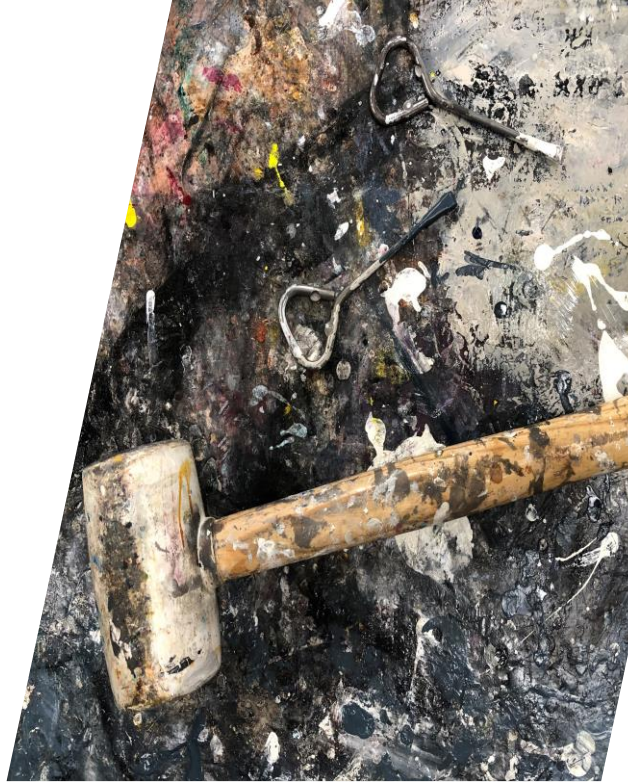
Application Basics



Product and System Updates

- Axalta Neutral Bases
  - NUF4202 Amarium Precat TC is stocked in pails and gals. (New this year)
  - AUF710X Series CV Ultraguard TC is stocked in pails and gals. (New this year)
  - AUF7000 CV Ultraguard Primer is stocked in pails.
  - VUC1100 Amarium Nuetral Basecoat is stocked in pails and gals.

- Axalta CV Ultraguard Primer
  - AUW1260 has been moved back to the original formula AUW7000

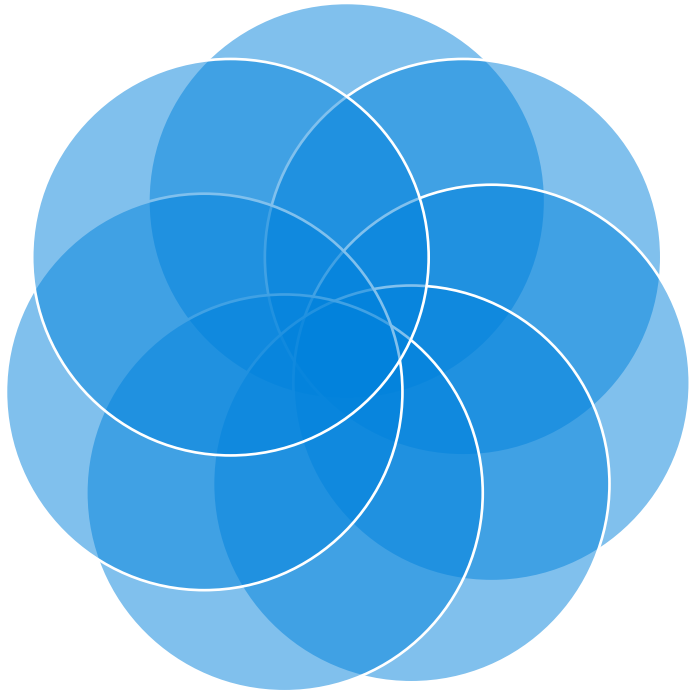
- Hirshfield's Recommended Pre-Cat White System
  - Recommend only using VUW2000 as the White Primer vs using NUW3610.
  - Hirshfield's has experienced less chipping and moisture failure with this system.

Application Basics

TDS

Catalysts

Spray Technique



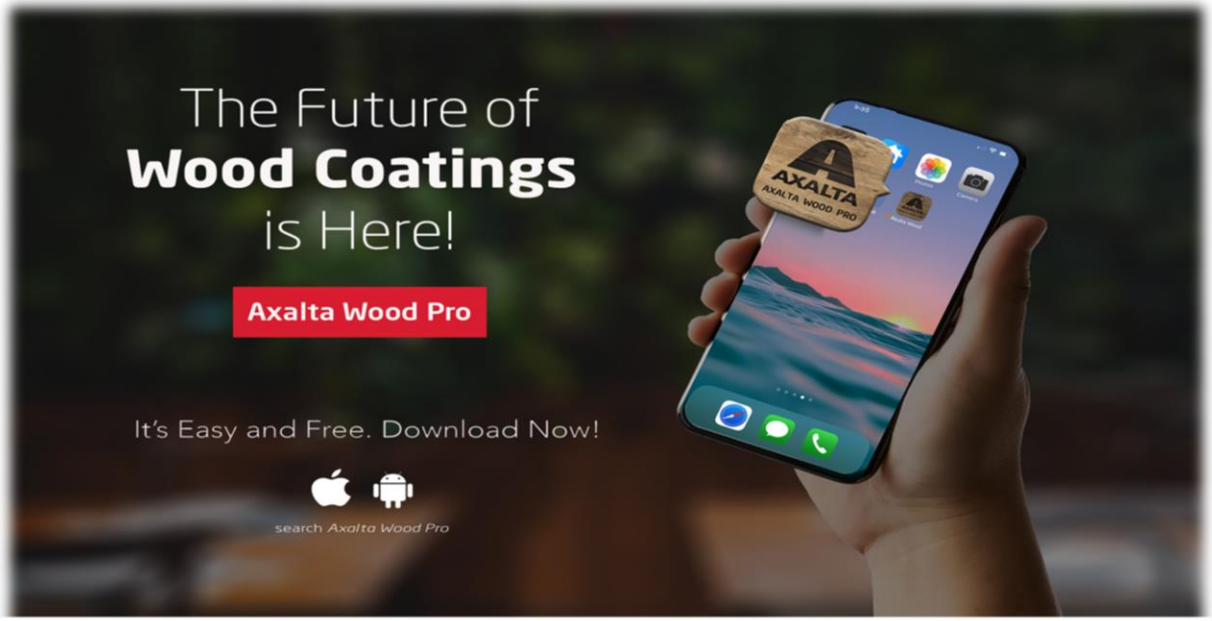
Solvents

Stain Application

Viscosity

Film Thickness

Axalta Wood Pro App



We're excited to introduce our innovative wood coatings app for iOS and Android devices. The new app provides simple and quick access to product information, the latest industry color trends and best practices for the wood coatings market.

Axalta Wood Coatings Pro is divided into four sections: product catalog, color trends, e-learning and distributor locator. The product information can be searched by industry segment, region, technology type (conversion varnish, nitrocellulose lacquers, polyurethane, pre-catalyzed lacquers and waterborne) and coatings type (clear, opaque, colorant, stain, glaze and volatile organic compound levels). In addition, users can access, print and share up-to-date information such as technical data sheets, product sell sheets, application best practice videos and color trends.

The new app is a step forward in showcasing the innovative, digital capabilities of Axalta Industrial Wood coatings, and is just the beginning of what Axalta can provide to the market. We are delighted to offer this streamlined experience to our customers and the broader industrial wood coatings market.

Axalta's Wood Coatings Pro mobile app is now available for free in both the Apple App Store and the Google Play Store.

Download today!
Search Axalta Wood Pro.

ANDROID APP ON Google play

Download on the App Store

Technical Data Sheets

AUW720x Series

Ultraguard™ White Conversion Varnishes

Date: Jan 8, 2018 (supersedes all previous revisions)

AXALTA

GENERAL INFORMATION

Axalta's Ultraguard™ White Conversion Varnishes are premium quality two-component white topcoats that have been engineered for high-end cabinet and millwork applications where a superior opaque finish is desired. It is particularly suited for higher build systems when used with Axalta's Ultraguard™ White Conversion Varnish Primer. This product has the added advantage of being low in formaldehyde.

1. PRODUCTS

- AUW7209 - Gloss
- AUW7202 - Satin
- AUW7204 – Soft Gloss
- AUW7201 - Matte

2. MIXING RATIO

- All products should be stirred well before use and, for best results, continuously agitated while in use.
- Catalyzation: 10% 399-5003 catalyst by volume
- Reduction:25-30% YYT1090 or 390-7001 by volume

3. SHELF LIFE @ 77°F (25°C)

- 18 months from manufacturing date

4. CLEAN UP

- Dispose of dirty solvent and cleaning rags in a safe and compliant manner. Solvent or lacquer soaked rags should be stored in water-filled, closed containers prior to disposal.

5. ADDITIVES

- Add Axalta 390-9303-00 Lacquer Retarder to extend dry time, max. 5% by volume.

6. SURFACE PREPARATION

- Surface must be clean and dust free with a moisture content of 6-8% prior to finishing. Remove all dust, dirt, wax and wood marks. Proper sanding and preparation of the wood is critical to achieving consistent results.
- On new wood, finish sand surface with 150-180 grit sandpaper
- On previously finished wood, remove all old paint or varnish and follow new wood procedure.

