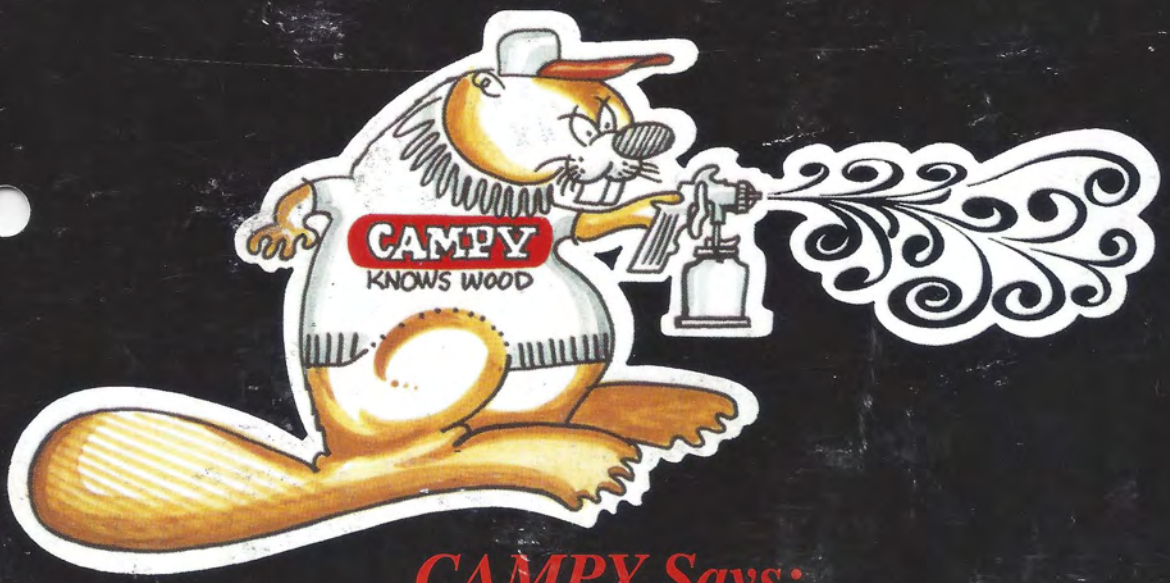
M.L. CAMPBELL®

WOOD FINISHING SYSTEMS




*CAMPY Says:*

# "We have the answers!"

COMMON WOOD FINISHING PROBLEMS

INDEX

# COMMON WOOD FINISHING PROBLEMS


| PROBLEM | SECTION |
|---|---|
| SEPARATION OF LIQUID | 1 |
| SAGGING OF FILM | 2 |
| SKINNING OF LIQUID | 3 |
| STREAKS | 4 |
| LACK OF FLOW | 5 |
| NON-DRYING OR POOR DRYING | 6 |
| SPOTTY DRYING | 7 |
| LACK OF HIDING | 8 |
| POOR ADHESION OF FILM | 9 |
| LACK OF ADHESION BETWEEN COATS | 10 |
| BRITTLENESS | 11 |
| FLAT SPOTS | 12 |
| EXCESSIVE SPRAY FOG | 13 |
| EXCESSIVE BODY | 14 |
| CRACKING OR CRAZING OF FILM | 15 |
| TOO LITTLE COATING WEIGHT | 16 |
| EXCESSIVE MARRING | 17 |
| DISCOLORATION | 18 |
| FINISH PRINTING | 19 |
| ORANGE PEEL | 20 |
| DIRTY OR SEEDY FINISH | 21 |
| BLUSHING | 22 |
| HAZE | 23 |
| OIL BLOOM | 24 |
| WHITE SPOTS | 25 |
| BROWN SPOTS | 26 |
| PINHOLES OR BUBBLING | 27 |
| BLEEDING | 28 |
| BLISTERING | 29 |
| EXCESSIVE SETTLING | 30 |
| CRATERING | 31 |
| DELAMINATION OF FINISH OVER STAIN | 32 |
| POOR ADHESION OF HIGH SOLIDS COATINGS | 33 |
| CHANGES IN LUSTER DURING APPLICATION | 34 |
| PROPER SANDING | 35 |
| SANDING / FINISHING TIPS | 36 |
| FINISHING CLOSED GRAIN HARDWOODS | 37 |
| HAND MARKS / FINGERPRINTS ON FINISH COAT | 38 |
| FOAMING (WATER-BORNE COATINGS) | 39 |
| BUBBLES (OPEN PORE WOODS) | 40 |
| BUBBLING OF COATING (LATEX) | 41 |
| RECOMMEND MOISTURE CONTENT FOR WOOD PRIOR TO FINISHING | 42 |
| SPRAY PATTERN BOTTOM HEAVY | 43 |
| SPRAY PATTERN HEAVY TO RIGHT | 44 |
| SPRAY PATTERN HEAVY TO LEFT | 45 |
| SPRAY PATTERN HEAVY AT CENTER | 46 |
| SPRAY PATTERN SPLIT | 47 |
| EXCESSIVE MATERIAL | 48 |
| MATERIAL WON'T SPRAY FROM SPRAY GUN | 49 |
| MATERIAL WON'T FLOW FROM SUCTION CUP | 50 |
| MATERIAL WON'T PUMP FROM PRESSURE TANK OR PRESSURE CUP | 51 |
| GUN SPUTTERS CONSTANTLY | 52 |
| MATERIAL LEAKS FROM SPRAY GUN | 53 |
| MATERIAL LEAKS FLUID NEEDLE PACKING NUT | 54 |
| SPRAY PATTERN TOP-HEAVY | 55 |
| PUMP FREEZE-UP (LATEX) | 56 |
| POST CATALYZED PRODUCTS APPLICATION GUIDELINES | 57 |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# PROBLEM SOLVING

