr>
<tr>
<td>Waste Powder Value ($)</td>
<td>$700</td>
<td>$3,500</td>
<td>$7,000</td>
<td>$14,000</td>
<td>$28,000</td>
<td>$56,000</td>
</tr>
</tbody>
</table>
Who to Call?

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Thank-you!