7. COMPANION PRODUCTS

- AUW7000 Ultraguard™ White CV Primer

8. TECH NOTES

- See Additional Notes for catalyzation, reduction and retarder details.

9. SUBSTRATES

- Commonly used furniture and cabinetry woods
- MDF/HDF

NOTE: Not to be used on exterior applications

10. APPLICATION

- See application notes for additional details.

11. FLASH / DRY TIMES

AIR DRY @ 77°F (25°C)

Dry to touch	30 Minutes
Flash between coats	35 - 45 Minutes
To Stack	Overnight

12. FORCE DRY

Flash	10 Minutes
Bake	15 Minutes @ 140°F
Cool Down	10 Minutes ambient
Stack	After cool down

13. GUN SET UP

Gravity Feed	1.6 mm - 1.8 mm
Siphon Feed	1.8 mm – 2.0 mm
Airless	10 – 15 thousandths
Air-Assisted Airless	11 – 15 thousandths

AIR PRESSURES

Gravity Feed	30-35 psi (2.0-2.4 bar)
Siphon Feed	35-40 psi (2.4-2.8 bar)
Air-Assisted Airless	10-20 psi (0.7-1.4 bar)
See spray gun manufacturer data for more information	

14. PHYSICAL DATA

Viscosity	70-75 Kreb Units
Weight Solids %	73.37±2%
Volume Solids %	59.58±2%
Actual VOC	2.90lbs/gal of Product
VOC Ratio (lb.voc/lb.solids)	0.24lb VOC/lb solid
Regulatory VOC (less water and exempt solvents)	348g/l*
Weight Per Gallon	11.27lbs/gal
Flash Point	4°C (~39°F) Closed Cup
Theoretical Coverage	886 sq ft/gal @ 1 mil dry
VHAP (lb.HAP/lb.solids)	2.38lb /gal solid
Coating Category	White/pigmented

Technical Data Sheets

GENERAL INFORMATION

Axalta's Ultraguard™ White Conversion Varnishes are premium quality two-component white topcoats that have been engineered for high-end cabinet and millwork applications where a superior opaque finish is desired. It is particularly suited for higher build systems when used with Axalta's Ultraguard™ White Conversion Varnish Primer. This product has the added advantage of being low in formaldehyde.

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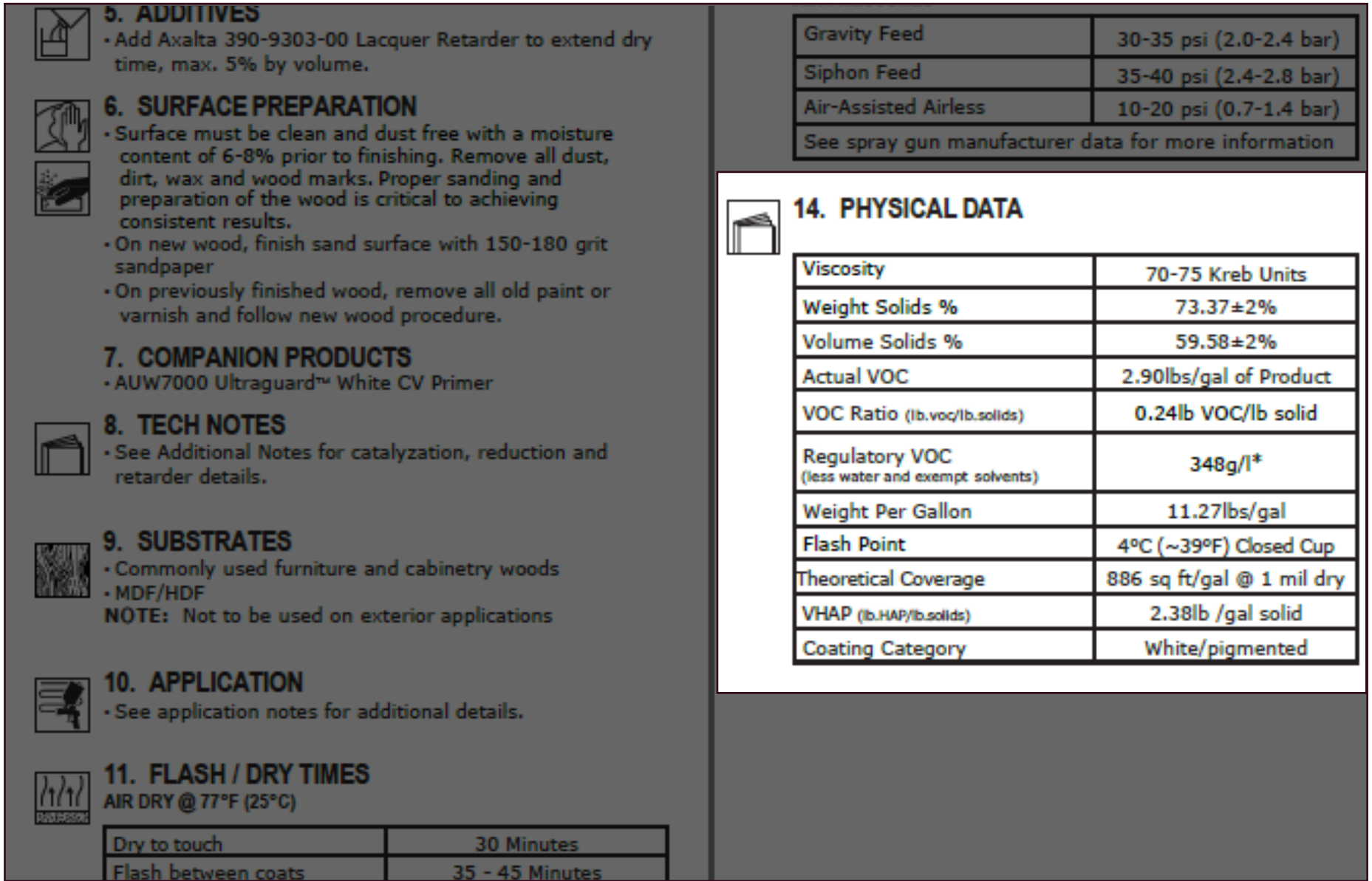
Viscosity	70-75 Kreb Units
Weight Solids %	73.37±2%

Technical Data Sheets



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VHAP (lb.HAP/lb.solids)	2.38lb /gal solid
Coating Category	White/pigmented

Stain Application

- Wiping Stain
- Spray Stain
- Differences
  - Application
  - Product Being Finished
  - Appearance
  - Process Time
  - Dry Times

Wiping Stain Application

- Mix thoroughly
  - Prior to and during use.
- Apply
  - Spray
  - Brush
  - Rag
  - Apply a liberal amount
  - Cover all grooves and profiles

Wiping Stain Application

- Work into the grain
  - Excess MUST be removed for proper adhesion.
- Allow the stain to sit
  - Needs to penetrate the pores of the wood.
- Lint-free rag
  - Wipe in a circular motion to work it into the pores.

11

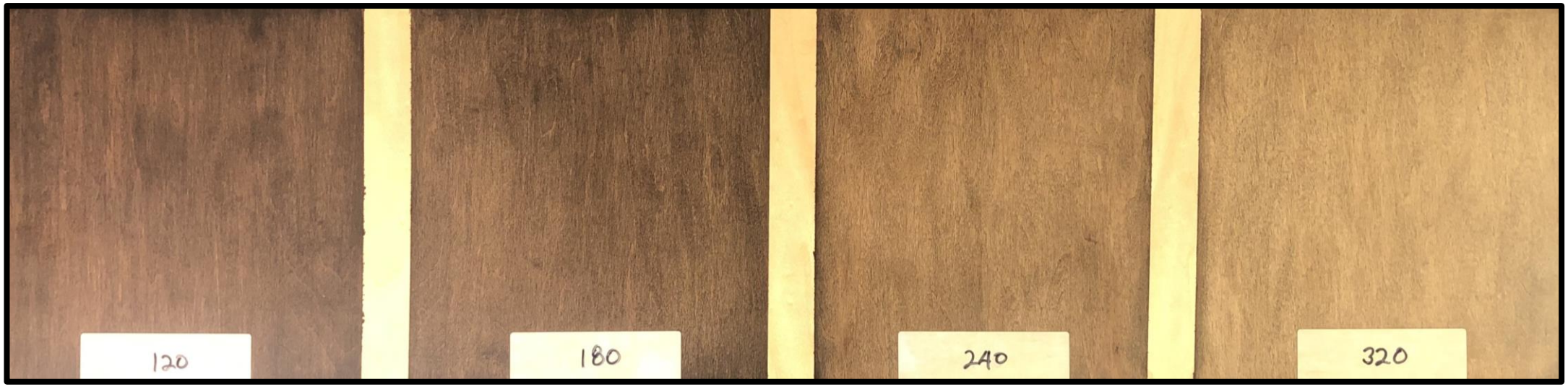
Wiping Stain Application

- Finally wipe clean
  - Always in the direction of the grain.
- Brush corners and crevices
  - Don’t leave excess stain
- Allow to dry thoroughly (min. 30 minutes)
  - Dry times may vary depending on many factors including wood, temp, humidity
  - Hirshfield’s recommends waiting until you can wipe with a clean rag and the rag remains clean.

