

Advantages, Cost & ROI Analysis of UV-Curable Powder Coatings

Michael Knoblauch
DVUV Holdings, LLC

Radtech
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Presentation Overview

- Market
- UV-Cured powder coating
 - Chemistry
 - Application technology
- Advantages
- Cost Analysis
- ROI Analysis
- Questions

Coatings Market

- Paints and coatings market*
 - The 2009 global coatings market was US\$86.7 billion.
 - In 2008, powder coating was a US\$6.5 billion industry.
 - Powder manufacturing is a US\$5.4 billion industry worldwide.
- UV-cured coating market*
 - UV-curable coatings from 2009-2017 will grow at a 6.65% rate to 1210.66 metric tons of product.

* Data from Global Industry Analysts, Inc.

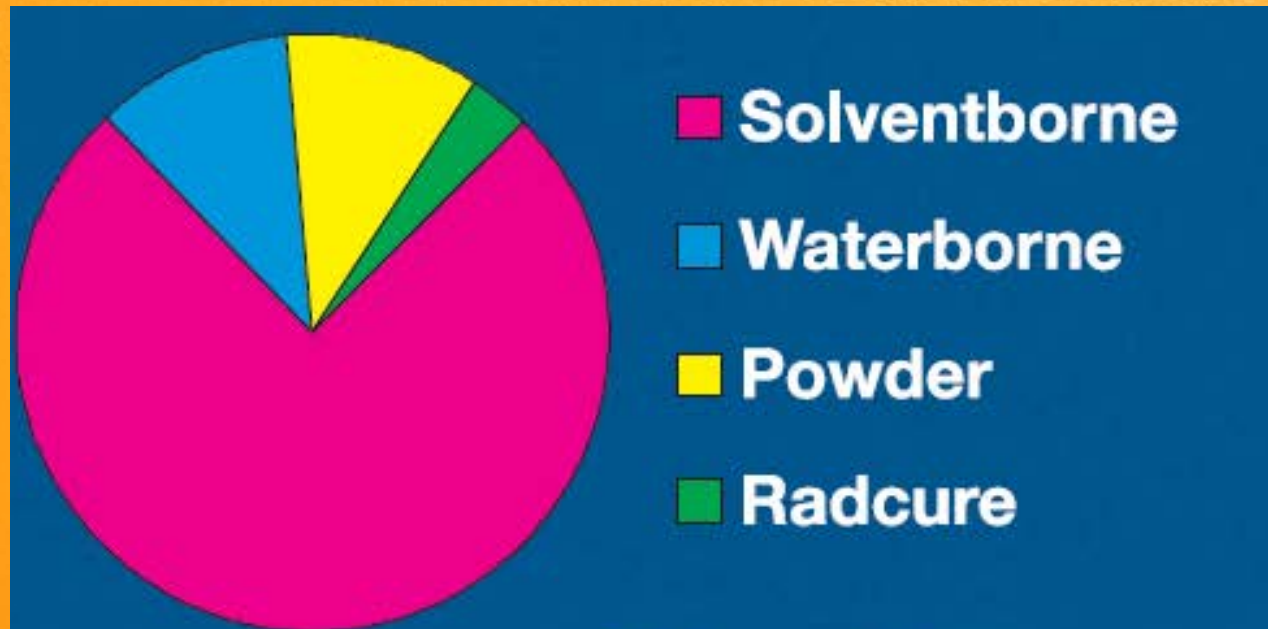


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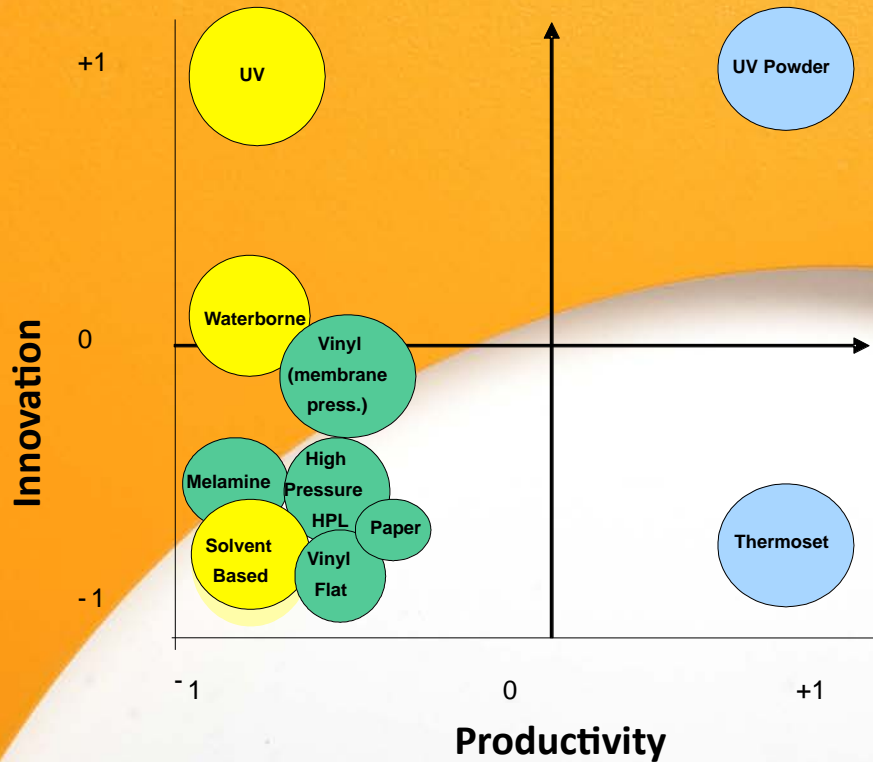