Should finishing problems occur, a careful investigation should be made for the purpose of determining the exact cause of the problem. Every factor that may have a bearing upon the finishing or coating operation from the wood or surface on through to the finishing coats should be taken into account. To solve problems, consider the following factors which impact the end result of your finishing operation.

1. Type of surface.
2. Preparation of the surface.
3. Type and brand of washcoat or sealer.
4. Type and brand of stain or filler.
5. Type and brand of thinner used.
6. Percentage of material reduction for each coat.
7. Type and brand of topcoats.
8. Method of application.
9. Drying time between coats and method of drying.
10. Number of coats in each operation.
11. Mixing procedures of material prior to application.
12. Appearance of the goods in the package.
13. Shop conditions.
    a. Cleanliness.
    b. Atmospheric conditions, shop temperature and humidity both in application area and drying area.
    c. Knowledge of finishing practice.
14. The manufacturing dates, product identification numbers or reference and other identification marks stamped on the packages of the material in question.

The usual causes of trouble are: an unclean surface, insufficient drying time for each coat, sealing in moisture, failing to stir the material thoroughly, and unfavorable shop conditions. Make sure the environmental conditions, ventilation, temperature and humidity are suitable to insure proper application. Check the spray equipment to make sure that the gun and compressor are working properly and that neither oil nor moisture is passing through the air of material lines.

## SEPARATION OF LIQUID
### (Partial precipitation out of solution of the coating)

| CAUSE | REMEDY |
|---|---|
| **A.** Wrong solvent used. | **A.** If the separation is slight, addition of the proper solvent, along with constant agitation, may have a positive result. |
| **B.** Material subjected to unusual conditions of heat or cold. | **B.** Keep material at a temperature of 70° F to 75° F. If separation occurs because of extreme heat or extreme cold, the treatment is similar to correction E. |
| **C.** Over reduction. | **C.** Follow directions for proper reduction. If material is already over reduced, addition of fresh material will often bring the production batch back to the proper state. |
| **D.** Reducer added too quickly without sufficient stirring. | **D.** Add reducer slowly, stirring constantly. |
| **E.** Natural evaporation of solvent if material allowed to remain open to the air over a period of time. | **E.** If oxidation has not proceeded too far, addition of proper amounts of solvent, plus addition of fresh material will restore the condition of the batch. |

Note: If the separation is too pronounced, it may not be possible to put the material back into condition satisfactorily for use.

