

Mist Coating/Roll Coating

Presented by Jim Arvin

RADTECH
THE ASSOCIATION FOR UV&ER TECHNOLOGY

Methods of Applying UV Coating

- Hand Spray
- Moulding Spray
- Reciprocating / Rotary Spray
- Robotic Spray
- Vacuum Coat
- Fan Coat
- Curtain Coat

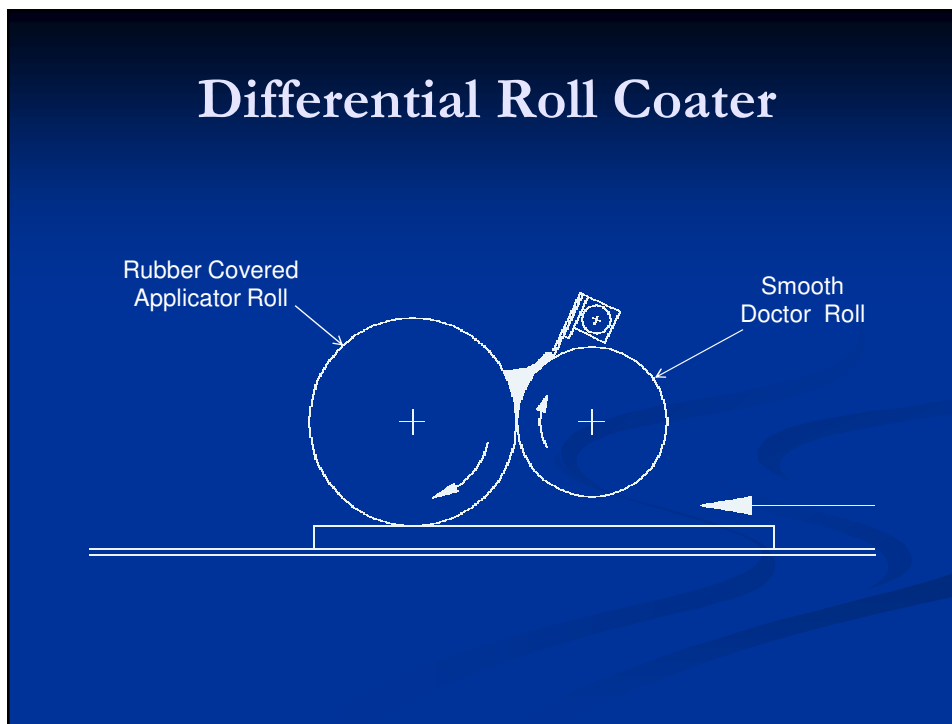
Methods of Applying UV Coating (Cont'd)

- Mist Coater
- Roll Coat
 - Differential Roll Coater
 - Combination Coater
 - Reverse Roll Coater

Mist Coater

- Most effective way to spray 100% solids UV curable coatings
- Advantages
 - 98% coating utilization
 - Low operating costs
 - Lower film builds
- Limitations
 - Color changes
 - Maximum part width 36 inches

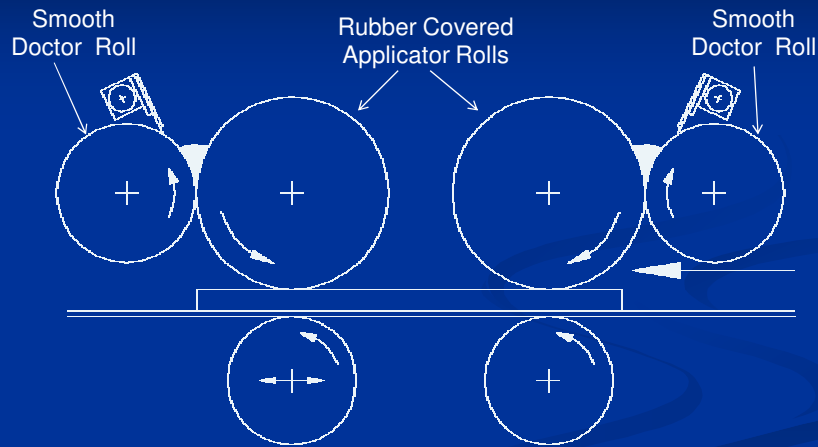
Differential Roll Coater



Differential Roll Coater (Cont'd)

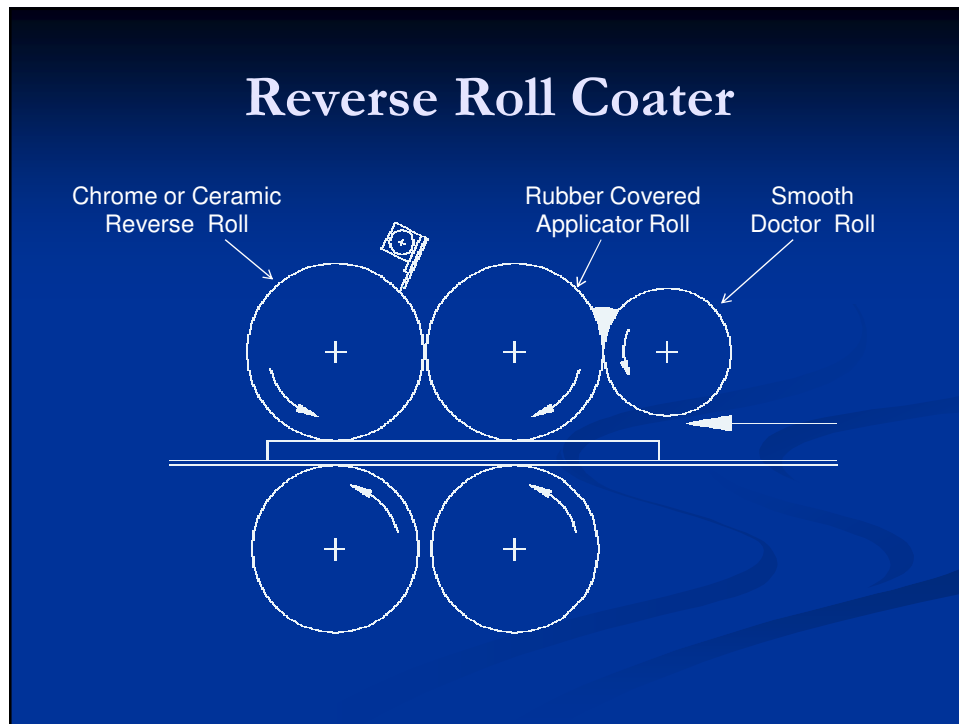
- Most effective roll coater type to apply UV curable coatings
- Upper limit on film build of about .5 mil
- Limitations
 - Multiple coats need to be applied to achieve heavier film builds
 - Wet-on-wet coats can be applied to slightly increase film build or partial UV between coats is used to achieve heavier builds