12

Sanding – Impact On Color

- Pre-test on the substrate for color.
- Sanding determines appearance
  - Too fine of a grit will prevent penetration
  - Too coarse will show scratch marks.
  - Worn sandpaper can also cause a burnishing effect.
- Consistency is key.



Wiping Stain

- Only use approved pigments (XP and 844)
  - Adhere to the tint load limitations (see Tint Load Chart)
  - When matching:
    - Use same wood as customer.
    - Use same sandpaper as customer and sand before application.
    - Use same application technique as customer (as much as possible)
    - Stay consistent with the dwell time (sit time) the stain is on the part before wiping off.

14

Max Tint Load

		Product	Fill Per Gal	Volume	Oz/Gal		Quart	1 Gal	5 Gal
Primer	Do not use RU or BU	VUW2022	120 oz	6%	7.2 oz		2 oz	7.2 oz	36 oz
		White Vinyl Primer							
		NUW3610	128 oz	3%	3.8 oz		1 oz	3.8 oz	19.2 oz
		Precat. Primer							
		VUW2000	120 oz	6%	7.2 oz		2 oz	7.2 oz	36 oz
		White Tintable B/C							
		VUC1100	120 oz	6%	7.2 oz		2 oz	7.2 oz	36 oz
		Neutral Tintable B/C							
		AUF7000	116 oz	5%	5.8 oz		1 oz	5.8 oz	29 oz
		CV Neutral Base Primer							
		AUW7000	120 oz	3%	3.6 oz		1 oz	3.6 oz	18 oz
		CV Primer							
Pigmented Topcoat	Do not use RU or BU	NUW361X	120 oz	3%	3.6 oz		1 oz	3.6 oz	18 oz
		Precat. White Topcoat							
		NUF420X	116 oz	8%	9.3 oz		2.3 oz	9.3 oz	46.4 oz
		Precat. Neutral Topcoat							
		AUF710X	116 oz	5%	5.8 oz		1.45 oz	5.8 oz	29 oz
		CV Neutral Topcoat							
		AUW710X	120 oz	3%	3.6 oz		1 oz	3.6 oz	18 oz
		CV White Topcoat							
Sealer	Do not use RU or BU	NUS4010	128 oz	6%	7.7 oz		1.9 oz	7.7 oz	38.4 oz
		Precat. Sanding Sealer							
		NUS4020	128 oz	6%	7.7 oz		1.9 oz	7.7 oz	38.4 oz
		Precat. High Solids Sealer							
		NVS2400	128 oz	6%	7.7 oz		1.9 oz	7.7 oz	38.4 oz
		Prod. Precat. Vinly Sealer							
		AUS5800/AUS0846	128 oz	6%	7.7 oz		1.9 oz	7.7 oz	38.4 oz
		CV Sanding Sealer							
Clear Topcoat	Do not use RU or BU	NUF240X	128 oz	6%	7.7 oz		1.9 oz	7.7 oz	38.4 oz
		Prod. Precat. Clear Topcoat							
		NUF400X	128 oz	6%	7.7 oz		1.9 oz	7.7 oz	38.4 oz
		Precat. Clear Topcoat							
		NUF450X	128 oz	6%	7.7 oz		1.9 oz	7.7 oz	38.4 oz
		Precat. Clear Topcoat							
		AUF580X	128 oz	6%	7.7 oz		1.9 oz	7.7 oz	38.4 oz
		CV Clear Topcoat							
		AUS5800/AUS0846	128 oz	6%	7.7 oz		1.9 oz	7.7 oz	38.4 oz
		CV Low Sheen Topcoat							
		VSS0194	116 oz	7%	8.1 oz		2.0 oz	8.1 oz	40.6 oz

Wiping Stain

- **DO NOT FOG** the stain on to darken the color.
  - Possible adhesion failure.
  - Hazy/smoky appearance

16

Wiping Stain

- Preventing blotchiness
  - A washcoat (diluted sealer) may be applied prior to staining
    - Problem woods like maple and cherry.
    - Remember to scuff sand the washcoat before staining.
  - Water-based wiping stains
  - Alcohol/water blend

Spray Stain Application

- Tinted
  - Pigments and/or dyes
- Different appearance than wiping stains.
- As the name implies, applied by spray
  - Not worked into the grain or wiped off.
- Contact your Wood Industrial Centers for more instruction if needed.

Spray Stain Application

- Cherry and maple
  - Tend to be blotchy with a wiping stain
  - Much more uniform with a spray stain.
- Sanding
  - Do NOT sand finer than 180 grit
  - 150 grit is recommended.

Spray Stain Application

- Applying a spray stain
  - Use lower air pressure
  - No more than two medium wet passes.
- Color not dark enough?
  - Adjust stain strength
  - Do not over tint and only use approved Colorants.
- Do NOT fog more stain
  - Could cause adhesion failure.

Viscosity

- What is it?
- Why check it?
- How do we check it?
- Different viscosity cups?
- What effects viscosity?

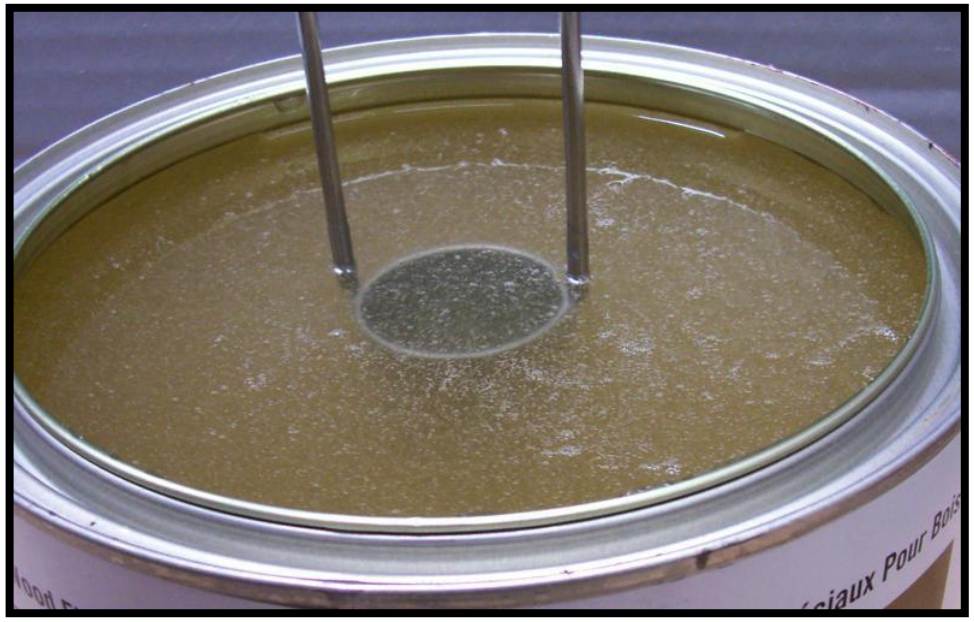
Viscosity

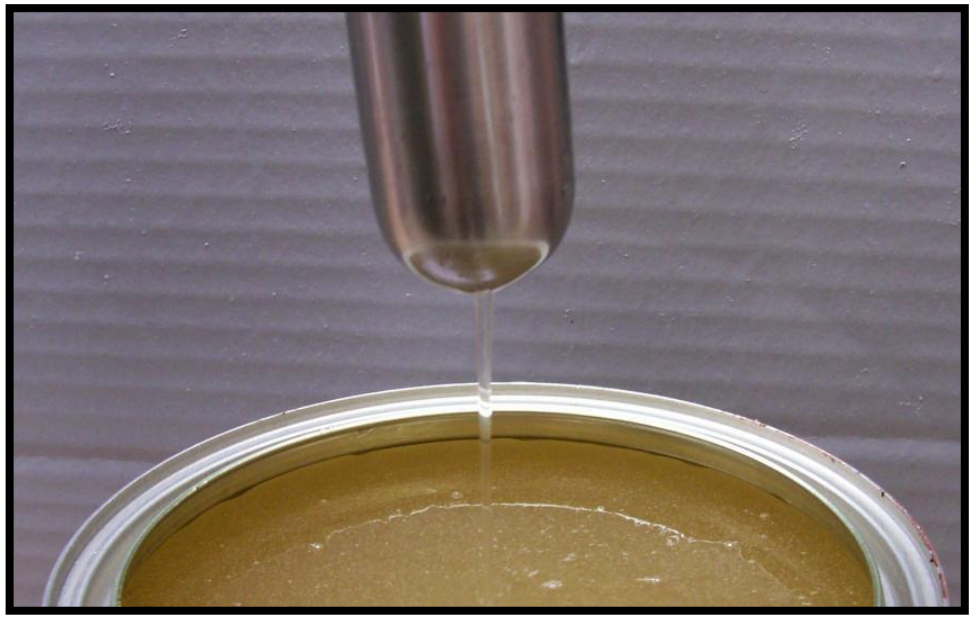
- Viscosity is the measure of a fluid’s resistance to flow
- Measure the time the material flows through the cup.
- Measured in seconds
- Common cups
  - Ford 4
  - Zahn 2

