

Wood Finishing & Refinishing

Fact Sheet #8

FINISHING

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Introduction

A finish is used on wood for protection and beauty. Your choice of finishing material depends on the following: (1) the type of wood; (2) the use of the furniture; (3) the time available to do the finishing job; and (4) how you want the wood piece to look when you are through.

In order to get good results in applying wood finishes here are some general guides to follow: (1) work in a room where there is good ventilation; (2) keep dust to a minimum; (3) if possible—don't sand and finish in the same room; (4) remove all dust from the wood piece with a tack rag prior to applying the finish; (5) work when room temperature is around 70 degrees F and the humidity is low; (6) follow directions on the label; (7) finish underparts and interiors before finishing the outside; (8) put all used rags into the garbage.

Types of Clear Wood Finishes

There are two general types of clear wood finishes. They are the penetrating finishes and the surface finishes.

1. The penetrating finishes sink into the wood. These include:
 - a. Penetrating resins or sealers such as Danish oils and penetrating seals.
 - b. Oil finishes such as linseed oil and tung oil.

2. The surface finishes build up on the wood surface. These include:
 - a. Varnish
 - b. The newer synthetic finishes such as polyurethane (urethane), acrylic, and epoxy (catalytic finish).
 - c. Lacquer
 - d. Shellac
 - e. Wax finish

Penetrating Finishes

These finishes soak into the wood to surround the fibers and fill much of the cell structure near the surface. The finish becomes part of the wood rather than a build up on the wood surface. Since the penetrating finish is in the wood instead of on it, small dents or scratches can be easily patched by rubbing the surface with the penetrating finish and steel wool. In addition, some of these finishes may come with the stain already added to it. With each additional coat of this type of finish, the wood becomes darker.

Because penetrating finishes do penetrate the wood, they darken it slightly. However, this darkening effect greatly enhances the color and grain of hardwoods. It also intensifies the differences in the grain pattern.

There are many penetrating finishes on the market. Trade names may or may not include the words resins, sealers, or oils. The label directions should indicate whether or not the product penetrates the wood.

The two most common types of penetrating finishes are the oil finishes and the penetrating resins or sealers. Both penetrate into the wood to become part of the wood structure and both contain penetrating oils. However, the penetrating resins or sealers also contain resins. When these resins penetrate, they become extremely strong and hard, making the wood surface more resistant to damage.

● Oil Finishes

They are among the oldest of all penetrating finishes. The oil finish leaves little or no surface build up and produces a natural soft sheen on the wood surface. Oil finishes should not be used over sealers or fillers.

Oil finishes do not fill the pores of open-grain in woods. Some people, however, prefer open grain woods to remain unfilled. If you're one of these people, then just go ahead and oil your wood after staining. To some people, oils are best used on closed pore hardwoods rather than open pore hardwoods.

The old fashioned oil finishes such as linseed oil require little in the way of materials, but lots of elbow grease. For this reason, the traditional linseed oil finish has been replaced by modern oils that are easier and faster to apply.

The contemporary oil finishes will produce the same deep soft luster as linseed oil. One of the oil finishes being used today is tung oil. Tung oil is also known as China wood oil. It is recognized as fast drying and hard and it resists water, acid, alkali, and mildew.

● Tung Oil

Tung oil is the most durable of all natural oils. However, there are synthetic oils that are more durable. Tung oil finish is made by several manufacturers and can be purchased in 100 percent tung oil or tung oil mixed with varnish. The tung oil and varnish mixture will give a higher gloss to the wood surface than 100 percent tung oil. To apply both types of tung oil finish, follow these general steps. For more specific instructions, check the directions on the container.

1. Put a few drops of the oil finish into the palm of your hand. Rub all the oil into the wood using your hand. The warmth from your hand helps work the oil into the wood. With the tung oil and varnish, be sure and rub all the excess into the wood or wipe off the excess with nylon hosiery. (See Figure 1, Rubbing Oil in by Hand.)

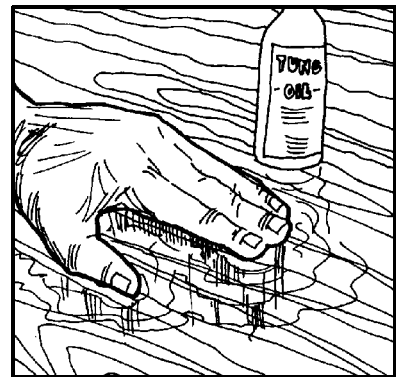


Figure 1. Rubbing Oil in by Hand

2. One hundred percent tung oil raises the wood grain. Therefore, after the finish has dried, lightly buff the surface with 4/0 steel wool, then wipe with a tack rag.
3. Apply as least two coats using the same procedure.