Industrial Coatings Market




Productivity & Innovation

Innovation



Liquid 

Lamination 

Powder coating 

UV-Cured Powder Coating Chemistry

- Chemistry and chemistry developments are key to the UV-cured powder market
- “UV-powder on MDF” a market success
- New and innovative UV-cured powder chemistries enable other market opportunities
 - New & improved resin chemistries
 - Additives
 - Applications for other types of heat sensitive substrate



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Powder Coating MDF

- MDF or Medium Density Fiberboard
 - ◆ Made from wood fibers, resins & additives which are bonded under heat and pressure.
- Excellent substrate for UV powder coating
 - ◆ Dense & flat
 - ◆ Low porosity
 - ◆ Homogenous

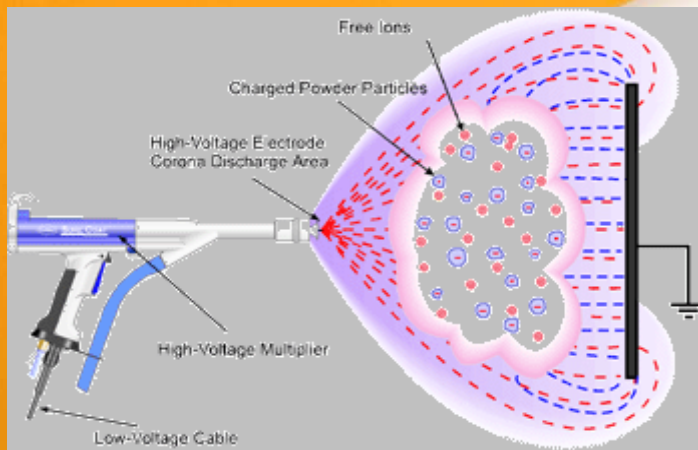


Powder Coating MDF

- Heating the board draws moisture to the surface, making it conductive for electrostatic powder application.
- 2 Types of Application

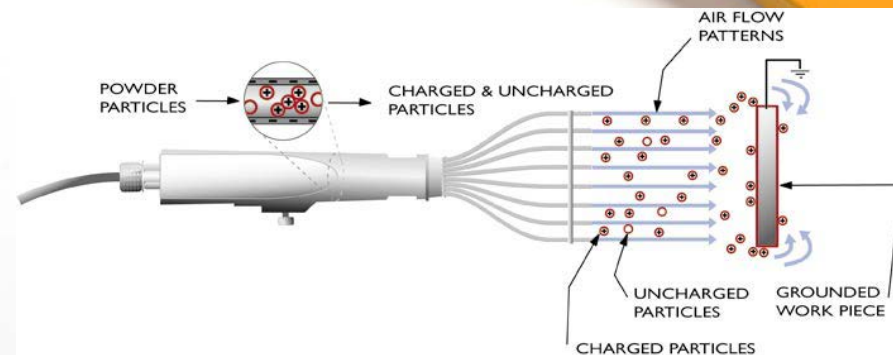
Corona Spray

Powder passes through highly charged & ionized corona field, powder picks up negative charge
High transfer efficiency and applies quickly



Tribo Charging

Powder develops a static charge due to friction
Provides better penetration into recesses
Slower application and lower transfer efficiency



UV Powder Applications for MDF

■ Markets

- Retail displays, fixtures and P-O-P
- Healthcare and medical equipment
- Storage and cabinetry
- Specialty furniture

■ Excellent Finish and Process

- Superior wear characteristics
- Visual appeal and design innovation
- Fast, efficient manufacturing
- Environmentally safe production and end-products