Viscosity

- Measuring viscosity
  - Dip the cup into the material.
  - Lift cup to the top of the material
  - Lift cup out of material/start stopwatch
  - Stop timing at first break in material flow

- Example: 24 sec Zahn #2





Viscosity

Zahn Cup 1# Zahn Cup 2# Zahn Cup 3# Zahn Cup 4# Zahn Cup 5#

Aperture (mm/inch)	ϕ2.00/0.08	ϕ2.74/0.11	ϕ3.76/0.15	ϕ4.26/0.17	ϕ5.28/0.21
Outflow time(sec.)	35-80	20-80	20-80	20-80	20-80
Viscosity range(cst)	5-60	20-250	100-800	200-1200	400-1800
Viscosity conversion formula v=k(t-c)	v=1.1(t-29)	v=3.5(t-14)	v=11.7(t-7.5)	v=14.8(t-5)	v=23t
Application	Very Thin	Thin Oil, Paint Lacquer	Medium Oil Mixed Paint	Viscous Liquid and Mixtures	Very Viscous Mixtures

Viscosity

Temperature °C	Temperature °F	Viscosity in seconds (Zahn #2)
15	59	39
25	77	25
30	86	22
35	95	20

- Temperature increases, viscosity decreases.
- Conversely, as temperature decreases, viscosity increases.
- Match viscosity to equipment
- Adjust the viscosity with the addition of solvents or changing the temperature.

Understanding Thinners & Retarders

- Formulation
  - Dissolve or suspend the resins.
  - Adjust viscosity so we may apply the coating to the workpiece.
  - Functionality
  - Evaporation rate
  - Price
- Field Use
  - What adjustment needs to be made?
    - Lower the viscosity
    - Increase the flash time
    - Reduce the solids content of the coating

Understanding Thinners & Retarders

Question: Why/when should you use a lacquer thinner?

A: To reduce viscosity of the coating.

- Material viscosity has increased due to solvent loss through evaporation
- Material is cold
- Orange peel/poor flow, solvent trap, bubbles
- Coating may be designed to be thinned to achieve the correct spraying viscosity

B: To reduce the solids of the coating.

- Common if a wash coat is needed to control stain penetration
- Thinner film is needed to avoid high film build
  - Multi-step finish or to achieve various glazing effects.

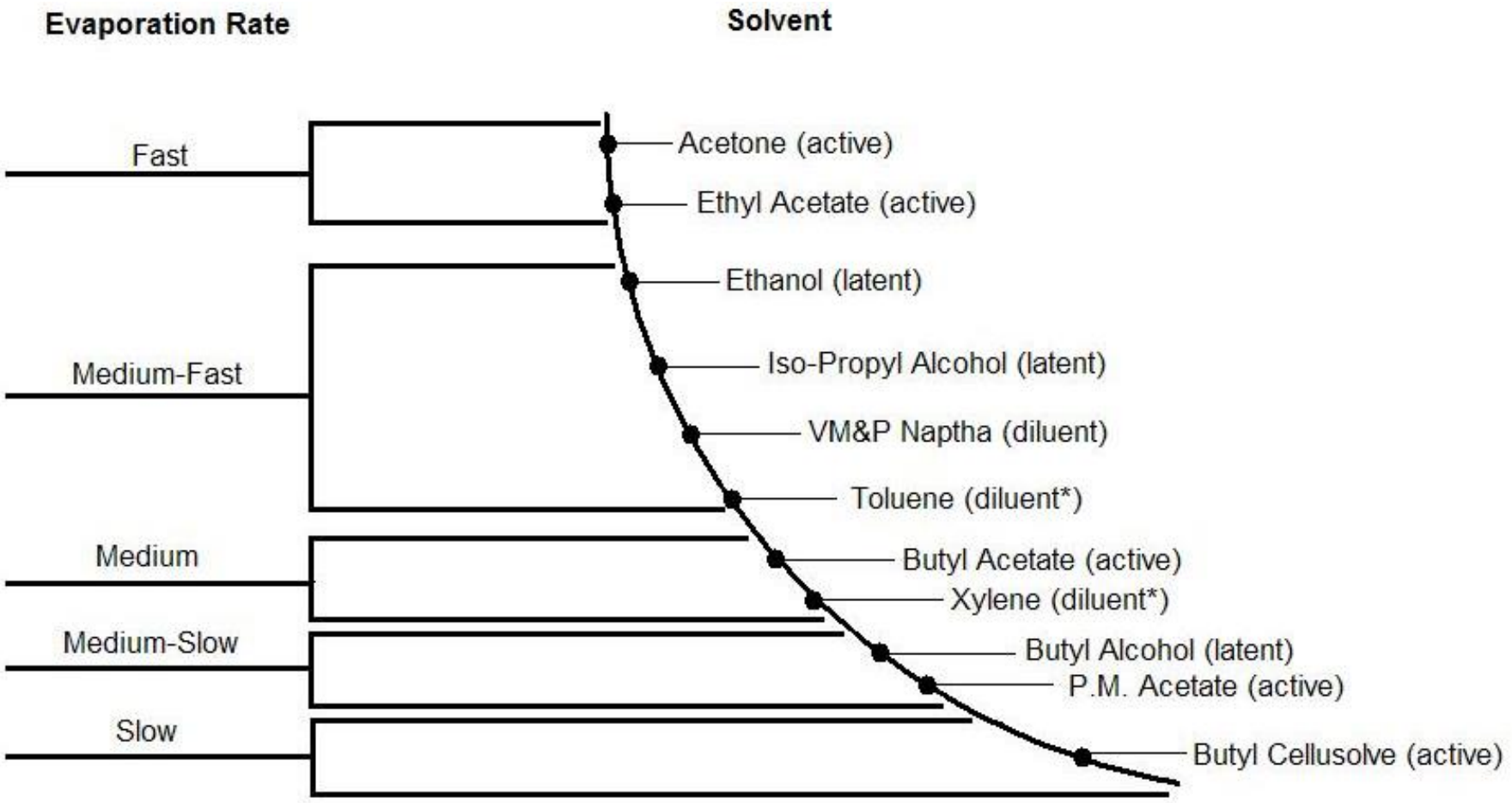
Understanding Thinners & Retarders

Question: Why/when should you use a lacquer retarder?

To slow the dry of the coating:

- Fast evaporation of solvents
  - High humidity area causes the coating to blush
- High ambient temperature
  - “Orange peel” or poor flow.
- Open time needs to be extended
  - Large pieces, overspray
- High ambient temperature
  - Coating to dry too quickly
  - Trapping air, creating bubbles

Understanding Thinners & Retarders



* = Active for some resin systems, but not nitrocellulose

Understanding Thinners & Retarders

TYPE	DESCRIPTION	REDUCER SOLVENTS (5-20%)	RETARDER SOLVENTS (2-5%)
I	**NITROCELLULOSE LACQUERS**	Approved Lacquer Thinner Active Solvents	Slow Active Solvents
II	**PRE-CATALYZED LACQUER**	Approved Lacquer Thinner Active Solvents	Slow Active Solvents
III	**CONVERSION VARNISHES**	Approved Thinner/Solvent Blend Aromatic Solvents, Alcohols, Glycol Ethers	Slow Aromatic Solvents Slow Alcohols Slow Glycol Ethers

Understanding Thinners & Retarders

Solvent	Description	Uses/Comments
Lacquer Thinner YYT1009	Solvent Blend	May be used with Type I,II,III. HAPs Free version available. Solvent blends vary and can change the dry time greatly if large amounts are used. Typical Evaporation Rate = ~2
Acetone YXT1001	Active—Ketone1	Very fast HAPs-Free and VOC-Free reducer. Will cut viscosity in Type I and II. Acetone is typically used as a cleaning solvent instead of a reducing solvent. Evaporation Rate = 6.3
Butyl Acetate YXT1003	Active—Acetate	Reducer solvent. May be used in any of the coating types. Butyl acetate is very safe as a reducing solvent. It is typically slightly slower than most lacquer thinner. Evaporation Rate = 1
PM Acetate YXT1008	Active—Acetate	Retarder solvent. May be used in any of the coatings types. PM acetate is Evaporation Rate = 0.4
Butyl Cellosolve (EB Solvent) YXT1005	Active—Glycol Ether	Slow Retarder solvent. HAPs solvent. May be used in any of the coatings types. Be cautious when using Butyl Cell, this is a very slow solvent, its use can affect dry times, cure times and recoat windows. Evaporation Rate = 0.1

Understanding Thinners & Retarders

Aromatic 150 YYT0443	Diluent—Aromatic	Slow Retarder solvent. Usually used in stains and Type III coatings. Photoreactive. Be cautious when using Aromatic 150, this is a very slow solvent, its use can affect dry times, cure times and recoat windows. Evaporation Rate = 0.06
VM&P Naphtha YXT1006	Diluent—Aliphatic	Reducer solvent. Usually used in stains. Not recommended for use in topcoats. Evaporation rate = 1.6
Mineral Spirits YXT1007	Diluent—Aliphatic	Slow Reducer. Usually used in stains. Not recommended for use in topcoats. Evaporation Rate = 0.13
Ethanol (Ethyl Alcohol) YYT0431	Latent—Alcohol	Fast reducer. Typically used in dye stains. Not recommended for use in topcoats. Usually used in stains or Type III coatings. Evaporation Rate = 1.8
Oxsol YXT2010	Diluent - Aromatic	Medium Reducer with an evaporation rate similar to Butyl Acetate but with a very strong odor. Limited amounts can be used in topcoats, usually 5-10%. Oxsol is zero VOC. Evaporation Rate = 0.9

Catalyzation

- What is a catalyst?
- Why catalyze?
- Best practice.

