The Benefits of Mastering Electrostatic Spraying

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Graco, Inc.
Advantages of Electrostatic Guns

- Savings in paint cost
- Reduced Hazardous Material
- Reduced VOCs & HAPS
- More Green
Variables of Transfer Efficiency

Transfer Efficiency Factors

- Applicator technology
- Fluid pressure
- Air pressure
- Booth airflow
- Grounding
- Operator experience
- Operator technique
Manual Electrostatic Gun Technology

- Air Spray Electrostatic Spraying
- Air Assisted Airless Electrostatic Spraying
Air Spray Technology

- Low fluid pressure
- Air pressure used to atomize
- Low to medium viscosity materials
- Class A or decorative finish
Setting Air Spray Fluid Pressure

- Adjust pressure to yield 8 - 10” straight fluid stream
- Different materials - different fluid pressures
- Distance from the part matters, not fluid pressure
- Measure with a fluid meter for best accuracy

Fluid Pressure
10 - 20 psi
0.66 - 1.3 bar

8 - 10 in
200 - 250 mm
Atomizing Air

- Adding atomizing air gives high velocity air flow that creates friction around the paint stream causing atomization.
- Start at 20 psi (1.5 bar) and make a quick pass over a test area.
- Inspect for consistent particle size.
- Increase pressure in 5 psi (.3 bar) increments and inspect again.
- After you reach consistent particle size more air will only cause more turbulence not better atomization.

Setting Air Spray Air Pressure

- Air Pressure
  - 20-60 psi
  - 1.5-3.5 bar

Transfer efficiency = 20 - 30%
Air Assisted Airless Technology

- High fluid pressure
- Air pressure used for pattern control
- High to medium viscosity materials
- High quality finish
Setting Air Assist Fluid Pressure

• Start at 400 psi (28 bar) fluid pressure

• Check pattern for consistent particle size

• Increase fluid pressure in 50 psi increments until consistent pattern

• Turn on pattern air to eliminate “tails”
Electrostatic Gun Setup

Minimize Current to Maximize Spraying Voltage

- Spraying distance to part
- Faraday Cage Effect
- Grounding of all components in spray booth
- Cleanliness of spray booth and gun
- Material conductivity
Factors

- Application tool determines base transfer efficiency

- Other contributing factors
  - Gun setup
  - Booth setup
  - Part size
  - Operator technique

Transfer Efficiency Variance of 20 - 30%

Efficiency is Effected by:

- Air & Fluid Pressure balanced with tip size +/-20%
- Air makeup +/-10%
- Size and Shape of Part
  - Small -20%
  - Medium -10/-20%
  - Large +10%
- Operator Technique +/- 10/-30%
Transfer Efficiency Comparison

- Paint Booth: Sprays 500 parts per day (2500 parts per week)
- Paint Costs: $60 per gallon
- Plant Operates: 50 weeks per year

**Poor Gun Set Up**
- Coats 100 parts per gallon of paint
- Paint used is 2500 parts/100 parts per gallon = 25 gallons
- Cost is 25 gallons x $60/gal = $1500 per week or $75,000 per year

**Proper Gun Set Up**
- Coats 115 parts per gallon (15% increase in TE)
- Paint used is 2500 parts/115 parts per gallon = 21.7 gallons
- Cost is 21.7 gallons x $60/gal = $1304 per week or $65,217 per year

=> Savings of $9,783 per year with a Proper Gun Set Up
Transfer Efficiency Testing

### ASTM Laboratory Standard

- Stationary gun operated automatically
- Specified paint characteristics
- Specified conveyor speed
- EVERYTHING IS SPECIFIED
- Weigh middle four targets
- Compare with total weight of paint sprayed
- Impossible to get > 50% transfer efficiency

### EN13966 Test Standard

- Spray pattern in middle of target
- Remove and weigh target
- Compare with total weight of paint sprayed

**Transfer Efficiency =** \[
\frac{\text{Weight of targets}}{\text{Weight of paint used}} - 1
\]
### Graco Applicator ROI

<table>
<thead>
<tr>
<th>Customer Name:</th>
<th>Joe Smith</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company:</td>
<td>Graco Inc.</td>
</tr>
<tr>
<td>Prepared by:</td>
<td>Graco Account Manager</td>
</tr>
<tr>
<td>Contact Information:</td>
<td>612-623-6000</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Paint price per gallon</th>
<th>$60.00</th>
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<tbody>
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<td>Gallons sprayed per day</td>
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<tr>
<td>Business days per month</td>
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</tr>
<tr>
<td>One month material cost</td>
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- **Current Technology Transfer Efficiency**
  - AirPro HVLP - 30%: 30%
  - New Technology Transfer Efficiency:
    - Pro Xp 60 - 65%: 65%

**One Month Material Savings**: $3,230.77

**Gun Price**: $5,750.00

**One Gun Payback**: 1.78 Months

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### ROI Transfer Efficiency

- Based on ASTM standards
- PRO Xp guns have not been tested to EN standards because the TE would be over 95%

### Material Savings Formula

\[
\text{Savings} = \frac{\text{TE old}}{\text{TE new}}
\]

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### Applicator ROI Tool

[www.graco.com](http://www.graco.com)  
Finishing Equipment Applicator Page
ROI Factors for Electrostatic Guns

- Reduced Material Usage
- Reduced Labor
- Increased Production Throughput
- Decreased Emissions
- Decreased Material Disposal Fees
- Decreased Filter Usage
Q and A

For more information go to www.graco.com/finishing

Thank you for Attending!