2

## SAGGING OF FILM
### (Curtaining)

| CAUSE | REMEDY |
|---|---|
| **A.** Sagging is caused by either over reduction or by use of a solvent that evaporates too slowly. | **A.** Use the proper solvent consistent with the general nature and temperature of the surface to be coated. |
| **B.** Heavy application of a coating. | **B.** Control amount of material applied to surface. |
| **C.** Draft condition. | **C.** Eliminate draft. |
| **D.** Strong sunlight causing top drying and consequently, late slippage of film on vertical surfaces. | **D.** Avoid application in strong sunlight. |
| **E.** Jerky operation of mechanical equipment from withdrawal from dip tank. | **E.** Repair or redesign equipment. |
| **F.** Cold weather. | **F.** Use faster evaporating reducing thinner (caution, may cause blush) or bring room temperature up to 70°F. |
| **G.** Dirty air cap and fluid tip. | **G.** Remove cap and fluid tip then clean. |
| **H.** Gun manipulated too close to surface. | **H.** Hold the gun 6 to 10 inches from surface. |
| **I.** Failure to release trigger at end of stroke (when stroke does not go beyond object). | **I.** Release trigger after every stroke. |
| **J.** Gun manipulated at wrong angle to surface. | **J.** Work gun at right angles to surface. |
| **K.** Fluid pressure too high. | **K.** Reduce fluid pressure. |
| **L.** Operation too slow. | **L.** Speed up movement of gun across surface. |
| **M.** Improper atomization. | **M.** Use larger air cap (internal mix); increase volume of air through horns (external mix) |

3

## SKINNING OF LIQUID

| CAUSE | REMEDY |
|---|---|
| **A.** While it has been possible (to a large extent) to minimize skinning, it is something which will occur to a varied degree whenever any air-drying material is exposed to air. | **A.** Make sure that containers in which the material is stored are sealed airtight. Dipping tanks should preferably have an oil or water-sealer cover. The cover should be in place whenever the tank is not in use. |

Note: To avoid skinning during storage of open containers or during long disuse of dip tank, follow the prescribed procedures.

1. Oil-Type Materials: Cover remaining contents of partially filled containers, with a small amount of turpentine before sealing.
2. Synthetic Type - Cover remaining contents of partially filled container with a small amount of synthetic reducer before sealing.
3. Water-borne - Float water on surface.

## STREAKS

4

| CAUSE | REMEDY |
|---|---|
| A. Dirty air cap and fluid tip. | A. Remove cap and fluid tip then clean. |
| B. Failure to overlap strokes correctly or sufficiently. | B. Follow previous stroke. |
| C. Gun moved too quickly across surface. | C. Take deliberate, slow strokes. |
| D. Gun held at wrong angle to surface. | D. Work gun at right angles to surface. |
| E. Gun held too far from surface. | E. Stroke 6 to 10 inches from surface. |
| F. Air pressure too high. | F. Use least amount of air pressure necessary. |
| G. Split spray. | G. Reduce air adjustment or change air cap. |
| H. Tipping gun. | H. Spray pattern should strike surface at right angles. |

## LACK OF FLOW

5

| CAUSE | REMEDY |
|---|---|
| A. Insufficient reduction. | A. Reduce according to instructions. |
| B. Use of solvents with high evaporation rates. | B. If fast evaporation is due to local weather conditions, choose a slower evaporating solvent than originally recommended. |
| C. Improper atomization of spray gun. | C. Adjust spray equipment. |
| D. Application of too thin a film. | D. Apply more material to surface. |
| E. Draft condition. | E. Find reducing solvent or blend to provide proper flow in a draft or eliminate the draft. |

## NON-DRYING OR POOR DRYING

6

| CAUSE | REMEDY |
|---|---|
| A. Humid weather. | A. If possible, place in heated and/or dehumidified drying room. |
| B. Cold weather. | B. Maintain a temperature in drying area of at least 70°F to 75°F. |
| C. Greasy, waxy or otherwise unclean wood surface. | C. Clean surface carefully with volatile solvents. Dry completely. |
| D. Failure to stir all pigmented finishes into proper suspension before application. | D. Stir the material thoroughly so that the liquids and pigments will be evenly disbursed. |
| E. If application is over a stained surface, there may be some dye in the stain used which tends to prohibit drying. | E. Use the proper stain. |
| F. Improper ventilation. | F. Provide ventilation (air movement). |
| G. An attempt to fill open grain wood by applying a heavy coat, or applying a heavy coat to flat surfaces such as table tops, retards through drying. | G. Apply only over a normal wet coat, 4 to 5 wet mils. |

## 7 SPOTTY DRYING

| CAUSE | REMEDY |
|---|---|
| **A.** Unclean surface. | **A.** Carefully clean wood surface with volatile solvent prior to coating. |