Catalyzation

- The catalyst is the substance needed to initiate the crosslinking or chemical reaction.

Catalyzation

- Post-catalyzed coatings require the addition of a catalyst prior to use for two reasons.
  - First, they are engineered to dry or cure with the assistance of a catalyst and not merely solvent evaporation as a conventional lacquer does.
  - Second, the catalyst initiates a cross-linking reaction that results in a much denser cure.

Catalyzation

- Catalyst and ratio can be found on the Technical Data Sheet (TDS).
  - This number, expressed as a percent, is not offered as a guide but rather the only correct addition.

Catalyzation

What happens if an incorrect amount of catalyst is used?

- *If too little catalyst is used, you will find that the material takes much longer to dry, and it will be much softer and thus not nearly as durable as it should be.*

- *If too much catalyst has been added the coating will likely crack as it sets up too quickly or you may notice a cloudy film or bloom as the material dries.*

Catalyzation

- **Proper Technique for adding Catalyst:**
- Catalyst must be added before the addition of any other solvents (i.e. lacquer thinner or retarder).
- Material should be at room temperature and under agitation ideally from a mixing blade on an air mixer. NEVER USE AN ELECTRIC DRILL.
- Ensure the exact amount of catalyst is measured according to the TDS.
- Under agitation, pour the catalyst slowly into the pail. Do not dump it in, this could shock the coating. Make sure to wear safety glasses.
- Allow 5 minutes for the catalyst to sufficiently mix into the coating (Sweat in).
- Add any solvents as necessary.
- Only catalyze enough material for one day's production.

Catalyst Ratios

	Product Number	Description	Catalyst	Catalyzation Rate by Volume	Pot Life	Reduction
Pigmented Products	AUW7000	Primer	CXC4000	1.5%	8-12 Hours	20% - 25%
			CXC4010	5%		
			CXC4005	2.3%	24 Hours	
	AUW710X	White Topcoat	CXC4000	4%	8-12 Hours	5% - 10%
			CXC4010	13.3%		
			CXC4005	6%	24 Hours	
Neutral Products	AUF7000	Neutral Primer	CXC4000	1.5%	8-12 Hours	20% - 30%
			CXC4010	5%		
			CXC4005	2%	24 Hours	
	AUF710X	Neutral Topcoat	CXC4000	4%	8-12 Hours	5% - 10%
			CXC4010	13.3%		
			CXC4005	6%	24 Hours	
Clear Products	AUS5800 AUS0846	Sealer	CXC4000	2%	8-12 Hours	
			CXC4010	6.6%		
			CXC4005	3%	72 Hours	
	AUF580X	Topcoat	CXC4000	3%	8-12 Hours	
			CXC4010	10.0%		
			CXC4005	5%	72 Hours	
	AUF4902	Topcoat	CXC4000	2%	8-12 Hours	
			CXC4010	6.6%		
			CXC4005	3%	72 Hours	

Finishing Issues

- Agitation
- Temperature
  - Coating
  - Substrate
- Humidity
- Application
- Setup

Material Agitation

Why is agitation so important?

- Coating composition
  - Liquids (solvents)
  - Solids (resins, flattening agents, colorants etc.).
- As a coating sits undisturbed settling begins
  - Flatting
  - Colorants
  - Pigments (filling, sanding)

Material Agitation

Why is agitation so important?

- Products requiring reduction and/or catalyzation.
  - Catalyst should be added to container while under agitation to ensure an even dispersion.
  - Best practice – mix for at least 5 minutes

Material Agitation

Why is agitation so important?

- *NOTE: Do NOT shake waterborne material*
  - *Introduces bubbles into the coating*
  - *Waterborne products should be stirred*
    - *By hand*
    - *Air mixer.*

Material Agitation

- Applies to stains and paints as well.
  - Colored with finely ground earth pigments.
  - Over time these pigments can settle in the bottom of the container.
  - Some stains that can settle out in a very short time.
- Stains and paints
  - Should be thoroughly agitated before use
  - Ensures pigments are not sitting on the bottom of the container and are thoroughly dispersed in the stain or paint.
  - Ideally need to be under constant agitation.

Material Agitation

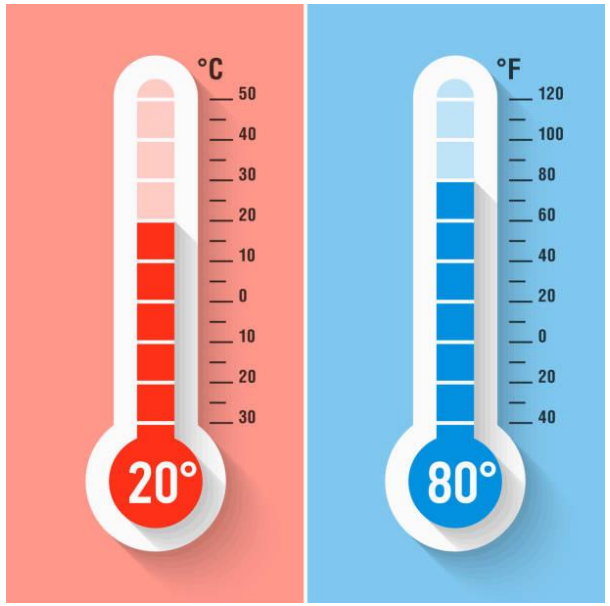
- Fluid lines should be flushed or recirculated
  - Short duration like a lunch break.
- Failure to agitate sufficiently
  - Possible color variation from piece to piece.
  - Sheen differences

Temperature

- ***Three temperatures***
  - ***Ambient***
  - ***Substrate***
  - ***Coating***

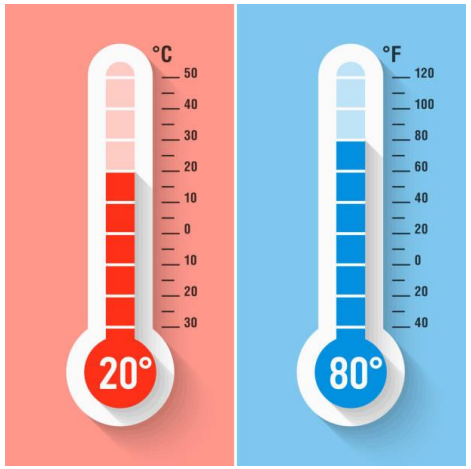
Temperature

- ***Ambient temperature***
  - Affects the finishing process
    - Drying
    - Curing.
  - Typically, the warmer the air in a shop the faster a coating will dry.
  - Ideal environment
    - Consistent 18-26° C (65-78° F)
    - 55% RH

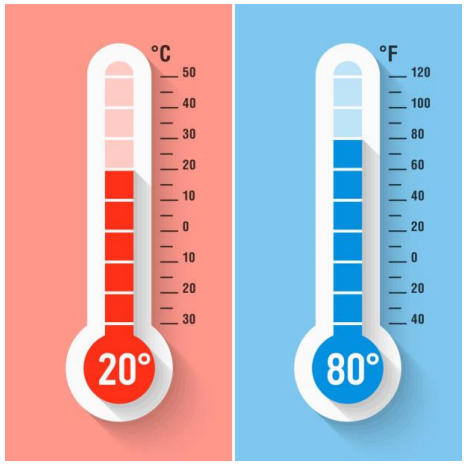


Temperature

- ***Substrate temperature***
  - Temperature of the wood.
  - Wood expands when warm and contracts when cooled.
  - Axalta's coatings are designed to tolerate the typical movement of wood.
  - Substrate should be room temperature before finishing.
  - Should remain relatively consistent during the curing process.
  - Temperature extremes could cause poor flow, dry and cure.