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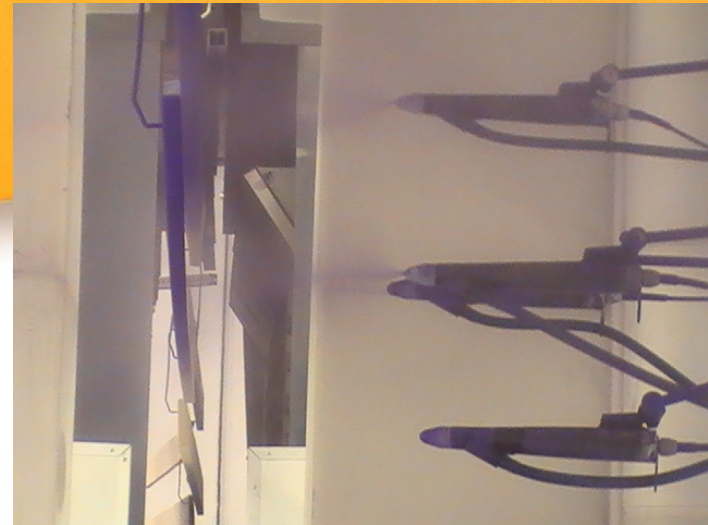
Why Powder Coat MDF?

- Increased design flexibility
 - ◆ No edge banding
 - ◆ Seamless 360° coverage
- Demand for environmentally friendly products and processes.
 - ◆ No VOCs, HAPs, or solvents
- Superior wear characteristics
 - ◆ Strong cross-linked finish
 - ◆ Withstands high traffic environments



Why Powder Coat MDF?

- Fast and efficient production
 - ◆ 20 minute process
 - ◆ 1 coat finish
- Ease of material handling
 - ◆ No messy liquids
 - ◆ Ability to reclaim waste powder
- Fast color changes



UV Curing

Ultraviolet curing (commonly known as UV curing) is a photochemical process in which high-intensity ultraviolet light is used to instantly cure or “dry” inks, coatings or adhesives.



