



# **Basic Principles of Finishing and the Vacuum Coating Process**



***Delle Vedove***<sup>®</sup>

**Leaders in Wood Finishing Systems**



## *I need to finish mouldings. How do I do that??*

3 basic steps to achieve a quality finished piece: **STAIN + SEAL + TOP COAT = DONE!**

**a.**

### **STAIN!**

The first step in the process of finishing wood mouldings is staining (giving your wood piece a particular color or tint). Stains are usually water-based, therefore you will need a machine that applies the stain, as well as a drying system to optimize your overall production time (common drying techniques include hot air and infrared).

**b.**

### **SEAL!**

Once you have a dry stained moulding, you need to seal it with a durable UV coating that will protect it and make it a quality piece for your customers. UV coatings are usually 100% solids (contain no water) and require a UV curing oven, that will instantly dry the piece before it comes out. After this step you will need to denib the wood piece to make it a smooth surface (the coating raises the wood fibers on the first pass when it is absorbed).

**c.**

### **TOP COAT!**

You're almost done - the final step in achieving a perfectly finished moulding is the top coat. Just run the wood piece again through the cycle of denibbing, coating, and drying. Voila'! If you have used a UV coating, your piece is ready for stacking!

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# Main Finishing Process for Mouldings

Basic Finish	Priming	Quality Finish
<p>Staining ↓ Self Sealing Top Coat (Toner)</p>	<p>Sanding ↓ One Coat Priming ↓ Denibbing ↓ Two Coat Priming</p>	<p>Sanding ↓ Stain + Dry ↓ Seal Coat + Dry ↓ Denibbing ↓ Top Coat + Dry</p>

# 1<sup>st</sup> Step: Staining your product (for wood pieces)



## 2. Cure

The dry piece comes out of the oven and is now ready to be sealed and top-coated.



## 1. Stain

The raw-wood moulding goes through a vacuum coater that applies a water-based tinted stain, then passes into an Infra-Red curing oven.



# Sealing & Top Coating

## 1. Sand/Denib

Before the coating is applied, the workpiece must be sanded for optimum adherence.



## 2. Coat

A vacuum coater applies clear or tinted UV on all 4 sides or only selected ones. Control film build by simply increasing or decreasing the vacuum.



## 3. Cure

After the coating process the moulding instantly runs through the curing tunnel, where UV lamps irradiate the moulding 360° for an instant curing of each piece.



4. Run the piece through again to top coat it

Model shown: CVS/3, Made in the USA.

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# Compact UV Finishing System

(CLICK ON IMAGE TO PLAY MOVIE CLIP)