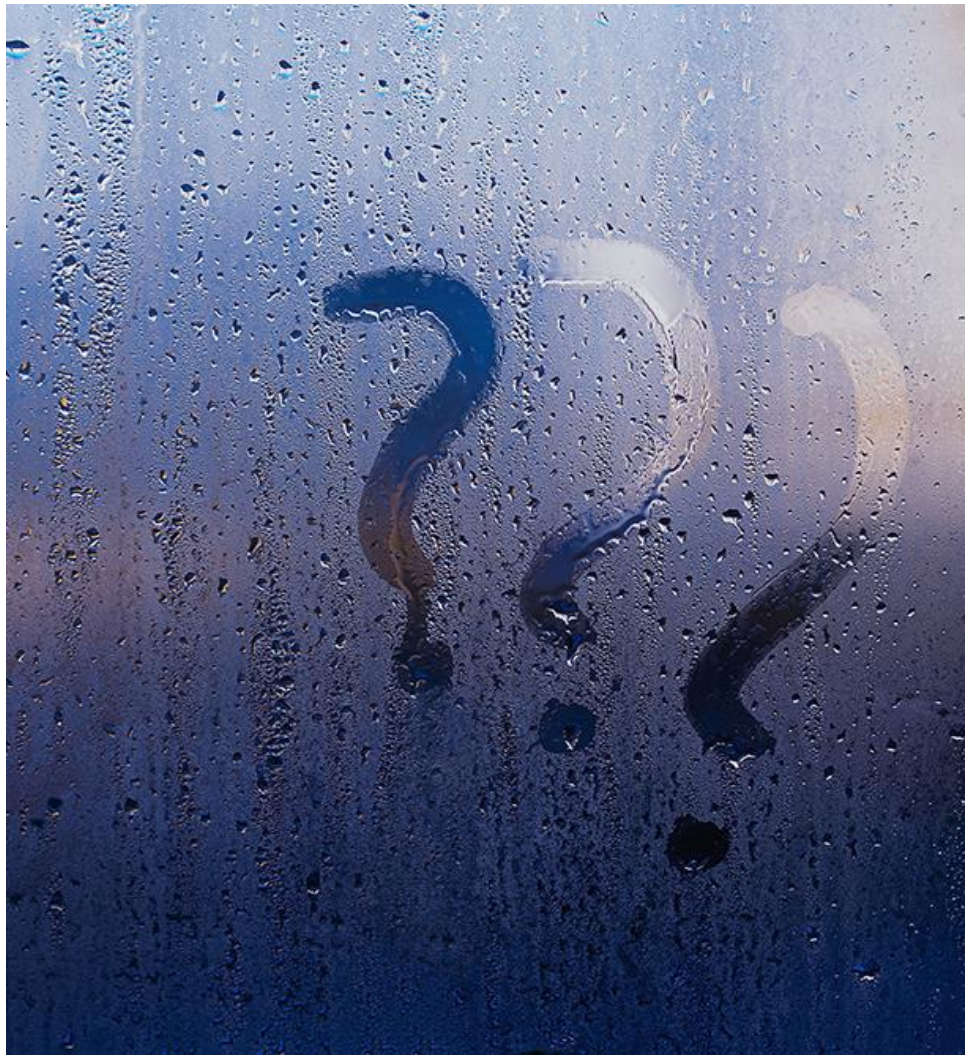
Temperature



- ***Coating temperature***
  - Temperature of the material to be sprayed.
  - Lower temperatures increase viscosity of the material.
    - Less flow
    - More difficult it is to spray.
  - Higher temperatures lower viscosity of the material
    - Possible sagging
    - Drying too fast.
  - For best results ensure that both the coating and the substrate have both reached room temperature.

Humidity

- Humidity, the amount of moisture in the air
- Will cause the wood and the performance of the coating to change.
- Wood loses or gains moisture until content is the same as the surrounding air.



Humidity

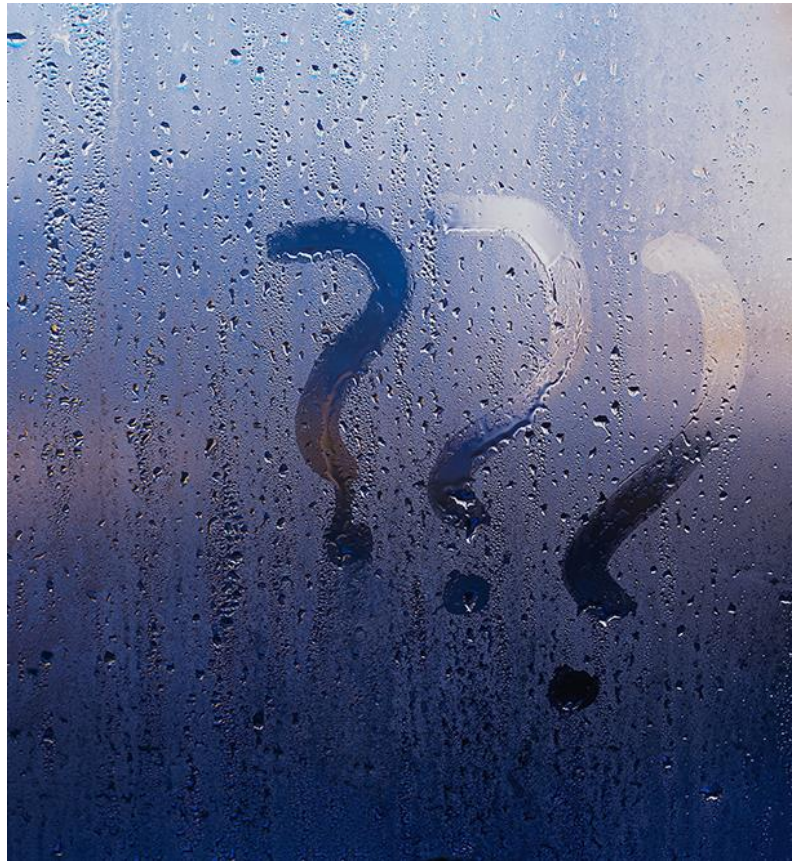
- If wood picks up moisture after sanding
  - Fibers will open and wood will accept more stain (darker)
  - Will accept finishes more easily
- If wood loses moisture after sanding
  - Fibers will shrink and accept less stain
  - Could cause adhesion failure of finish products (not enough “bite”)
- Inconsistent moisture from piece to piece will cause color variance

Humidity

- Moisture in the air will affect dry time and cure response.
- High humidity will be slow the evaporation of solvents.
- The dry times of coatings become longer when humidity is higher.

Humidity

- Timelines for finishing must be adjusted on humid days to allow more time to dry before the next step in the process.
- Slow evaporating solvents or retarders may be needed to help prevent moisture issues like blushing.



Improper Application

- This can be characterized two ways –
  - Not following the manufacturer's specifications
    - Applying too much/little product
    - Dry times
    - Total film build
  - Combination of products
    - Competitive products mixed
    - Mixed technologies

Improper Application

- Follow TDS
  - Which catalyst and amount
  - Recommended reduction
  - Wet mils applied per coat
  - Dry times
  - Crucial information

Improper Application

- Avoid finishing “tricks” that can actually cause failures.
  - Coatings are designed to be used as systems
  - Certain products are to be used with certain other products.
  - Always ensure the products used are compatible
  - Don’t mix manufacturers
  - Beware “I’ve always done it this way”

Improper Equipment Setup

- Correct
  - Tip size?
  - Air pressure
  - Fluid pressures?
- Adequate air compressor?
- Correct spray system
  - (i.e. is HVLP too slow for their needs)?

Improper Equipment Setup

- Have they cleaned their lines recently?
- Is there a moisture trap on the line?
  - How often to they empty it?
- Are booth filters clogged
  - Not allowing sufficient air flow?
- Equipment in need of repair?
  - Cleaning?
  - Replacing?