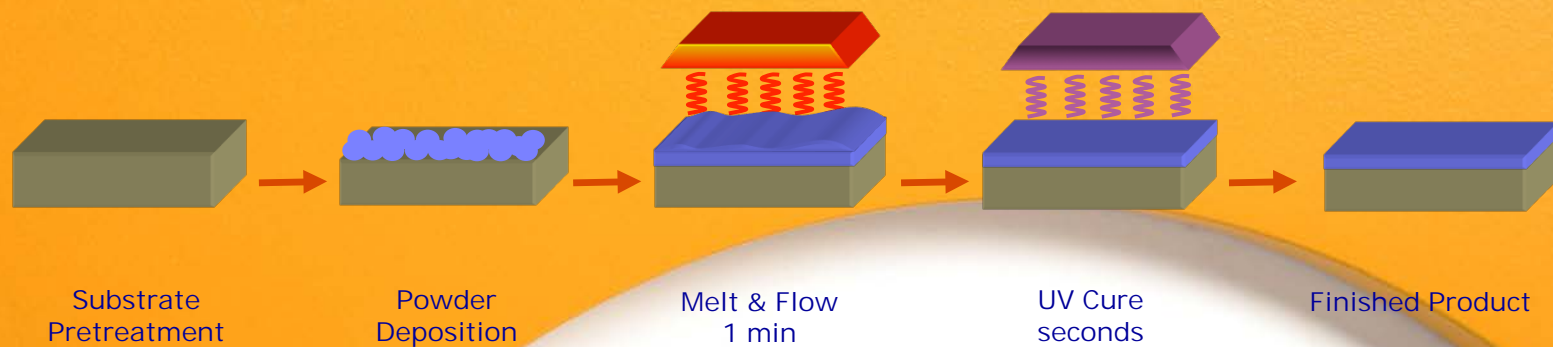
DVUV
finishing at the speed of light™

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DVUV Systems

UV-Cured Powder Coating Process



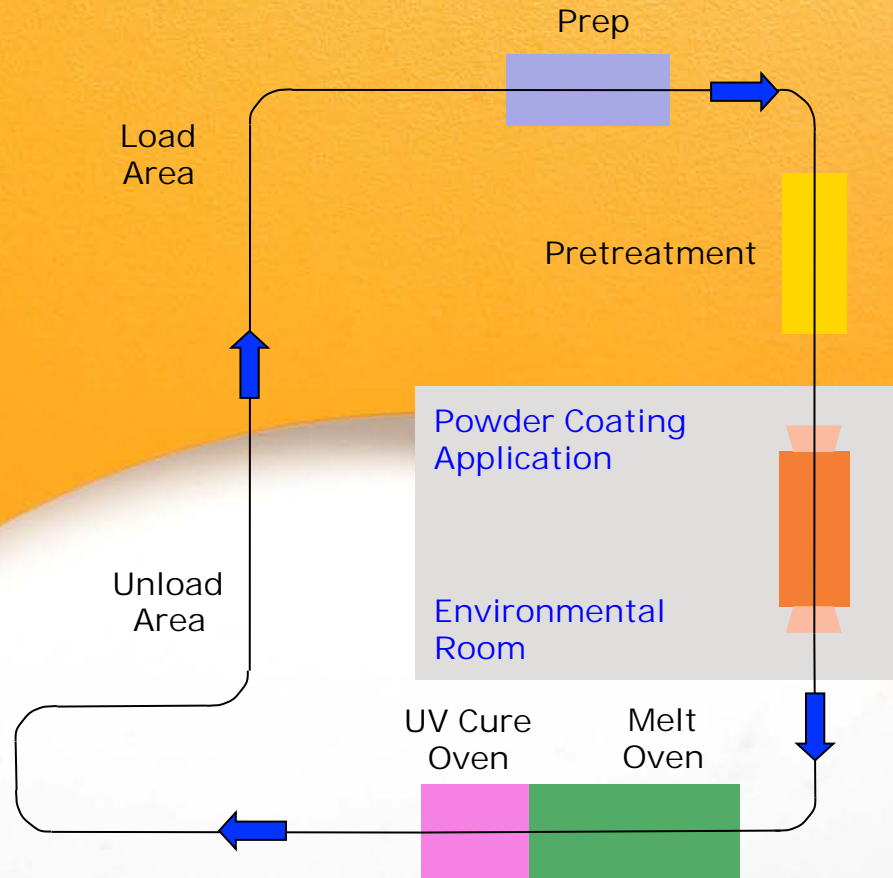
Raw Component to Finished Product:
20 Minutes

UV Powder Application System

- A UV powder application system

- Parts are loaded and prepared
- Pretreatment
- Electrostatic powder application
- Flow/Melt oven
- UV Cure oven

200 feet line – cycle 20 minutes



UV Finishing Advantages

■ Fast

- Instant cure
- Completed parts in 20 minutes or less
- One coat

■ Clean

- No harmful chemicals
- Safe to use – no special safety gear
- Easy material handling and clean up

■ Green

- Smallest carbon footprint of any coating material
- No VOC's
- No operating permits – waste recycling