● Penetrating Resins or Sealers

One of the newest and most unusual finishes available today is the penetrating resin finish. As the name indicates, resins are added to penetrating oils. When these resins penetrate into the wood, they become extremely strong and hard and are very resistant to water, alcohol, heat, and abrasion.

Penetrating resins are self-sealing. Therefore, they should not be used with fillers or sealers. Open grain woods such as oak, teak, and mahogany will take a penetrating resin well. However, you'll probably have to give these woods at least three applications to fill the open grain structure.

For specific instructions on how to apply penetrating resins or sealers, follow the direction on the container. Generally, penetrating resins are applied in the following manner.

1. Generously apply penetrating resins or sealers onto the wood surface with nylon hosiery, using a circular motion.
2. Work the penetrating resin into the wood surface using 4/0 steel wool. Keep applying the finish until the wood won't absorb any more. Keep the surface wet for at least 15 minutes. Check the manufacturer's suggested time.
3. Wipe off all excess oil using clean nylon hosiery or a lintless cloth. If the residue is difficult to remove, soften it first by applying more finish and then wipe off immediately.
4. Allow the finish to dry. Check label for time.
5. Apply additional coats until the desired finish is obtained. This will require between two to five coats.

NOTE: Tables 1 and 2 provide handy information on surface and penetrating finishes.

Surface Finishes

Surface finishes are a general classification of clear wood finishes. Surface finishes build up on the wood and give the surface a glass-like appearance.

Surface finishes include varnish, synthetic finishes, shellac, lacquer, and urethanes. These surface finishes are difficult to apply because dust and lint often settle on the finish while it is drying. If the dust is controlled, a superior finish can result.

Surface finishes will show scratches. You will not be able to patch scratches and worn places as easily as with penetrating finishes.

● Varnish

Most varnishes today are made of synthetic resins or a combination of synthetic resins with natural gum resins. Synthetic resins are tougher and more resistant to wear.

Varnish, lacquer and most synthetic finishes may be purchased in either high gloss or satin gloss. For furniture that will receive a lot of hard wear, use a high gloss finish for hardness, then dull the finish by rubbing it with paraffin oil or paraffin oil and rottenstone, extra fine steel wool or extra fine grit sandpaper. (See Figure 2, Dulling High-Gloss Finish.)

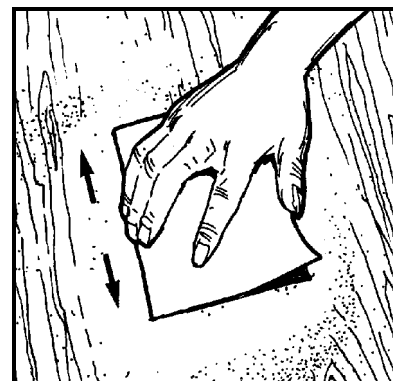


Figure 2. Dulling High-Gloss Finish.

Don't stir or shake varnish before using. Stirring creates air bubbles which are hard to brush out and which will appear as pitted dents when dry.

● Synthetic Finishes

Synthetic finishes are recommended whenever a hard, abrasive, finish that will resist chemicals is needed. Generally the synthetic of surface coatings are more durable than varnish.

Polyurethane (plastic) is the most common synthetic finish. Synthetic finishes give the wood surface a plastic-like appearance which is more glass-like than varnish.

Procedure for applying varnish and synthetic finishes:

When you apply varnish or synthetic finishes , you will have better results if you follow these suggestions.

1. Take precautions to eliminate as much dust as possible in the room when applying varnish or synthetic finish. Vacuum or sweep prior to finishing. Allow enough time for the dust to settle. Wet the floor if possible.

2. Carefully read and follow the manufacturer's instructions.

3. Never use varnish or synthetic finishes directly from the can. Pour the amount you will need into a separate container and put the lid back on the can. This will prevent dust from contaminating your finish container. (See Figure 5, Pouring into Separate Container.)

4. Apply varnish or synthetic finish on a clear, dry day when the temperature is about 70 degrees F.

5. Use a good quality, clean brush.

6. Never dip the brush more than one-third of the way into the finishing material. Wipe off surplus on the sides of the container.

7. Apply varnish or synthetic finish quickly and with the grain. Then, stroke across the grain. (See Figure 4, Brushing Across Grain.)

8. The final brushing is called tipping off. It is a very gentle brushing with the grain of the wood. (See Figure 5, Brushing with the Grain.)