## 8 LACK OF HIDING

| CAUSE | REMEDY |
|---|---|
| **A.** Over reduction. | **A.** Add fresh, unreduced material to that which has been reduced. |
| **B.** Application on very hot or smooth surface which tends to cause film to flow off. | **B.** Use a faster evaporating solvent. Sand surface to be finished with 120 grit sandpaper. |
| **C.** Pigment not properly stirred into suspension. | **C.** Stir thoroughly to properly distribute pigment. |
| **D.** Slow evaporating solvent causing too much flow. | **D.** Use faster evaporating solvent. |
| **E.** Improper atomization. | **E.** Adjust spray equipment. |
| **F.** Low film thickness. | **F.** Apply more paint via more passes with spray gun, higher solids (less reduction), or faster thinner. |
| **G.** Edges show through. | **G.** If edges are too sharp before finishing, sand white wood edges with 120 grit sandpaper first then smooth with finer grit paper. |
| **H.** Wood sanded too smooth. | **H.** Always pre-sand wood with 120-140 grit paper. |

## 9 POOR ADHESION OF FILM

| CAUSE | REMEDY |
|---|---|
| **A.** Unclean surface. | **A.** Clean carefully with volatile solvent. |
| **B.** Sometimes the finishing coat and primer coat are not meant to be used together. The solvent in the finishing coat lifts the primer from the surface. Even though the film will dry and have a good appearance, primary adhesion has been ruined. | **B.** Make sure that the proper recommended primer and finishing coat are used together. |
| **C.** Wood sanded too smooth. Especially closed grain hardwoods like maple and birch. | **C.** Always finish sand closed grain hardwoods with 120 grit sandpaper before the finishing process. |

## LACK OF ADHESION BETWEEN COATS

10

| CAUSE | REMEDY |
|---|---|
| **A.** Stain or top coat not recommended to use together. | **A.** Use proper system. A total system from one manufacturer is always recommended. |
| **B.** Primer surface may have picked up contamination. | **B.** Clean surface. Apply the finishing coat in recommended sequence. |
| **C.** Stain coat not wiped. | **C.** Always wipe stain coat to remove excess pigment. |
| **D.** Stain coat not dry. | **D.** Always allow stain coat to dry to manufacturer's recommendation. |
| **E.** Catalyzed finishes allowed to dry too long between sanding and recoating. | **E.** Always sand catalyzed finishes within eight hours of recoating. |

## BRITTLENESS

11

| CAUSE | REMEDY |
|---|---|
| **A.** It is often difficult to differentiate between "lack of adhesion" and brittleness when evaluating film failures. Other than inherent brittleness or lack of adhesion in a finish, the cause for either difficulty will be the same. | **A.** See "Lack of Adhesion" |

## FLAT SPOTS

12

| CAUSE | REMEDY |
|---|---|
| **A.** An absorbent-type putty used that has not been sealed in, causes the topcoat to strike in. | **A.** Seal the putty. |
| **B.** Oily or dirty surfaces. | **B.** Provide clean finishing surface. |

## EXCESSIVE SPRAY FOG

13

| CAUSE | REMEDY |
|---|---|
| **A.** Wrong solvent blend. | **A.** Usual remedy is to choose a slower evaporating thinner. |
| **B.** Atomizing air pressure too high. | **B.** Use least amount of compressed air necessary. |
| **C.** Over reduction of material. | **C.** Use less reduction. Add fresh material to that which has already been over reduced. |
| **D.** Gun held too far from surface. | **D.** Hold gun at proper distance, usually 6-10 inches, from work. |
| **E.** Spraying past surface of the product. | **E.** Release trigger when gun passes target. |
| **F.** Wrong air cap or fluid tip. | **F.** Ascertain and use correct combination. |
| **G.** Fluid pressure too low. | **G.** Increase fluid pressure. |

## 14 EXCESSIVE BODY

### (Material Too Thick))

**CAUSE**

**A.** Any material which will dry in the presence of air at normal temperatures will tend to take on body. This occurs by virtue of the evaporation of solvent (oxidation) which takes place.

**B.** In the more advanced stages of oxidation, a livering action often occurs. This is aggravated by the too-swift addition of extra thinner. It should be remembered that thinner should always be added slowly and the mixture stirred at the same time.

**C.** Use of improper solvent.

**D.** Freezing (Latex)

**REMEDY**

**A.** If body of the material has not proceeded to the point where there is livering action, it is often possible to bring the thickened particles back into solution. Addition of a stronger solvent of the same general type or class should accomplish this task.

**B.** If a definite livering has occurred, it is not easily feasible to reclaim the material. A sample should be obtained for evaluation.