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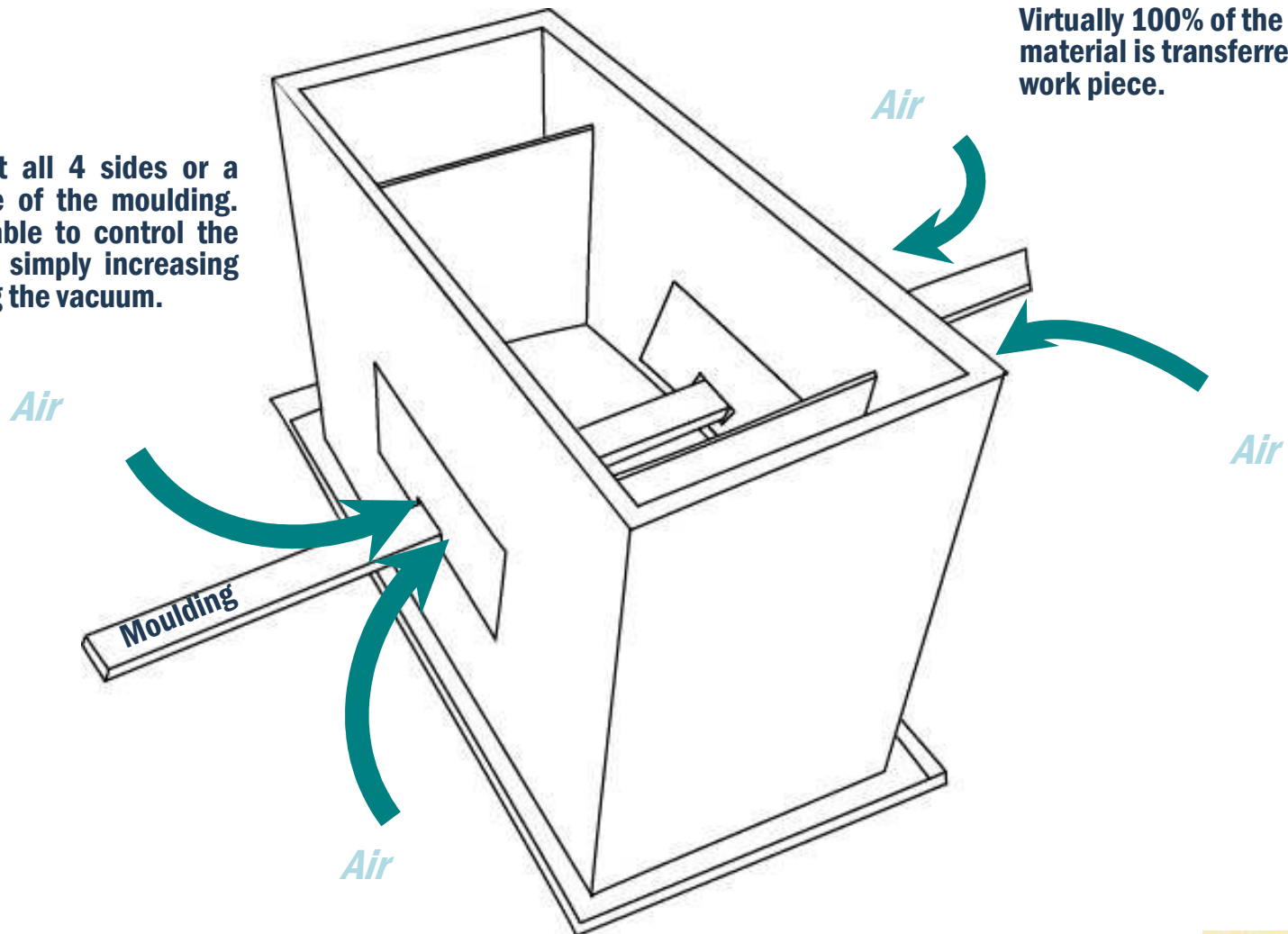
**Ok, I get the process of finishing now...**

**So how does the vacuum coater work?!**

# Vacuum Coating: Application Process

The fundamental concept of vacuum coating is very simple. Liquid coating is pumped into the base of the application chamber and due to the vacuum created the material flows freely to coat all exposed sides of the workpiece that is being passed through the unit.