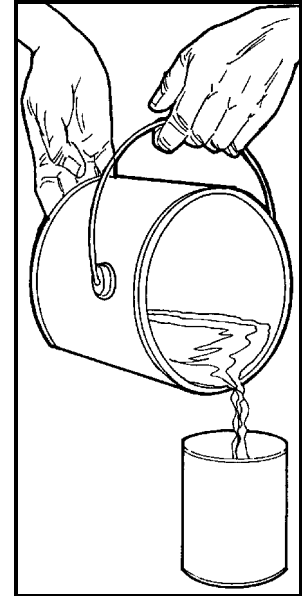


Figure 3. Pouring into Separate Container

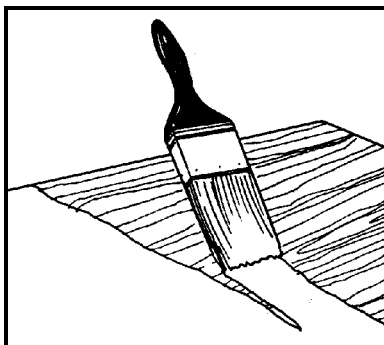


Figure 4. Brushing Across Grain

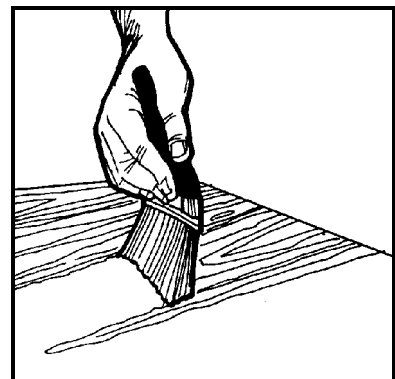


Figure 5. Brushing with the Grain

9. Remove dust specks with a small artist brush.
10. Let dry completely. Check the label for time.
11. Smooth with very fine sandpaper (220-280 grit) or 4/0 steel wool. Wipe with tack rag and apply additional coats of finish.
12. After the finish is dry, use pumice stone, 0000 steel wool, or rottenstone and oil (mineral or paraffin) to obtain a fine satin sheen and to remove any surface imperfections. Wipe with paint thinner and clean soft cloth to get rid of the oil.

● Epoxy or Catalytic Finishes

Epoxy finishes are packaged in a two-package system to prevent chemical solidification. Equal parts of the two chemicals are mixed in a separate container prior to application. Some epoxy finishes are brushed and some are poured onto the wood surface. The ones that are poured are suitable for flat surfaces.

This type of finish is very resistant to all types of abuse. However, it is expensive and gives a hard, glassy appearance to the wood. It is probably the toughest finish you can apply.

● Lacquer

Spraying lacquer is used extensively by furniture manufacturers and in custom finishing. Commercially, it is applied with spray equipment and dries very quickly.

A brushing lacquer which dries slower than spraying lacquer can be purchased. Don't try to brush on spraying lacquer. To identify a lacquer, look at the label. If the label indicates that lacquer thinner should be used for clean up, it is a lacquer finish.

When using a brushing lacquer, here are some steps to follow to get good results:

1. Wipe surface with a tack rag before applying lacquer.
2. A wide natural bristle or polyester brush should be used.
3. Buy a lacquer thinner recommended by the manufacturer for thinning and for cleaning the brush. Check the label. There are sufficient differences in thinners to cause drying, adhesion, and blemish troubles in some cases.
4. Brush a full, even coat of lacquer onto the wood surface. Try not to brush back and forth.
5. Apply lacquer on wood surface by brushing in one area with long, fast, continuous strokes. Keep each succeeding stroke working against the wet edge of the last stroke.

6. Allow it to dry for 2–4 hours. Check the label for the recommended time.

7. Sand with 320 sandpaper to remove defects and to provide for good adhesion of the next coat. (Figure 6.)

8. Wipe with a tack rag and apply a second coat. Follow the same procedure for each additional coat.

9. After the finish is dry, use pumice stone, 0000 steel wool, or rottenstone and oil (mineral or paraffin) to obtain a fine satin sheen and to remove some of the surface imperfections. Wipe with paint thinner and a clean soft cloth to get rid of oil.