**C.** Use recommended thinner.

**D.** Store inside or above 32° F. If material has freeze/thaw stability, do not agitate material when frozen. Allow it to return to the unfrozen state undisturbed.

*NOTE: Primary causes of excessive bodying are: use of old material, improper handling of dip tanks or mishandling of other storage facilities. A method for keeping all storage tanks tightly sealed should be arrived at and carefully adhered to.*

## 15 CRACKING OR CRAZING OF FILM

**CAUSE**

**A.** Excessive coating weight can cause cracks and checks in the film when aging (first twelve months). Excessive coating weight is not usually a problem with nitrocellulose lacquers but it is critical when using acid catalyzed products like precatalyzed lacquers and catalyzed varnishes.

**B.** Mud cracking.

**REMEDY**

**A.** Use a wet mil guage during application. Follow manufacturer's recommendation for the number of coats and wet mil application per coat.

**B.** Occurs when latex is applied in excess film thickness or encounters air too soon after application.

*NOTE: Normally 4 to 5 dry mils, after sanding is recommended for proper coating weight. Film cracking can be identified by cracks across grain. Cracks that run with the grain indicate substrate cracking.*

## 16 TOO LITTLE COATING WEIGHT

**CAUSE**

**A.** The coating weight will directly effect the durability of all types of coatings. Too little coating will allow wood fibers to penetrate the film and wick moisture causing early film failure.

**REMEDY**

**A.** Do not over-thin coating! Use a wet mil gauge during application and follow the manufacturer's application spreading rates. Assist new spray personnel in establishing a pattern for proper application.

*NOTE: Normally 4 to 5 dry mils, after sanding is recommended for proper coating weight.*

## EXCESSIVE MARRING

17

| CAUSE | REMEDY |
|---|---|
| **A.** Film not completely dried. | **A.** Allow for more complete air drying. |
| **B.** Cold application (latex). | **B.** Most latex coatings will not coalesce below 50°F-60°F. Film that has not coalesced properly will be powdery or exhibit very poor film integrity. |
| **C.** Cold drying area (crosslink/catalyzed coatings). | **C.** Catalyzed coatings, drying area should be 68° F-70° F. If not then cold cure (improper crosslinking) can occur. |
| **D.** Catalyzed finishes used too quickly after application. | **D.** Catalyzed finishes reach 90% of their hardness within 24 hours. They then take 15-25 days to reach final cure. If used in harsh environment (i.e. restaurants, schools), then allow 5-7 days curing before use. |
| **E.** Catalyzed finishes or precatalyzed finishes used after shelf life or pot life has expired. | **E.** Follow manufacturer's usage schedule for pot life or shelf life. |

## DISCOLORATION

18

| CAUSE | REMEDY |
|---|---|
| **A.** Presence of foreign vapors/fumes. | **A.** Investigate the nature of vapors which might be present. It will then be necessary to shield off the vapors from contact with the finish. |
| **B.** Water-borne coatings will rust steel parts or oxidize aluminum in application equipment and can contaminate coatings. | **B.** Change to stainless or plastic parts. |
| **C.** Improper drum liner. | **C.** Make certain correct liner is being used. |
| **D.** Using old nitrocellulose products. | **D.** Nitrocellulose finishes tend to amber in color as they age, even in a closed container. Always use as fresh material as possible. |
| **E.** Tannin bleed when using water base coatings. | **E.** Use undercoater as first coat to stop tannin bleed. |

## FINISH PRINTING

19

| CAUSE | REMEDY |
|---|---|
| **A.** Insufficient drying time. | **A.** Allow longer air drying. |
| **B.** Too heavy a coat. | **B.** Apply lighter coats. |
| **C.** Slow drying or poor drying conditions. | **C.** See reference to non-drying or poor drying. |
| **D.** Improper coating selection. | **D.** Check with your coatings supplier for proper selection. |
| **E.** Improper catalyzation. | **E.** Check with your coatings supplier for proper catalyst amount. |
| **F.** Catalyzed material past pot life. | **F.** Follow manufacturer's recommended time for pot life. |
| **G.** Catalyzed material dried in a cold area, less than 70°F (cold cure). | **G.** Make sure drying area is 70°F. |