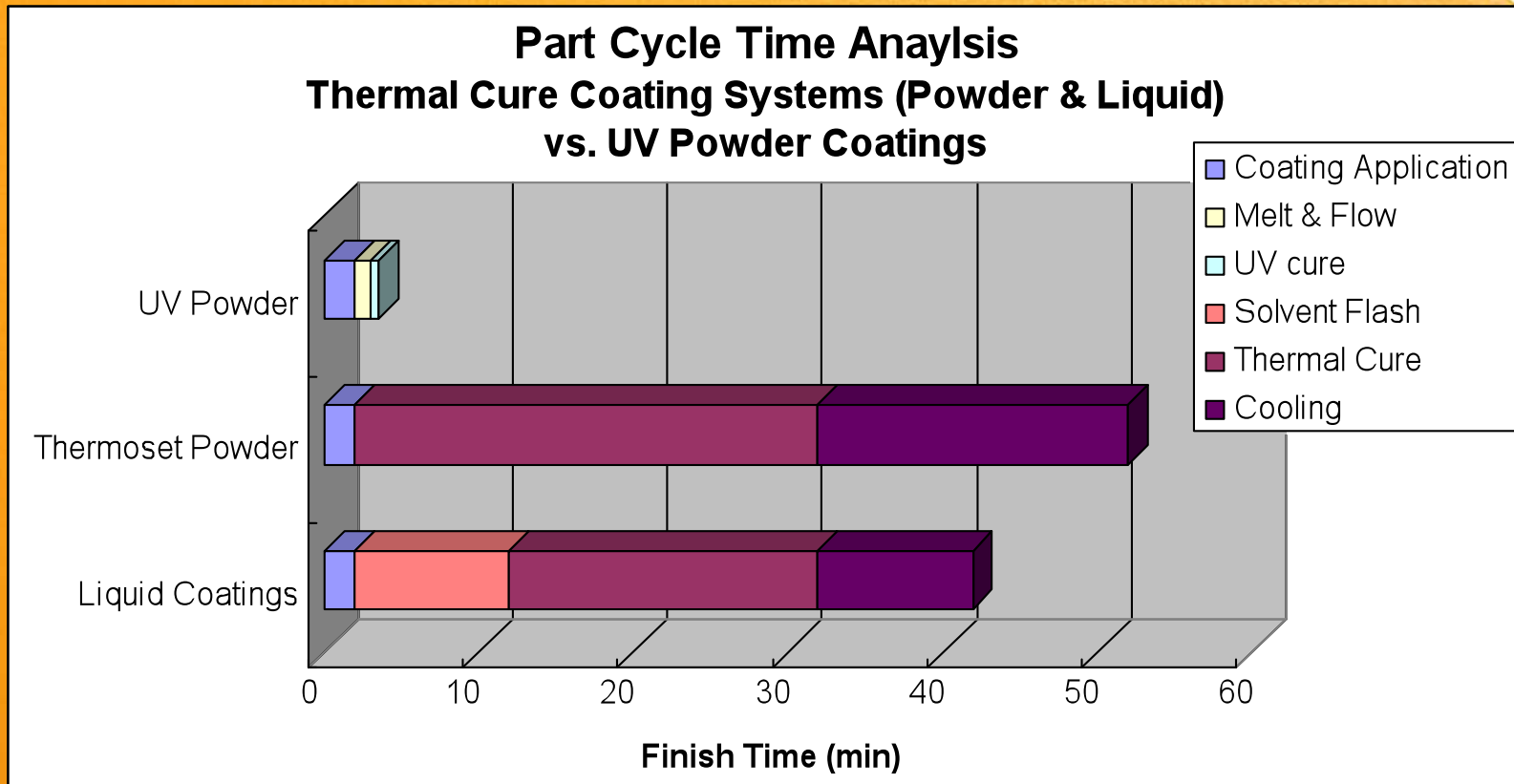


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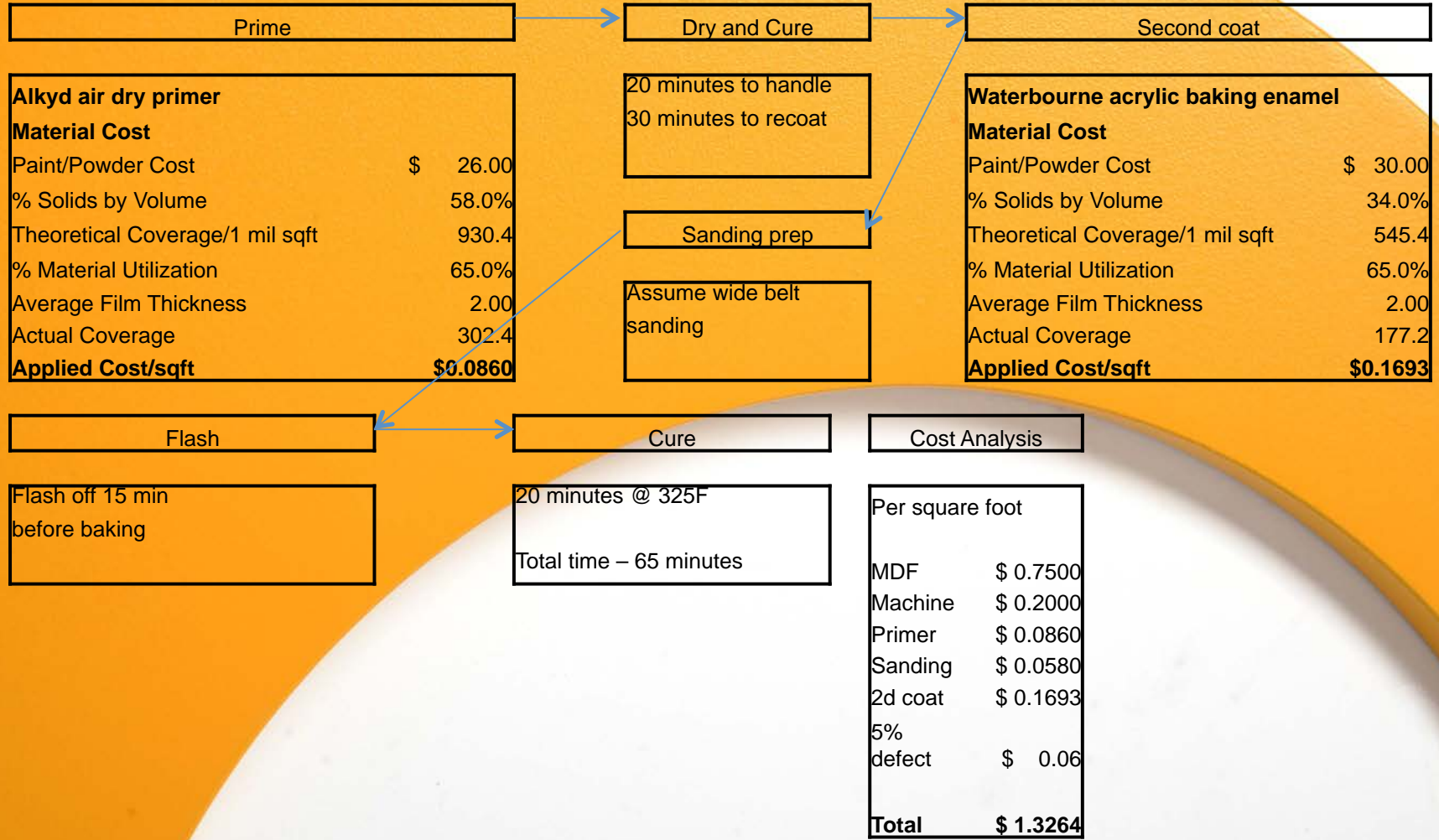
Speed Wins!