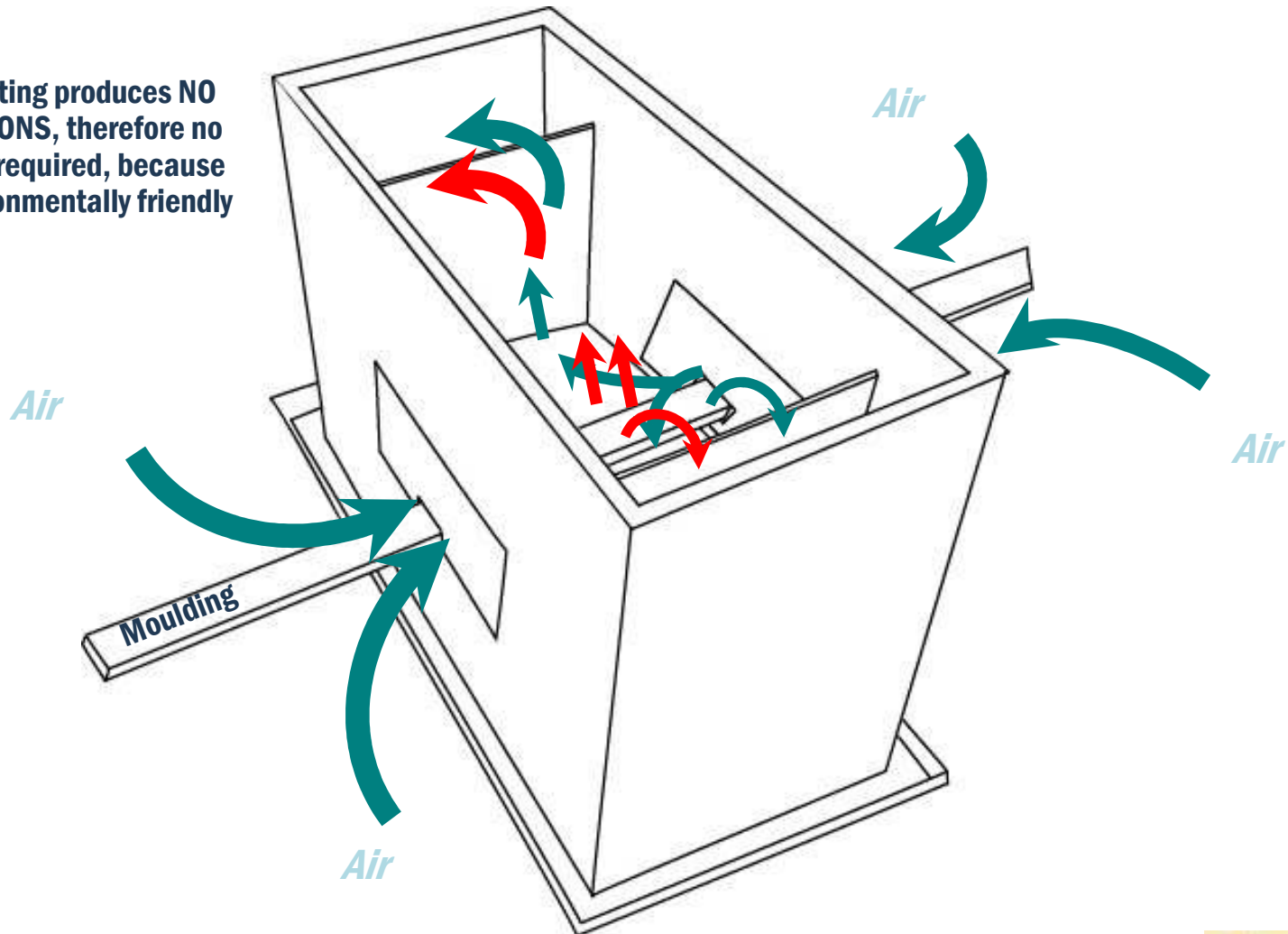
You can coat all 4 sides or a selected side of the moulding. You will be able to control the film build by simply increasing or decreasing the vacuum.