## 20 ORANGE PEEL

| CAUSE | REMEDY |
|---|---|
| **A.** Material not thinned out sufficiently. | **A.** Add the correct amount of solvent by measure. |
| **B.** Failure to deposit a wet coat. | **B.** Check solvent. Use correct spread and overlap of stroke. |
| **C.** Spray gun stroke too rapid. | **C.** Take deliberate, slow stroke. |
| **D.** Insufficient air pressure. | **D.** Increase atomizing pressure or reduce fluid pressure. |
| **E.** Using wrong air cap. | **E.** Select correct air cap for the material and feed. |
| **F.** Spray gun too far from the surface. | **F.** Stroke the spray gun 6 to 10 inches from surface. |
| **G.** Spray gun too close to surface. | **G.** Spray gun should be worked 6 to 10 inches from surface. |
| **H.** Overspray striking a previously sprayed surface. | **H.** Spray detail parts first and end with wet coat. Hold spray gun so over spray hits unsprayed work. |
| **I.** Poor thinner, too hot. | **I.** Use better grade of thinner for material or add retarder to allow flow-out. |
| **J.** Material not thoroughly dissolved. | **J.** Mix material thoroughly. |
| **K.** Drafts. | **K.** Eliminate excessive drafts. |
| **L.** Humidity too low. | **L.** Raise humidity of room. |

## 21 DIRTY OR SEEDY FINISH

| CAUSE | REMEDY |
|---|---|
| **A.** Unclean conditions of application areas.<br>1. Dust in paint room.<br>2. Dirt in air or paint line of spray application. | **A.** Cleanliness. Rearrange equipment so that any spray dust from booth does not reach drying chambers. |
| **B.** Improper solvent which tends to throw resin out of solution. | **B.** Use the proper recommended thinner. |
| **C.** Material has been subjected to extreme cold which tends to throw some particles out of solution. | **C.** Allow material to reach 75° F before applying. If still seedy, consult your coatings supplier. |

*NOTE: Always check coating with a magnifying glass to be sure there is dirt in film instead of small air bubbles. Pour coating on a clean surface like glass to assure finish is not seedy or has dirt in finish. Let it dry in a dust free area. Any contamination will show up when glass is held up to light.*

## BLUSHING

22

**CAUSE**

**A.** A combination of factors tend to cause blushing. Likewise, a combination of factors may be used to remedy the difficulties.
- Humide weather.
- Drafts
- Poor thinner (too hot)
- Lacquer sprayed when cold
- Damp spray rooms (generally concrete floor at ground level)
- Moisture in spray equipment

**REMEDY**

**A.** Add up to 13 oz. per gallon of a slow evaporating lacquer reducer like M.L. Campbell C161 1 Lacquer Retarder. Retarder should always be added to solvent lacquers when humidity is over 50%.
- Humid weather: add retarder to thinner or use a higher quality thinner. For drafts, find source.
- Bring the lacquer to room temperature.
- Blushing caused by condensation of water and subsequent evaporation from cold spray rooms can be avoided by warming up the room.
- Film has a white haze in areas. The film has dried too fast and entrapped

## HAZE

23

**CAUSE**

**A.** Incorrect thinner (not necessarily an inexpensive one).

**B.** Over catalyzation of finish.

**REMEDY**

**A.** Use the correct thinner as recommended by the manufacturer of the lacquers.

**B.** Finish must be removed.

*NOTE: Both blushing and haze can almost always be removed on finished articles by spraying retarder thinner over the affected parts, if it is not caused by over catalyzation.*

## OIL BLOOM

24

**CAUSE**

**A.** Rubbing down with oil before lacquer is thoroughly dry. Absorbed oil floats to the surface later.

**REMEDY**

**A.** Allow longer drying time. Bloom can sometimes be removed by washing with gasoline or spraying thin coat of clear. Allow to dry and re-rub.

## WHITE SPOTS

25

**CAUSE**

**A.** Water mixing with the lacquer either through the "separator" or by not having the surface dry.

**B.** Flatting paste not mixing in.

**REMEDY**

**A.** Clean air line and "separator". Be sure surface to be finished is dry. Bleed the line at least once every shift, or every eight hours.