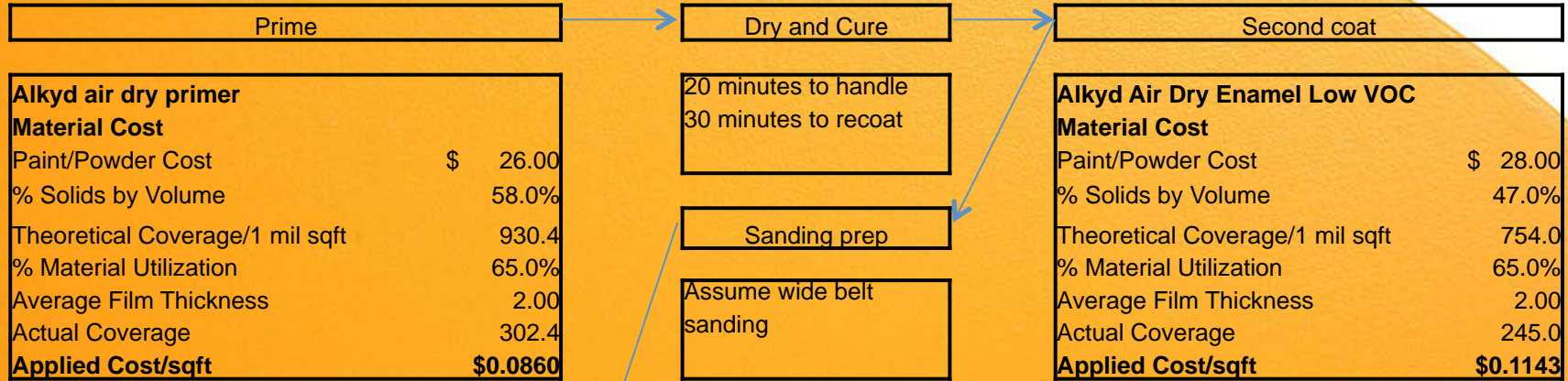




Cost Example #1



Cost Example #2



Alkyd air dry primer

Material Cost

Paint/Powder Cost	\$ 26.00
% Solids by Volume	58.0%
Theoretical Coverage/1 mil sqft	930.4
% Material Utilization	65.0%
Average Film Thickness	2.00
Actual Coverage	302.4
Applied Cost/sqft	\$0.0860

20 minutes to handle
30 minutes to recoat

Sanding prep

Assume wide belt sanding

Alkyd Air Dry Enamel Low VOC

Material Cost

Paint/Powder Cost	\$ 28.00
% Solids by Volume	47.0%
Theoretical Coverage/1 mil sqft	754.0
% Material Utilization	65.0%
Average Film Thickness	2.00
Actual Coverage	245.0
Applied Cost/sqft	\$0.1143