# Vacuum Coating: Application Process

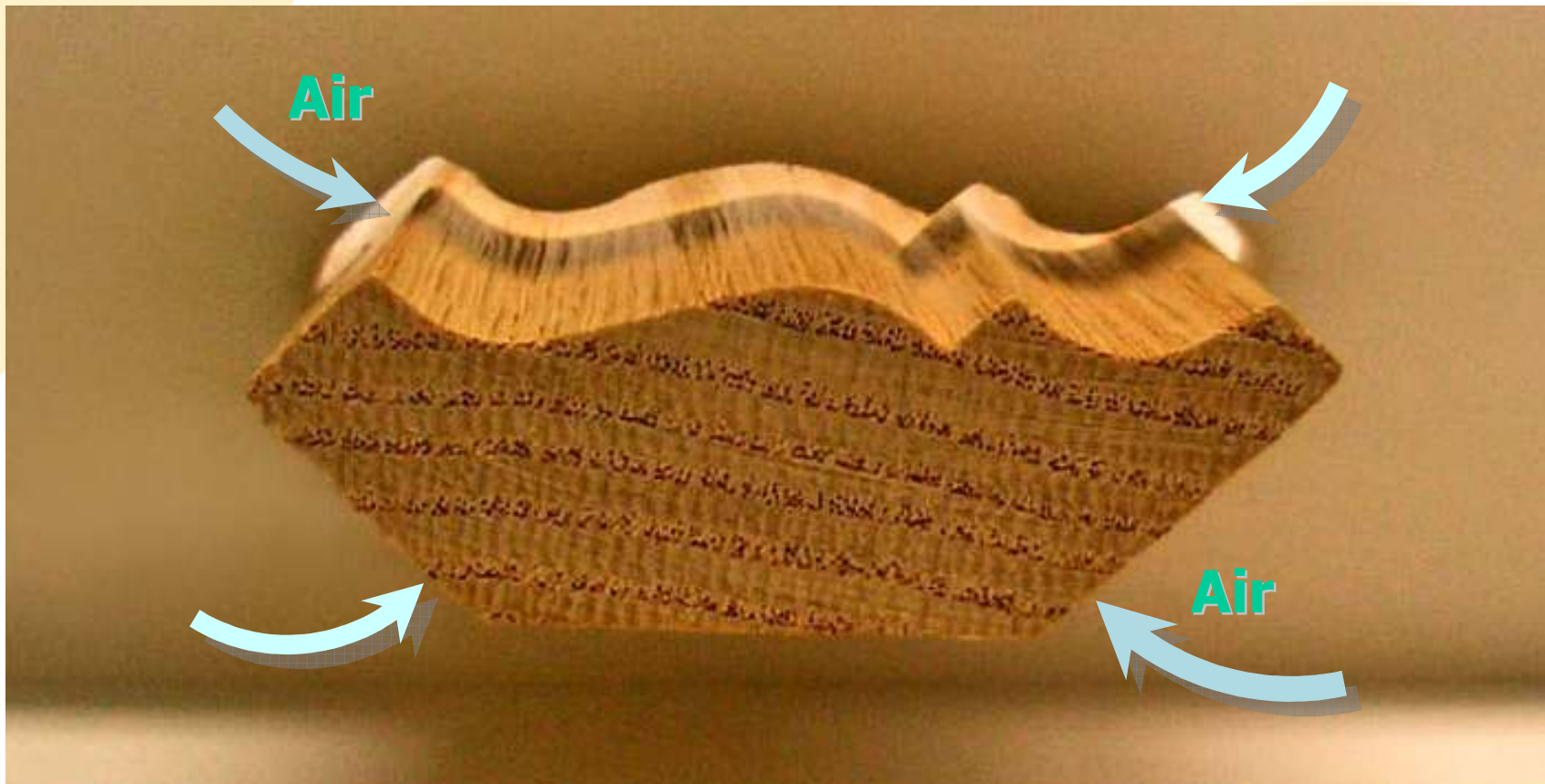
**100% TRANSFER EFFICIENCY** = The coating material is transferred to work piece inside the vacuum chamber. Any material that has not been transferred is recycled and returns to the reservoir for the next application. This process is called a “closed-loop system”, it keeps coating costs down, since no coating product is wasted.

Vacuum coating produces **NO VOC EMISSIONS**, therefore no permits are required, because it's an environmentally friendly process.



