

# Finishing – The Basics

PREPARED FOR THE VALLEY WOODWORKERS OF WEST  
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# What is a finish

- **Finish** is a substance that changes from a liquid to a solid after it's applied to the wood. The purpose of a finish is to protect the wood and enhance its appearance.

# What does a finish do?

- It changes the appearance of your project.
- It can make or break your project. Even the best made project will look like it was made by an amateur if the finish is poorly applied
- It may or may not protect the wood from spills
- It may or may not protect the wood from abrasion and scratches

# Film Finishes

- **A Film** finish is any finish that can be built (by repeated applications) to a hard, thick layer, or layers, on top of the wood. The key requirement for a film finish is that it must dry hard. Alkyd and polyurethane varnish, shellac, several types of lacquer, water-based finish and various two-part high-performance finishes are all film finishes.
- Typical thickness is 4-6 mils.

# Penetrating Finishes

- **Penetrating finish** is a somewhat misleading term used to designate linseed and tung oil that don't dry hard, so they can't be built up to a functional film.
- Typical thickness is 0 mils

# Oil-Varnish Finishes

- Oil-Varnish finishes are varnishes that are thinned with an oil. Examples are Watco Danish Oil, Wipe-on Poly and Wipe-on Varnish.
- Because these finishes are thinned, they soak into the wood like a penetrating oil.
- Because they are thinned, it takes many, many applications to build up a protective finish.
- Typical thickness is 0.1 mils
- Will not dry properly if applied during humid conditions.

# Which Type of Finish Should You Use?

- Kitchen ware, cutting boards:
  - Tung oil; Wax and Glycerin
- Decorative, seldom handled items:
  - Oil-Varnish or Film
- Furniture: Film finishes
  - Moderate use; Lacquer or varnish
  - High use (eg. tables, cabinets, chairs); High performance catalyzed varnish or lacquer

# Stains

- **Stain** changes the color, tone and/or shade of wood. There are two kinds of colorant used in stains: pigment and dye. Pigment particles are opaque and resemble colored earth. They settle to the bottom of the can and must be stirred into suspension before using. Applied to wood, pigment lodges in cavities, such as pores and sanding scratches, large enough to hold it. Built up on wood, pigment obscures the wood like paint.



# Stains

- Dye is transparent. It dissolves in a specified liquid. Once dissolved, dye remains in solution. Applied directly to wood, dye penetrates into the wood and thus doesn't need a binder. Dyes do not obscure the grain as pigment stains may. Some commercial stains contain both pigment and dye.

# Sanding Sealer

- Sanding sealer is used only under film finishes.
- Sanding sealer is applied over stains or directly to the wood.
- The finish can be used to seal the wood, but:
  - Sanding sealer sands easier
  - Partially fills the pores and provides a smoother finish on open grain woods

# Sanding

- Extremely important and often poorly performed. Machine marks from jointers and planners are highlighted after the finish is applied if sanding not done properly.
- Use a coarse sandpaper to remove machine marks and tearout followed by finer grits to remove the scratches left by the previous grit.

# Sanding

- 120 to 180 grit is sufficient for film finishes.
  - 120 grit is sufficient when using the wide belt sander.
  - 150 grit is sufficient with a 3 mm orbit orbital sander (our Festool sander).
  - 180 grit is sufficient with most other sanders.
  - 150 – 180 grit is sufficient when using a drum sander, but must be followed by orbital sanding.
- When in doubt, finish with a 150 grit sanding block going with the grain.

# Sanding

- For wipe-on finishes, the film applied is very thin. Therefore, the wood must be sanded to 320 grit or finer to ensure that the sanding scratches do not show.

# Finish application

- Finishes can be wiped on, brushed on, or sprayed on.

# Wipe-on Finishes

- Very easy to apply. Just wipe the finish on with a brush or rag.
- Let the finish sit for about 15 minutes and wipe off the excess finish.
- Additional coats can be applied at 24 hour intervals.
- Do not apply when it is humid. The finish will not dry properly.

# Brushed on Film Finishes

- Apply with a wet brush in overlapping strokes.
- Do not go back over areas where finish has already been applied and started to dry.
- Let sit for 24 hours.
- Sand with 280 – 320 grit to remove brush marks.
- Apply additional coats as desired, sanding after each coat.



# Brushed on Film Finishes

- Sand final coat with 280 – 320 grit sand paper to remove the brush marks.
- Sand with 400 grit, 600 grit, 800 grit, 1200 grit and 1800 grit to smooth the finish.
- Polish the finish with rottenstone or polish from an automotive finish supplier.

# Spray Finishing

- Provides a smooth finish that usually does not require sanding or polishing the final coat.
- Only light sanding is required between coats.
- Much quicker to apply than wipe-on or brushing
- Lacquer and catalyzed finishes can be finished with several coats in a matter of hours.

# Spray Guns

- Use air to atomize a small (~0.50") stream of finish that flows out of the gun.
- The better the atomization, the smaller the droplets of finish that are generated.
- The smaller the droplets of finish, the smoother the finish will be.
- Decent spray guns can be expensive.
- Cheap spray guns will frustrate you and cause you to regret your purchase.

# Spray Finishing Equipment

- High Volume Low Pressure air spray guns are preferred. The two types available are:
  - Turbine
  - Conversion

# Turbine Spray Equipment

- Uses high rpm turbine motors (think vacuum cleaner) to provide the atomization air.
- They are available with two to five turbines connected in series.
- The more turbines present, the greater the pressure generated and the higher the viscosity of the finish that can be atomized.
- Three or four turbines are adequate for furniture finishes.

# Turbine

- Apollo four stage with non-bleeder gun ~\$840 (Woodcraft)



# Conversion Spray Equipment

- Uses compressed air from an separate air compressor to provide the atomization air.
- Decent conversion guns require about 8-9 cfm of compressed air. An air compressor that can provide this amount of air on a continuous basis requires 4 -5 hp.
- A lower horse power compressor can be used in most cases because you seldom spray continuously and the compressor has an air storage tank that provides a buffer. The larger the air storage tank, the smaller the compressor can be.

# Air Compressors

- 10 cfm with 60 gal tank ~\$535 (Home Depot)





# Conversion Spray Guns

- Devilbiss GFG
- \$75-100



# What does a higher priced spray gun provide

- Control of both the air flow rate and the spray pattern
- Better atomization:
  - Smoother finish – No orange peel, no need to sand and polish the final coat
  - Lower chance of runs that will need to be sanded out
- Ability to handle larger flow rates of finish
  - Finishing is completed quicker
  - Adjacent spray passes flow together better

# Spray Gun Types



# Cup Feed

- A fluid holding cup is attached below the spray gun
- Turbine guns pressurize the cup to force the finish up to the spray gun.
- Conversion guns suck the finish up into the spray gun
- The gun must be held vertical at all times when spraying
- The cup prevents getting into tight places



# Gravity Feed

- The fluid cup is mounted above the spray gun and the fluid flows into the gun by gravity.
- The gun feels top heavy and awkward until you get used to it.
- The gun must be held vertically unless a special cup is used.
- Cannot get into tight places.
- Easier to clean than a siphon spray gun.





# Pressure Feed Spray Gun

- The fluid is fed to the spray gun by hose from a pressurized tank.
- Tank sizes from two quarts to five gallons are commonly used.
- The fluid tank needs to be refilled less frequently than syphon gun or gravity feed cups.
- The gun can get into tight places, like inside cabinets, book cases, dressers, Toyota Tool boxes.
- The gun can be used in any orientation, even upside-down.

# Help

- I will provide free consultation on the purchase and use of spray equipment

Questions?