Specific Troubleshooting Issues

- Craters
- Runs
- Blushing
- Cracking
- Bubbles, Pinholes
- Adhesion

Cracking

Cracking

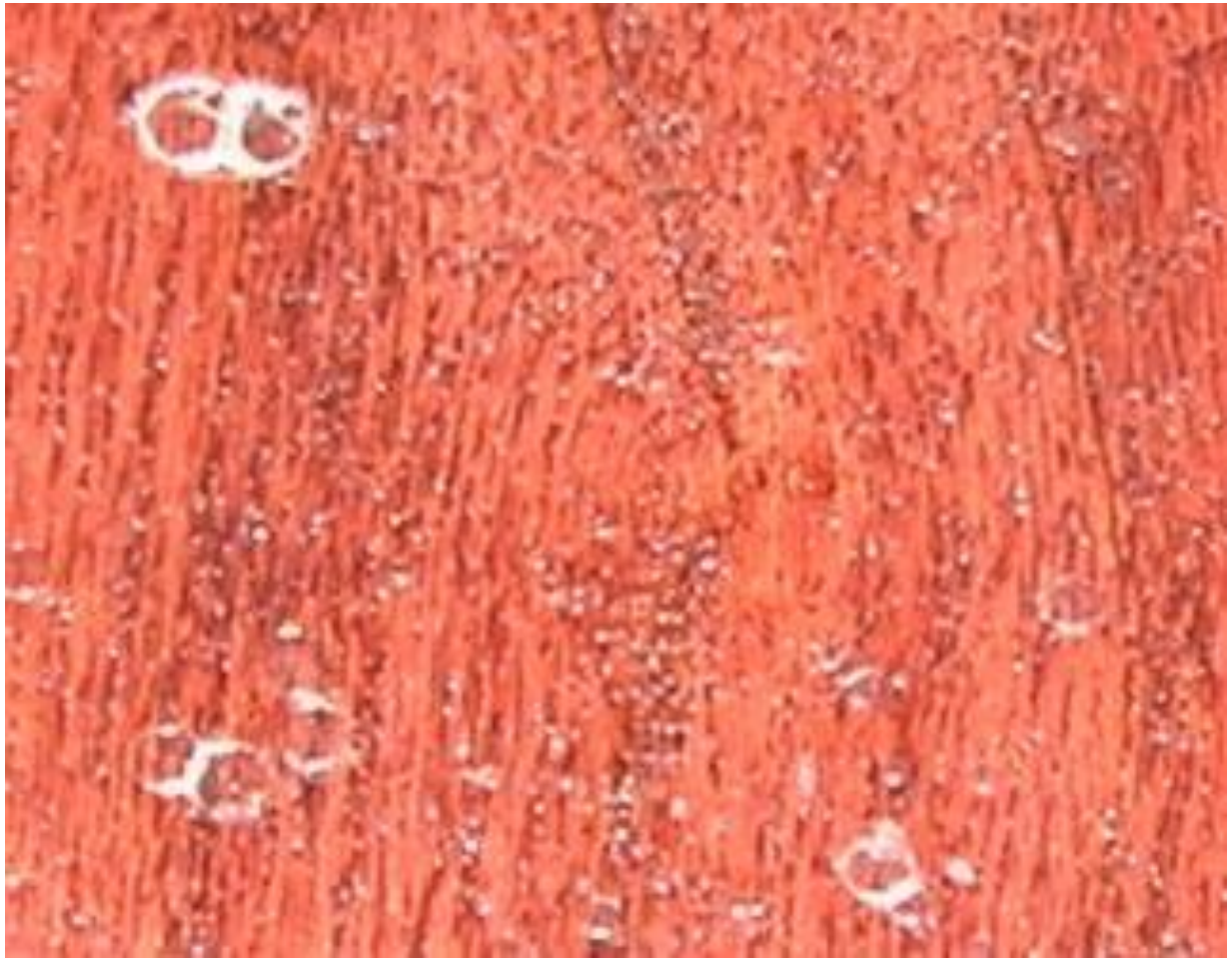
Causes	Remedies
• Excessive coating build (mils) can cause cracks and checks in the film when aging. • Critical when using acid catalyzed products	• Use a wet mil gauge during application. • Follow manufacturer's recommendation for the number of coats and amount per coat.
• Exposure to cold temperatures while curing.	• Allow to cure at room temperature (ideally 22C or ~72F)
• Mud cracking.	• Waterborne applied in excess film thickness or encounters air too soon after application.

Blush

Blush

Cause	Remedy
• Humid weather	• Add retarder per TDS. Retarder should generally be added when humidity is over 50%.
• Drafts	• Humid weather: add retarder or use a higher quality thinner. • Find source of high air movement
• Product sprayed when cold	• Warm product • Consider material storage location
• Damp spray rooms (generally concrete floor at ground level)	• Film has a white haze in areas. The film has dried too fast and entrapped.
• Moisture in spray equipment.	• Ensure moisture trap is empty and working

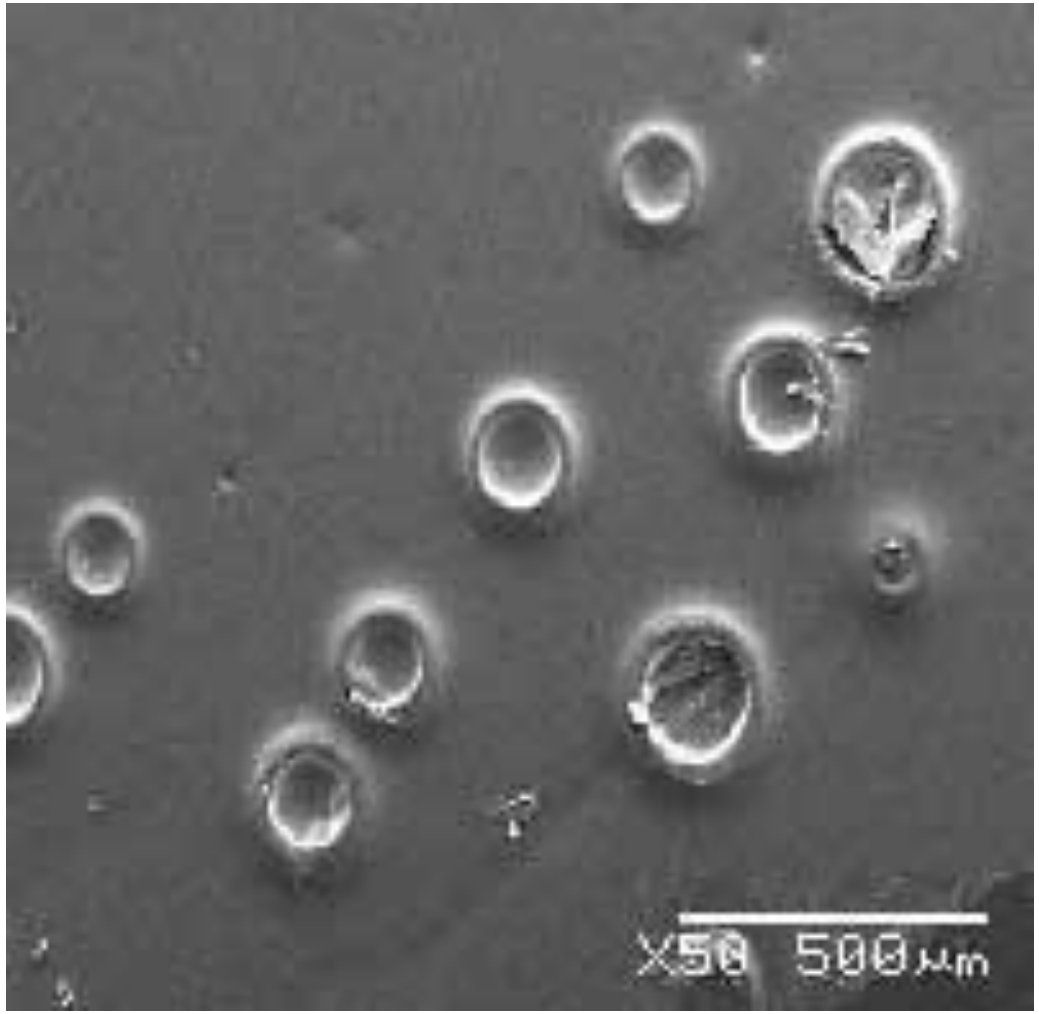
Bubbles



Bubbles

Causes	Remedies
• Drafts which cause surface drying before the solvent can break through the surface film in order to evaporate.	• Find source of drafts (i.e. open windows, doors etc.)
• Fine drops of moisture coming through "separator" in spray apparatus.	• Clean spraying equipment.
• Air trapped in open pores of wood such as red oak.	• Spray a thin wash coat as first coat or add retarder to finish.
• Fine bubbles after force drying.	• Be sure adequate solvent flash off time is used before putting the finished part in oven.

Pinholes



Pinholes

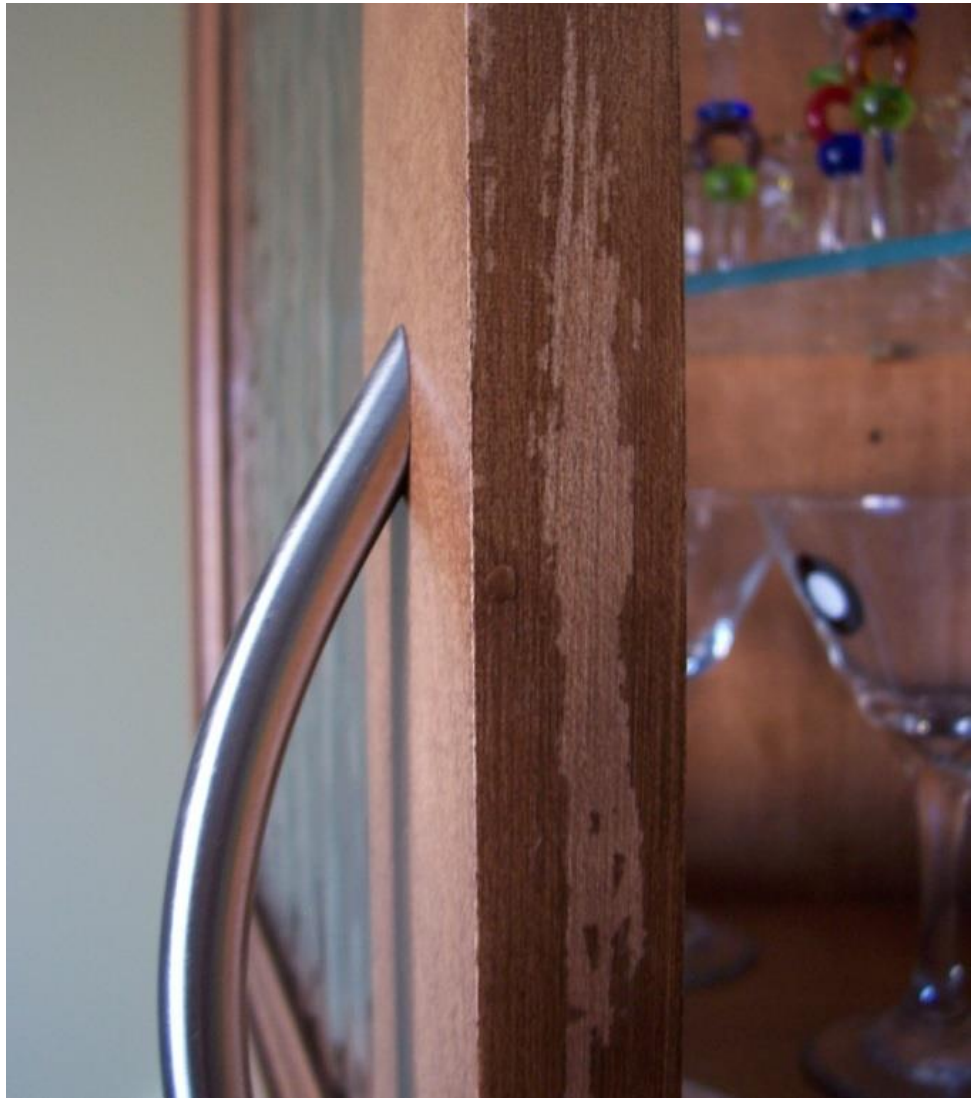
Causes	Remedies
• Insufficient fill on open pore woods.	• Use higher solids sealer or use a wood filler to fill the grain.
• Drafts which cause surface drying before the solvent can break through the surface film in order to evaporate.	• Find source of drafts (i.e. open windows, doors etc.)
• Fine drops of moisture coming through "separator" in spray apparatus.	• Clean spraying equipment.