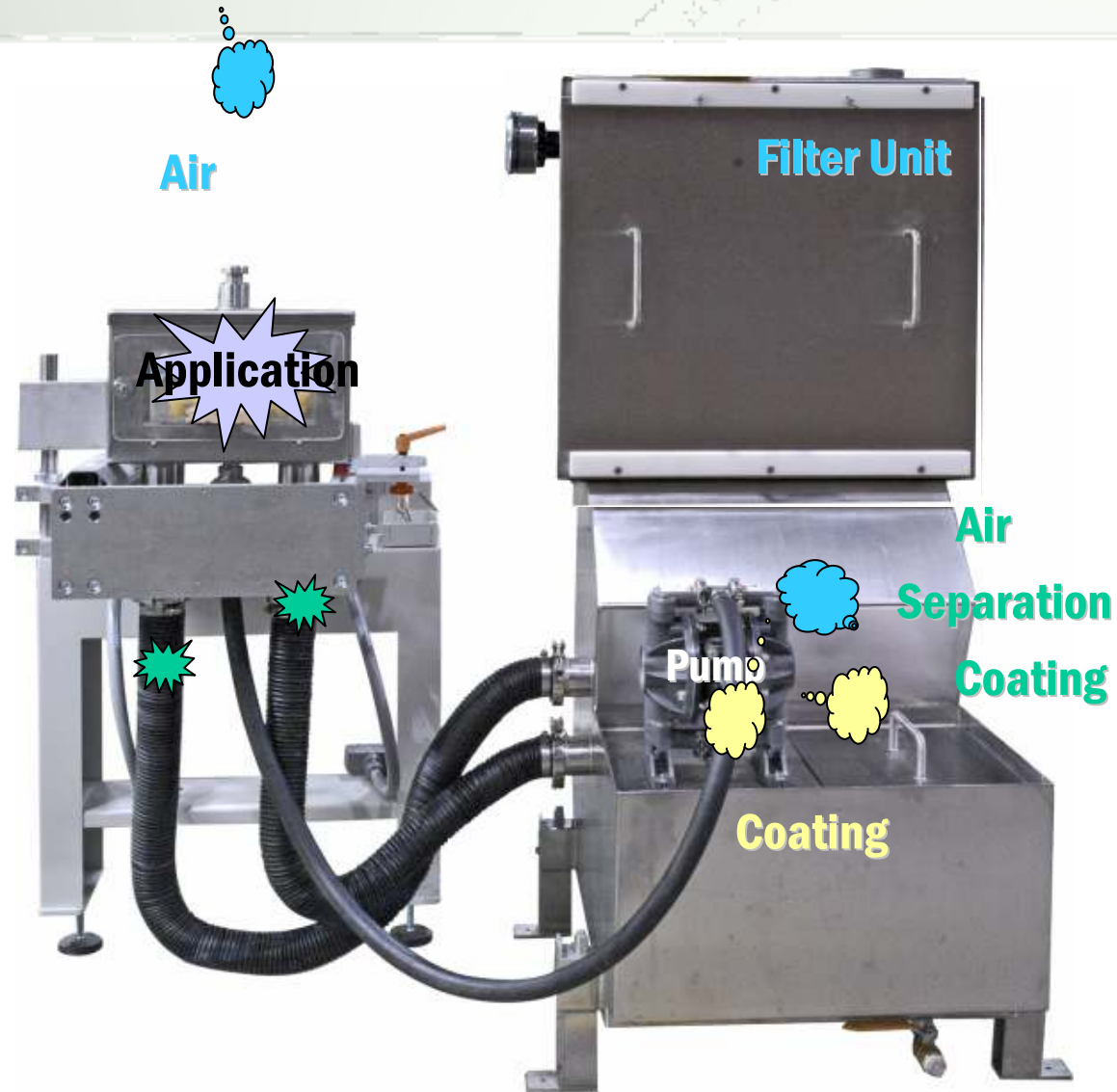
## Vacuum Coater Template

A template can be created for any kind of moulding – the profile is traced according to the particular work piece so the best possible application can be achieved.



It is important that the contour of the in-feed and out-feed matrixes be matched to the contour of the work piece, allowing approximately 1/8 of an inch space for air to flow around the moulding.

# Vacuum Coating uses a *CLOSED LOOP SYSTEM*



# Precise control of film thickness

The air vacuum serves two purposes. First it suctions coating material from the bottom of the chamber into the application area, vaporizing the material much like a tornado. Secondly, it creates a laminar flow of air through the contoured entry and exit slots, removing excess coating and smoothing the substrate surface finish.

**Precise control of film thickness is based on these determining factors:**

- a. Quantity of coating material in the application chamber. This is controlled by a fine adjustable ball valve.**
- b. Vacuum: The volume and therefore the force of air which suctions the coating material back into the application chamber is controlled by the amount of vacuum.**
- c. Feed Speed: The feed speed controls the amount of time the air is given to suction off coating material from the substrate.**

These controls are used together to achieve the correct coating thickness desired. Coating thicknesses from 20 to 200 g/m<sup>2</sup> have been achieved.