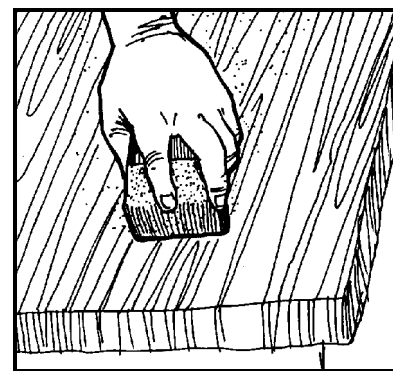


Figure 6. Removing Surface Defects

● Shellac

Shellac makes a beautiful surface finish. It is fast drying, but it is not resistant to moisture, alcohol, heat, scratches, and chips.

These disadvantages are serious enough so that shellac is not recommended for use as a surface finish. However, shellac can be used as a sealer. As a sealer, shellac is painted over fillers and stains so they don't bleed into the top finishes. This procedure, however may not be necessary with today's products. A sealer is not needed for synthetic finishes and penetrating finishes because they are self-sealing. Use the same brushing techniques as used with lacquer since shellac dries rapidly.

● **French Polish**

Many fine antiques have a French polish finish. This type of finish has been used for generations to give wood a clear, warm luster and provide more durability than is given by shellac.

French polishing is a painstaking operation that requires patience and hard work. You'll need shellac, turpentine, boiled linseed oil, a clean, lint-free cloth, and a lot of energy to do the job. French polishing should be done quickly, but with attention given to the proper technique. Here's how it is done:

1. Pour shellac into a small bowl and the turpentine into another small bowl. Wad a nylon into a ball, dip it into the shellac, then the turpentine, and apply the shellac and turpentine to the surface with straight, light, rapid strokes. Work with the grain of the wood.

2. Let dry, then sand lightly with extra fine sandpaper or steel wool. Wipe with a tack rag.

3. Apply additional coats in the same way until the finish begins to shine.

4. Then, add several drops of boiled linseed oil to the shellac and apply this mixture by dipping and rubbing. Switch to a rotary motion instead of a linear one, and add a drop or two more of linseed oil as the shine intensifies.

5. Stop when the finish has the look you want. If the finish ever dulls, you can revive it by rubbing it down with rottenstone and paraffin oil, and then French polishing in the same manner.

● **Paste Wax**

Wax is one of the oldest finishing compounds known. It is the least expensive finish you can buy and is easy to apply, even though it does require more elbow grease than some other finishes.

You can put a wax finish on wood that has just been stained or you can apply wax for protection over a final coat of shellac, varnish, polyurethane, enamel, or lacquer. A good wax finish makes any surface finish look even better.

Wax offers protection against scuffing and staining, but it will not stand up to heavy wear or water.

Here is how the wax is applied:

1. Wrap a lump of paste wax between two or more layers of cheesecloth and wipe a THIN film over the surface in a circular motion. Don't put on a thick layer or you'll get a dull, uneven, and gummy appearance.

2. Wait for the wax to dull, then wipe the surface with a clean, soft cloth.

3. Buff in a circular motion, then a linear motion with the grain of the wood. The harder and longer you buff, the shinier the finish. You can use a lamb's wool buffing attachment on an electric drill to speed up the work.

4. Wait at least an hour before applying another coat of wax, but remember that a high luster finish depends on good buffing, not on multiple coats.

Table 1. Penetrating Finishes

Finish	Advantages	Disadvantages	Recommended Common Use
Penetrating sealer			
<ul style="list-style-type: none"> ● natural unfinished appearance ● enhances grain and color 	<ul style="list-style-type: none"> ● easy to apply and maintain ● no sealer or filler required ● durable—resists alcohol, heat, household chemicals, water and most scratches ● dust is not a concern during application ● use over any stain ● can be patched in areas receiving most use and wear ● small dents or scratches less obvious 	<ul style="list-style-type: none"> ● difficult to remove for future refinishing 	<ul style="list-style-type: none"> ● open grain woods: teak, oak, pecan, chestnut, walnut, mahogany (do not use on Philippine Mahogany—produces a dull appearance) ● modern, Scandinavian styles
Polyurethane			
<ul style="list-style-type: none"> ● a synthetic resin varnish 	<ul style="list-style-type: none"> ● some do not require sealer ● very tough finish ● non-yellowing ● glossy or satin finish ● easier to apply than varnish ● quick drying 	<ul style="list-style-type: none"> ● incompatible with many stains and sealers ● some require special synthetic thinners 	<ul style="list-style-type: none"> ● bare wood ● where “tough” finish is needed
Lacquer			
<ul style="list-style-type: none"> ● intensify grain and color 	<ul style="list-style-type: none"> ● fastest drying ● hard, durable finish 	<ul style="list-style-type: none"> ● difficult for do-it-yourself project ● spray application best ● sealer required ● non-grain-raising or water-based stains only ● must be thinned ● many thin coats required 	<ul style="list-style-type: none"> ● where hard, durable finish is required ● do not use on mahogany or rosewood
Oil			
<ul style="list-style-type: none"> ● clear, soft luster ● natural bare-wood look ● includes tung, Danish and linseed oils 	<ul style="list-style-type: none"> ● penetrating and durable ● resistant to water and alcohol ● Danish and tung oils—superior to linseed oil ● tung oil available in semi- and high gloss ● Danish oil available in satin ● apply over bare or stained wood ● no sealer required ● tung oil will not darken 	<ul style="list-style-type: none"> ● must be periodically reapplied ● linseed oil is sticky and hard to apply, less durable, darkens wood ● open grained wood may be filled ● many layers needed for true hand-rubbed look 	<ul style="list-style-type: none"> ● dark woods—walnut, mahogany, cherry ● where hard finish is not required