Combination Coater



Combination Coater (Cont'd)

- Used to apply heavier film builds, greater than .5 mil
- Limitations
 - Difficult to coat cut-to-size parts because leading and trailing edges are difficult to control



Reverse Roll Coater (Cont'd)

- Used to fill voids in substrate surface
 - Particle board
 - Open grain in wood (desktops, oak flooring, etc...)
- Limitations
 - Limited on size of void that can be filled

Selecting Application Method

- Product Considerations
 - Flat surface
 - Flat surface with contoured edges
 - 3D (less than 6" tall)
 - Number of surfaces to be coated
 - Lineal components
 - Frequency of profile changes
 - Product Length

Selecting Application Method (Cont'd)

- Coating Considerations
 - 100% Solids, Solvent Reduced, Water Reduced
 - Sealer or Top Coat
 - Clear or Pigmented
 - Variations in Sheen
 - Dry film build required
 - VOC limitations

Selecting Application Method

(Cont'd)

- Quality Considerations
 - Performance
 - Scratch Resistance
 - Abrasion Resistance
 - Chemical Resistance
 - Appearance

Selecting Application Method

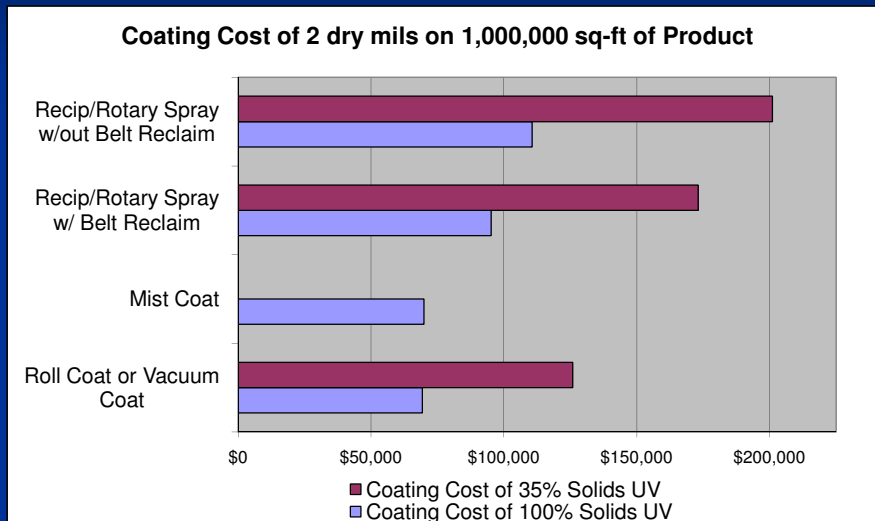
(Cont'd)

- Cost Considerations
 - Coating
 - Equipment
 - Labor
 - Utilities
 - Floor Space
 - Equipment
 - Work in process

Coating Cost Comparison

- Application Efficiency Ranges:
 - Reciprocator /Rotary Spray WITHOUT belt reclaim
 - 55% to 70%
 - Reciprocator /Rotary Spray WITH belt reclaim
 - 65% to 80%
 - Mist Coat
 - 98%
 - Roll Coat or Vacuum Coat
 - 99%

Coating Cost Comparison (Cont'd)



Coating Cost Comparison (Cont'd)

Coating Cost Formula

$$\frac{\text{Surface Area (ft}^2\text{)} \times \text{Coating Dry Build (mils)}}{\text{Coating Solids (\%)} \times \text{Application Efficiency (\%)}} \times \text{Coating Cost per Gallon (\$)} \times 6.234$$

Where constant 6.234 represents unit conversions.

Coating Cost Comparison (Cont'd)

Example:

Surface Area:	1,000,000 ft ²
Coating Dry Build:	2 mils
Coating Solids:	40 %
Application Efficiency:	72 %
Coating Cost:	\$ 35.00 per Gallon

$$\text{\$ 151,520.83} = \frac{1,000,000 \times 2}{40 \times 72} \times 35 \times 6.234$$

Summary

- Coating application method needs to be chosen based on the following considerations
 - Product shape
 - Coating
 - Quality
 - Cost
- Roll coating can be combined with other application methods

Summary (Cont'd)

- Roll coating is the most efficient method of applying 100% solids UV coatings
- Mist coater is the most efficient method of applying 100% solids UV coating to 3D parts
 - Application efficiencies equal to Vacuum Coating
- 3D UV curing systems should provide even energy to all surfaces (edges & top)

Summary (Cont'd)

- UV coating system advantages
 - Low or No VOCs
 - Lower applied costs
 - Small equipment footprint
 - Reduced cycle times

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