## *What type of coatings can I apply with a vacuum??*

### **WATER**

**STAINS  
PRIMERS  
EXTERIOR COATINGS**

### **100% UV**

**CLEAR  
PIGMENTED  
FILLERS  
TINTED UV**

### **OTHER**

**WAX/PARAFFIN  
ADHESIVE  
OIL**



# ***Why should I use vacuum coating technology?***

**Because the advantages of vacuum coating are endless!**

## **Increased Application Efficiency**

**VIRTUALLY 100% OF THE COATING IS TRANSFERRED TO THE WORK PIECE, WITH LOW COATING COSTS  
COAT ALL 4 SIDES OR ONLY SELECTED ONES  
SELECTIVE EDGE APPLICATION (SHROUDING)**

## **Uniform Coating Application**

**PRECISE CONTROL OF FILM THICKNESS  
THIN APPLICATIONS  
TIME-EFFICIENT APPLICATION & SUPER-FAST DRYING**

## **Very Low Operating Maintenance**

**NO FREQUENT CLEANING REQUIRED  
LOW SKILL LEVEL REQUIRED – EXTREMELY EASY TO USE**

## **Minimal Energy Consumption**

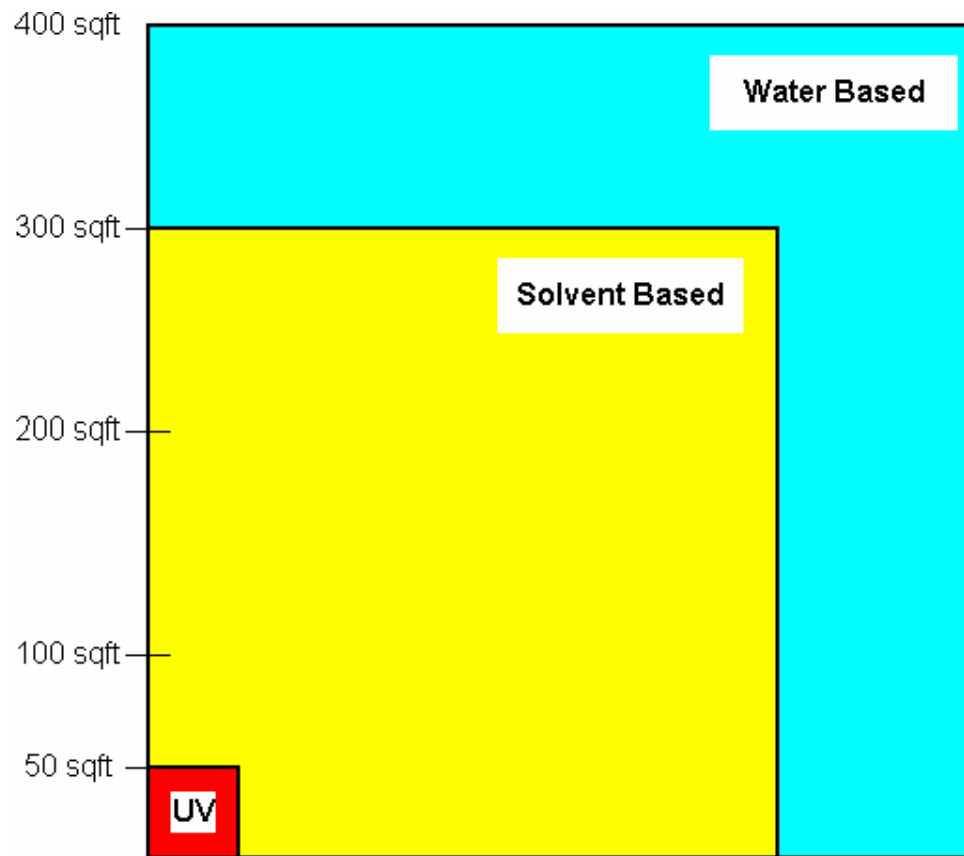
**UV OVEN (60kW/Hr = \$3.00 TO \$5.00/hour)**

## **Lower Capital Investment**

**SMALL FOOTPRINT – SMALL SPACE REQUIRED  
FEW MATERIAL HANDLING EQUIPMENT  
LOW FLAMMABILITY/ NO VOC EMISSIONS  
NO PERMITS REQUIRED BECAUSE IT'S AN ENVIRONMENTALLY FRIENDLY PROCESS!  
AFFORDABLE FOR ANY SIZE SHOP**

# Comparing Applications

## SPACE REQUIREMENT



# *Should I spray or should I vacuum??*

Let's compare application systems: Spray Vs. Vacuum.