Flash

None required

Cure

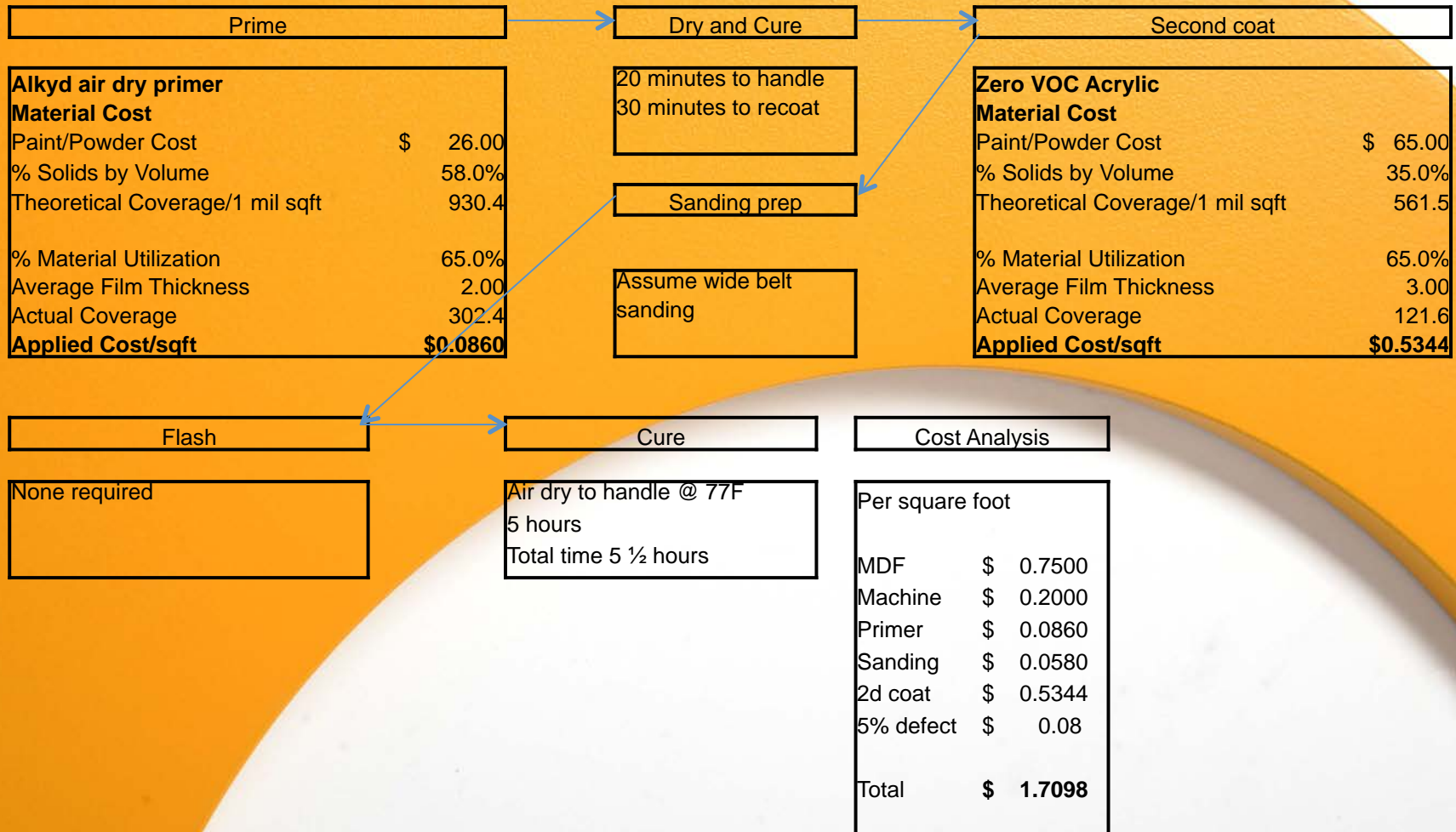
Air dry to handle 60 min
Total time 90 minutes

Cost Analysis

Per square foot

MDF	\$ 0.7500
Machine	\$ 0.2000
Primer	\$ 0.0860
Sanding	\$ 0.0580
2d coat	\$ 0.1143
5% defect	\$ 0.06
Total	\$ 1.2687

Cost Example #3



Cost Example #4

Applied Coating Cost Worksheet UV-Cured Powder Coating

Process	Application	
	Single Pass	Reclaim
Paint Cost \$/lb	\$ 7.00	\$ 7.00
Volume Solids	100%	100%
Specific gravity	1.5	1.5
Theoretical Square ft Coverage @ 100%	128.2	128.2
Application Material Utilization %	65%	95%
Dry Film Thickness Mils	3.5	3.5
Actual Coverage Sq Ft/ pound	23.81	34.80
Applied Cost \$/Sq. ft.	\$ 0.294	\$ 0.201

Cost Analysis Per Square Foot	
MDF	\$ 0.7500
Machine	\$ 0.2000
Primer	\$ -
Sanding	\$ -
Finish Coat	\$ 0.2940
1.5% defect	\$ 0.0173
Total @ 65%	\$ 1.2440
Total @ 95%	\$ 1.1683