Fisheyes

Fisheyes

Causes	Remedies
• Improper surface cleaning or preparation, usually involving deposits of silicone or wax on the surface of the old topcoat	• Remove all traces of silicone or wax by thoroughly cleaning with a product designed for this purpose
• Effects of an old finish with embedded silicone that is not removable by solvent wiping	• Add fish eye eliminator to the topcoat.
• Oil contamination of air lines	• Drain and clean the air pressure regulator daily.

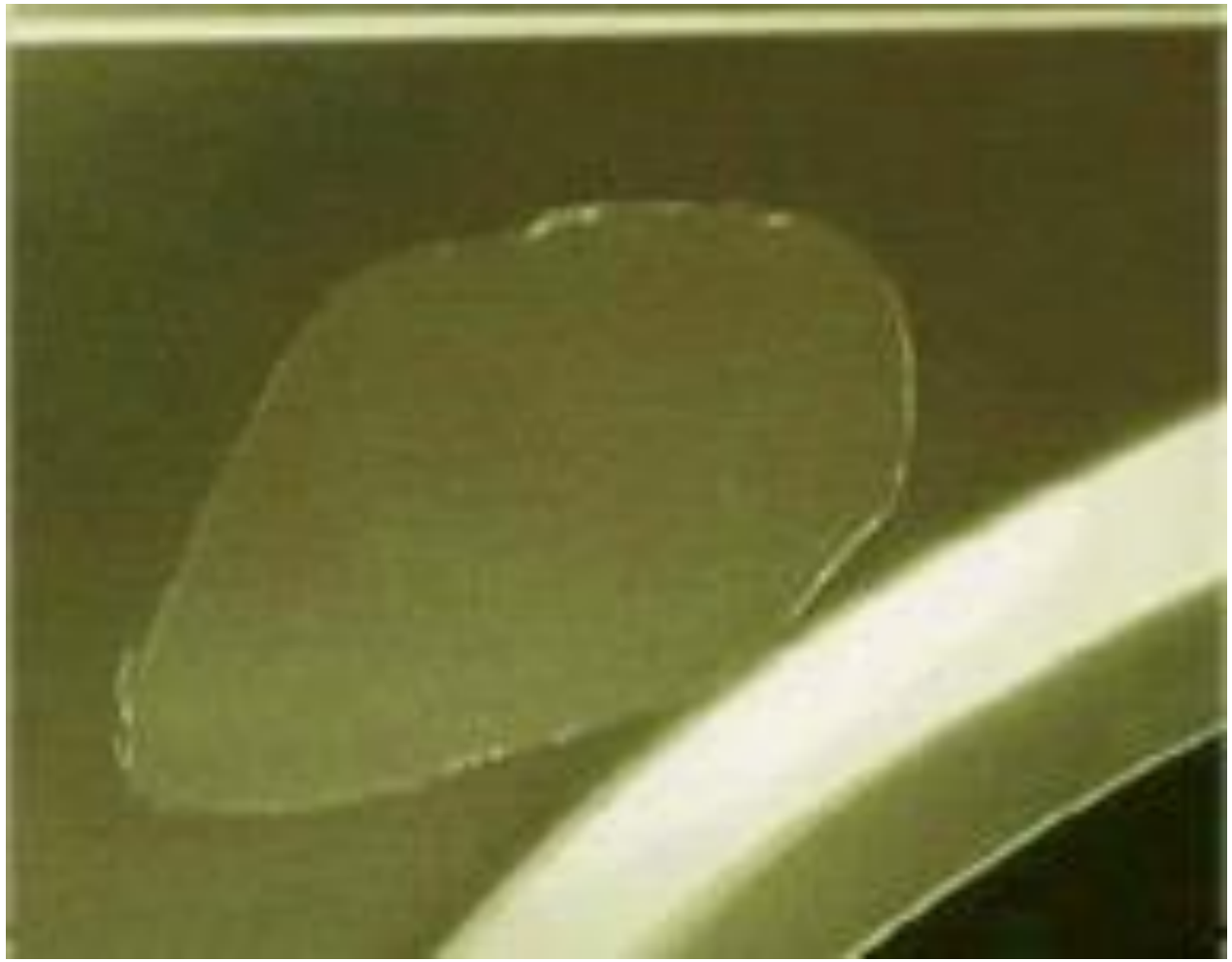
Adhesion to Substrate



Adhesion to Substrate

Causes	Remedies
• Unclean surface.	• Clean carefully with solvent/cleaner
• Wood sanded too smooth. Especially hardwoods like maple and birch.	• Always finish sand @150-180 grit sandpaper before the finishing process.
• Stain coat not wiped.	• Always wipe stain coat to remove excess pigment.
• Stain coat not dry.	• Always allow stain coat to dry per TDS.

Intercoat Adhesion



Intercoat Adhesion

Causes	Remedies
• Primer/sealer surface may have picked up contamination.	• Clean surface. Apply the finishing coat in recommended sequence.
• Catalyzed finishes allowed to dry too long between sanding and recoating.	• Always sand catalyzed finishes within eight hours of recoating.
• Incompatible finish coat and primer/sealer.	• Make sure that the proper recommended primer and finishing coat are used together.

Improper Sanding

Improper Sanding

Causes	Remedies
• Cross Grain sanding	• Always sand with the grain or use a random orbital sander
• Too coarse paper was used	• Sanding should be an incremental process from coarser to finer grit prior to finishing. • Do not skip grits.
• Swirl scratch marks – insufficient air pressure delivered to orbital	• Ensure that air pressure (PSI) and flow (CFM) is sufficient to run orbital at manufacturer's recommended RPM

Orange Peel

Orange Peel

Causes	Remedies
• Material not thinned out sufficiently.	• Add the correct amount of solvent by measure.
• Failure to spray a wet coat.	• Check solvent, TDS, spray technique
• Spray gun stroke too rapid.	• Take deliberate, slow stroke.
• Insufficient air pressure.	• Increase atomizing pressure or reduce fluid pressure.
• Using wrong air cap.	• Select correct air cap for the material and feed.
• Spray gun improper distance to surface.	• Spray gun should be 6–10 inches from surface.
• Overspray striking a previously sprayed surface.	• Spray gun should be worked 6–10 inches from surface so overspray hits unsprayed work.
• Thinner too fast evaporating	• Use better grade of thinner for material or add retarder to allow flow-out.
• Material not thoroughly dissolved.	• Mix material thoroughly.
• Drafts.	• Eliminate excessive drafts.
• Humidity too low.	• Raise humidity of room.

Runs / Sags

Runs / Sags

Causes	Remedies
• Sagging is caused by either over reduction or by use of a solvent that evaporates too slowly.	• Use the proper solvent consistent with the general nature and temperature of the surface to be coated.
• Heavy application of a coating.	• Control amount of material applied to surface.
• Dirty air cap and fluid tip.	• Remove cap and fluid tip then clean.
• Gun manipulated too close to surface.	• Hold the gun 6 to 10 inches from surface.
• Failure to release trigger at end of stroke (when Stroke does not go beyond object).	• Release trigger after every stroke.
• Gun manipulated at wrong angle to surface.	• Work gun at right angles to surface.
• Fluid pressure too high.	• Reduce fluid pressure.
• Operation too slow.	• Speed up movement of gun across surface.
• Improper atomization.	• Set equipment with proper air pressure and fluid pressure with the right tip or caps.

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