Finish	Advantages	Disadvantages	Recommended Common Use
Wax			
<ul style="list-style-type: none"> ● to protect finishes and bare wood 	<ul style="list-style-type: none"> ● easy to apply ● non-sticky ● heat resistant ● apply over bare or stained wood ● improves durability of varnish and shellac finishes 	<ul style="list-style-type: none"> ● easily damaged ● liable to wear, dulls quickly ● frequent buffing and reapplication required ● use sealer coat of thinned shellac if sealer-stain not used ● not recommended as only finish 	<ul style="list-style-type: none"> ● bare wood or on furniture that can be cared for regularly ● over other hard finishes (varnish, shellac)

Table 2. Surface Finishes

Finish	Advantages	Disadvantages	Recommended common use
Shellac			
<ul style="list-style-type: none"> ● fine, mellow finish, accents grain 	<ul style="list-style-type: none"> ● easy to apply ● polishes well ● quick drying — reapply in 4 hours ● mistakes easy to fix ● use over any stain ● use with any filler 	<ul style="list-style-type: none"> ● brittle when dry ● easily damaged ● dissolves in water and alcohol ● white rings a problem ● cannot apply in humid weather—turns white ● absorbs moisture, turns white or hazy with age ● frequent touch-up required ● surface becomes soft after drying, waxing essential to protect surface ● short shelf life 	<ul style="list-style-type: none"> ● walnut, mahogany, teak, fine veneers ● decorative pieces not requiring hard wear ● sealer under other finishes
French polish (shellac base)			
	<ul style="list-style-type: none"> ● more durable than standard shellac ● increases value of fine antiques ● easy to repair 	<ul style="list-style-type: none"> ● water or spirit based stains only ● application requires skill, time and energy 	<ul style="list-style-type: none"> ● fine “period” furniture ● closed grain wood, fine veneers ● infrequently used items
Varnish			
<ul style="list-style-type: none"> ● enhances and gives warmth to grain 	<ul style="list-style-type: none"> ● one of the toughest finishes ● resists heat, impact, abrasion and alcohol ● use over any stain ● use with any filler ● flat, glossy or satin finish ● can be rubbed and polished (piano finish) 	<ul style="list-style-type: none"> ● slightly darkens wood ● dries slowly ● difficult to apply—careful brush technique ● dust a problem ● cloudy finish if brush previously used for painting ● bubbles in finish ● do not shake can 	<ul style="list-style-type: none"> ● topcoat over worn finishes ● tables, etc. receiving hard use

Table 3. Summary Steps for Various Finishes

Finish	Penetrating sealer	Oil	Wax	Shellac	French polish	Varnish	Polyurethane
Sealer	None	None	Optional	Yes	Yes	Yes	Yes/No check label
Stain	Any, except varnish or vinyl base	Any type	Any type	Any type	Water or spirit based stains or bare wood	Any type	Check label for type
Filler	None	Optional, open grained woods	Optional	Yes	Yes	Yes	Yes, check label for types
Pumice & oil rub	No	No	Optional	Usually	Yes	Usually	Optional
Wax	No	No	Yes	Usually	Yes	Usually	Optional
Approx. drying time 1 coat	4 hr	12-24 hr Danish or tung, 1 wk linseed	30 min	4 hr	24 hr	24 hr	6-12 hr
Number coats	2-3	2-3 Danish or tung; 10-20 boiled linseed	2-3	2-4	3-5	2-3	Varies, see label
Solvent	Check label			Denatured alcohol	Denatured alcohol	Turpentine or mineral spirits	Check label

Reference

Judith Williamson, Housing and Home Furnishings Specialist, **Furniture Refinishing**, Cooperative Extension Service, University of Maryland.

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