Total time to finish 20 minutes



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Margin Analysis

	#1 Waterborne acrylic baking enamel	#2 Alkyd air dry enamel low VOC	#3 Zero VOC Acrylic	#4 UV-cured powder spray to waste	#5 UV-cured powder reclaimed
Parts # day	413	388	148	1,078	1,078
Sqft # day	4,750	4,462	1,702	12,397	12,397
Sqft # yr	1,187,375	1,115,500	425,500	3,099,250	3,099,250
Selling price/sqft	\$ 2.00	\$ 2.00	\$ 2.00	\$ 2.00	\$ 2.00
Unit selling price	\$ 23.00	\$ 23.00	\$ 23.00	\$ 23.00	\$ 23.00
Sales per day	\$ 9,499	\$ 8,924	\$ 3,404	\$ 24,794	\$ 24,794
Sales per year	\$ 2,374,750	\$ 2,231,000	\$ 851,000	\$ 6,198,500	\$ 6,198,500
Direct costs/sqft	\$ 1.3264	\$ 1.2686	\$ 1.7097	\$ 1.2440	\$ 1.1683
Direct costs/part	\$ 15.25	\$ 14.59	\$ 19.66	\$ 14.31	\$ 13.44
Profit margin/part	\$ 7.75	\$ 8.41	\$ 3.34	\$ 8.69	\$ 9.56
Profit margin %	33.68%	36.57%	14.52%	37.80%	41.59%
Contribution margin/day	\$ 3,199	\$ 3,264	\$ 494	\$ 9,372	\$ 10,311
Contribution margin/yr	\$ 799,816	\$ 815,877	\$ 123,523	\$ 2,343,033	\$ 2,577,646

Application Utilization Analysis

	#1 Waterborne acrylic baking enamel	% of sales	#2 Alkyd air dry enamel low VOC	% of sales	#3 Zero VOC Acrylic	% of sales	#4 UV- cured powder spray to waste	% of sales	#5 UV- cured powder reclaimed	% of sales
Average utilization	65%		65%		65%		65%		95%	
Material purchased gals or lbs	10,626		8,242		9,811		130,165		89,058	
Cost of paint material	\$ 303,080	12.76%	\$ 223,404	10.01%	\$ 527,935	62.04%	\$ 911,155	14.70%	\$ 623,406	10.06%
Waste generation gals or lbs	3,719		2,885		3,434		45,558		4,453	
Value of waste @ purchase \$	\$ 106,078	4.47%	\$ 78,191	3.50%	\$ 184,777	21.71%	\$ 318,904	5.14%	\$ 31,170	0.50%



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ROI Sensitivity Analysis

#1 Waterborne acrylic baking enamel

#2 Alkyd air dry enamel low VOC

#3 Zero VOC Acrylic

#4 UV-cured powder spray to waste

#5 UV-cured powder reclaimed

ROI Sensitivity Analysis:

Operating margins:

Operating Margin	#1 Waterborne acrylic baking enamel	#2 Alkyd air dry enamel low VOC	#3 Zero VOC Acrylic	#4 UV-cured powder spray to waste	#5 UV-cured powder reclaimed	ROI
5.0%	\$ 118,738	\$ 111,550	\$ 42,550	\$ 309,925	\$544,538	9%
7.5%	\$ 178,106	\$ 167,325	\$ 63,825	\$ 464,888	\$699,501	11%
10.0%	\$ 237,475	\$ 223,100	\$ 85,100	\$ 619,850	\$854,463	14%

Capital investment

Operating Margin	Capital Investment	#1 Waterborne acrylic baking enamel	#2 Alkyd air dry enamel low VOC	#3 Zero VOC Acrylic	#4 UV-cured powder spray to waste	#5 UV-cured powder reclaimed
5.0%	\$ 250,000	47%	45%	17%	124%	218%
	\$ 500,000	24%	22%	9%	62%	109%
	\$ 750,000	16%	15%	6%	41%	73%
	\$1,000,000	12%	11%	4%	31%	54%
	\$1,250,000	9%	9%	3%	25%	44%
7.5%	\$ 250,000	71%	67%	26%	186%	280%
	\$ 500,000	36%	33%	13%	93%	140%
	\$ 750,000	24%	22%	9%	62%	93%
	\$1,000,000	18%	17%	6%	46%	70%
	\$1,250,000	14%	13%	5%	37%	56%
10.0%	\$ 250,000	95%	89%	34%	248%	342%
	\$ 500,000	47%	45%	17%	124%	171%
	\$ 750,000	32%	30%	11%	83%	114%
	\$1,000,000	24%	22%	9%	62%	85%
	\$1,250,000	19%	18%	7%	50%	68%



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Conclusion

UV-Cured Powder Coating

- High speed finishing and increased productivity
- Durable and high quality finish
- Energy and space savings
- Environmentally safe – application process & chemistry
- Higher ROI opportunity



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Thank You!

Questions?

Michael Knoblauch

President

DVUV Holdings, LLC

4641 Hinckley Ind. Pkwy.

Cleveland, OH 44109

mfk@dvuv.com

216-741-5511



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