**B.** Stir thoroughly and strain material if necessary.

## 26 BROWN SPOTS

| CAUSE | REMEDY |
|---|---|
| **A.** Oil coming through "separator" of supply line. | **A.** Cleanliness. Bleed the line at least once every shift, or every eight hours. |

## 27 PINHOLES OR BUBBLING

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

## 28 BLEEDING

| CAUSE | REMEDY |
|---|---|
| **A.** Organic red pigments or various dyes used in stain or undercoats and have not been sealed properly. | **A.** Best remedy is to avoid use of bleeding colors. Where bleeding colors have been used, a vinyl-type sealer usually tends to seal the bleeding better than lacquer sanding sealers. |

## 29 BLISTERING

| CAUSE | REMEDY |
|---|---|
| **A.** Sometimes strong solvents tend to react with the preceding coat. Also air or gasses in film can be trapped as it dries due to temperature, air movement or fast solvents being used. | **A.** Be sure that the undercoats are thoroughly dry. Use recommended primer. Use thinner with weakest solvent strength which will still act as a steady diluent. If you are using heat lamps or oven drying, be sure adequate flash off time is used before putting finished part in oven. |
| **B.** Butyl cellosolve used as a retarder | **B.** Butyl cellosolve is a heavy solvent. If too much is used, it will sink to the bottom of the film. If top of film skins over before complete film drying, then solvent pop can occur. |

## 30 EXCESSIVE SETTLING

| CAUSE | REMEDY |
|---|---|
| **A.** Over reduction or improper thinner. | **A.** Follow thinning instructions. |
| **B.** Too rapid thinning. | **B.** Add thinner gradually, stirring constantly. |

## CRATERING
### (The formation of small depressions in the coating)

31

**CAUSE**

**A.** Cratering (crawling) is the tendency of a wet film to crawl away from certain areas of the substrate. Cratering is caused by contamination of the surface. The equipment or coating with silicon, wax, oil or other contaminants. Cratering is a prevalent problem in refinishing shops.

**B.** Old work (refinishing).

**REMEDY**

**A.** Locate source of contamination and eliminate it. Check wipers, belt dressings, lubricating greases, oils, hand creams, metal and wood polishes, etc., as possible sources.

**B.** Add an anti-cratering additive (silicon) to the finish. Caution: Anti-cratering additives will contaminate all equipment.

## DELAMINATION OF FINISH OVER STAIN

32

**CAUSE**

**A.** Clear finish is peeling or shows poor adhesion and when removed, finish shows stain adhering to the back of the chip.

**REMEDY**

**A.** This usually occurs when the finisher is trying to obtain a very deep stain color such as a mahogany or a white white.

The application of too heavy of a coat of stain without wiping can leave a loose surface film of pigment. When the clear coat is applied over the pigment, it only adheres to the pigment and does not have good adhesion to the wood, therefore, leading to peeling.

Dark stain color should be obtained by using toners as a first coat before stain application. All heavy application of stains should be wiped before finish is applied. In addition, stain should be allowed to dry the time recommended by the manufacturer.

## POOR ADHESION OF HIGH SOLIDS COATINGS

33

**CAUSE**

**A.** High solids coatings (40% solids or more) show delamination.

**REMEDY**

**A.** Inspect the wood sanding process prior to finishing. High solids coatings need a better wood profile to anchor to then a low solids coating that contains more thinner. Many times in sanding (especially hard woods like maple) the finishers will over sand and polish the wood to where there is not enough profile to produce good adhesion with the top coat. This problem can also be caused by the shop using worn sanding belts. When utilizing high solids coatings (40%+) a final sanding on hard woods should be done with 120-140 grit paper. This will assure good adhesion to the wood.

34

## CHANGES IN LUSTER DURING APPLICATION

| CAUSE | REMEDY |
|---|---|
| **A.** After several hours of application, the material will dry to a lower luster than when the application started. | **A.** Stir material thoroughly at the start of the job being sure all flatting agent is well distributed. Thoroughly stir low solids products and stains before and during the application process. |

**Note:** The more coats applied to a piece, the smoother the finish will be. The smoother the finish is, the glossier the finish will look, optically, due to light reflectance.

35

## PROPER SANDING

### (Prior to application of stain or finish)

| | Finish Sand |
|---|---|
| Close Grain Hardwoods - Maple, Birch, Beech | 120 Grit |
| Open Grain Hardwoods - Oak, Ash, Walnut | 120 - 140 Grit |
| Soft Woods - Pine, Fir, Poplar | 120 - 140 Grit |
| MDF - Routed Areas | 400 - 600 Grit |
| Face Area | 320 Grit |
| UV Filled Board | 180 Grit |