**SPRAY**



**VACUUM**

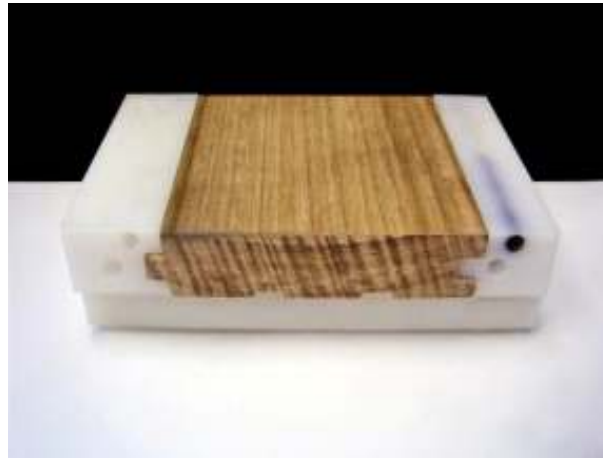


<b>Transfer Efficiency</b>	<b>40%- 60%</b>	<b>99%</b>
<b>Coats 4 sides</b>	<b>No</b>	<b>Yes</b>
<b>Coating Selection</b>	<b>All Types</b>	<b>Water &amp; UV</b>
<b>Emissions</b>	<b>Yes</b>	<b>Not relevant</b>
<b>Maintenance</b>	<b>High</b>	<b>Low</b>
<b>Setup Time</b>	<b>Low</b>	<b>Low-Med</b>
<b>Skill Level</b>	<b>Med-High</b>	<b>Low</b>
<b>Space Requirement</b>	<b>200-400sq.ft.</b>	<b>50ft.</b>

# *Will vacuum coating work on my products??*



- **4-SIDED COATING**
- **3-SIDED COATING**
- **SELECTIVE COATING**



## **COVERED MARKETS:**

- **FURNITURE MOULDINGS**
- **KITCHEN CABINET MOULDINGS**
- **ARCHITECTURAL MOULDINGS**
- **PICTURE FRAMES**
- **FLOORING**
- **TOOLS/HANDLES/DOWELS**
- **SHUTTERS/BLINDS**
- **BUILDING PRODUCTS**
- **BILLIARD MOULDINGS**
- **CASKET COMPONENTS**



# Air Drying Systems

## RACKS / AUTOSTACKER



Air Dry Waterbase & Solvent Coatings

**ADVANTAGE:** Low initial cost

**DISADVANTAGE:** Long dry time with evaporation of solvent vapors

## HIGH VELOCITY HOT AIR OVEN



Drying of both Waterbase & Solvent Coatings

**ADVANTAGE:** Very flexible with capability for extended drying times

**DISADVANTAGE:** Large Footprint

# Radiation Curing Systems

## INFRARED

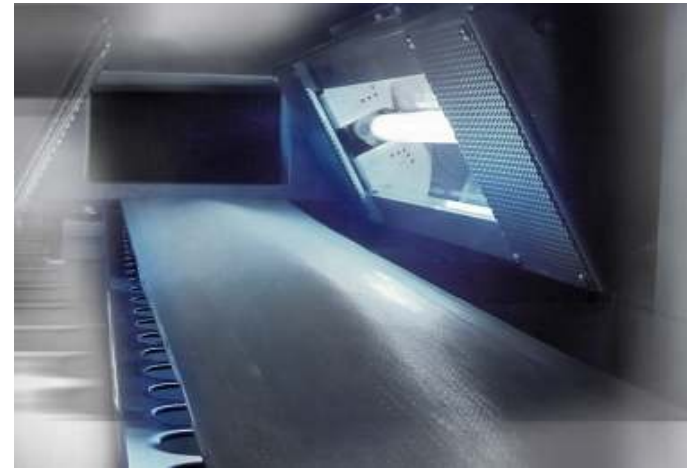


High Speed Drying of Waterbase Coatings, (usually white primer)

**ADVANTAGE:** High speed drying

**DISADVANTAGE:**  
Normally a single use production system

## UV OVEN



Curing of 100% Solid UV Coating

**ADVANTAGE:** Small Footprint and instant cure without VOCs

**DISADVANTAGE:** Used only for UV coatings

**THANK YOU FOR YOUR ATTENTION!**

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