36

## SANDING/FINISHING TIPS

- Sanding should be done as close to finishing as possible to assure a wood profile remains for finish adhesion.
- The coarser the sandpaper grit used, the darker the stain color produced due to penetration.
- Caution - Sanding belt will polish the wood as grit is worn off. Worn sanding belts can cause intense heat (up to 400 degrees) and produce a burned surface that restricts finish penetration.
- To avoid scratches in the wood, always use a series of grits when sanding and each subsequent sanding grit should be *just* one grit finer than the previous paper used. A sequence to use could be 100 grit followed by 120,140.
- Most fine woods are not sanded beyond the 140 grit before finishing. When using solid wood and veneers on the same project, the veneers are traditionally sanded with one finer grit that you sand the solid wood. This will tend to give you better uniformity of stain colors.
- Sanding new (white) wood, should be done with an open coat type paper that is made with silicone carbide or aluminum oxide. Never use silicon papers on unfinished wood. These papers are recommended for the sanding of finishes only.

37

## FINISH SANDING NEW WOOD (Before applying stain or clearcoats on closed grain hardwoods: Maple, Birch, Beech, etc.)

- Finish sand with 120 grit paper, be sure sanding belts are not worn.
- Thin first coat 10-15%, or use a vinyl sealer as first coat.

*NOTE: It is important on closed grain hardwoods that there is a good wood profile for the first coat of finish to be anchored to.*

38

## HAND MARKS / FINGERPRINTS ON FINISH COAT

| CAUSE | REMEDY |
|---|---|
| **A.** Oily hands in contact with finish during sanding operation. | **A.** Employees should, prior to sanding, clean hands thoroughly or wear gloves during the sanding process. |

## FOAMING
### (Water-borne Coatings)

39

**CAUSE**

**A.** Agitation too rapid.

**REMEDY**

**A.** Reduce the amount of agitation.

## BUBBLES
### (On open pore wood)

40

**CAUSE**

**A.** Air, gas or vapor is entrapped in the pores of open-grain wood (oak) and the finish dries before bubbles can dissipate.

**REMEDY**

**A.** Apply a thin, wash coat of sealer (5 to 1 reduction) as a first coat. Bubbling is a difficult problem that seems to be related to the quality of the wood used and its occurance is very spotty. A retarder (slower solvent) can also be used to slow the drying. Bubbles can be caused by air leakage in a gun or a hose.

## BUBBLING OF COATING
### (Latex)

41

**CAUSE**

**A.** Temperature too high for application.

**B.** Excessive air pressure.

**REMEDY**

**A.** Lower temperature. Use flow additive.

**B.** Reduce air pressure.

## RECOMMENDED MOISTURE CONTENT FOR WOOD PRIOR TO FINISHING

42

Hardwoods' moisture content should be 6-8 percent. Softwoods' moisture content should be 10-12 percent. Always use a moisture gauge to randomly check wood's moisture content. Store lumber in a warm dry room. Wood shrinks when it loses moisture and expands when it absorbs moisture.

## SPRAY PATTERN BOTTOM HEAVY

43

**CAUSE**

**A.** Horn holes partially clogged (external mix).

**B.** Obstruction on bottom side of fluid tip.

**C.** Dirt on air-cap seat or fluid-tip seat.

**REMEDY**

**A.** Remove air cap and clean.

**B.** Remove and clean tip.

**C.** Remove and clean seat.

## SPRAY PATTERN HEAVY TO RIGHT

44

**CAUSE**

**A.** Right side of air holes partially clogged.

**B.** Dirt on right side of fluid tip.

**REMEDY**

**A.** Remove air cap and clean air holes.

**B.** Remove fluid tip and clean.

## 45 SPRAY PATTERN HEAVY TO LEFT

| CAUSE | REMEDY |
|---|---|
| **A.** Left side of air holes partially clogged. | **A.** Remove air cap and clean air holes. |
| **B.** Dirt on left side of fluid tip. | **B.** Remove fluid tip and clean. |

## 46 SPRAY PATTERN HEAVY AT CENTER

| CAUSE | REMEDY |
|---|---|
| **A.** Spreader adjustment valve set too low. | **A.** Increase volume of air by opening spreader adjustment valve. |
| **B.** Atomizing pressure too low. | **B.** Increase pressure. |
| **C.** Material of too thick a viscosity. | **C.** Thin material with suitable thinner. |
| **D.** Fluid pressure too high for air cap's normal capacity (pressure feed). | **D.** Reduce fluid pressure. |
| **E.** Fluid tip too large for material used. | **E.** Use smaller fluid tip. |

## 47 SPRAY PATTERN SPLIT

| CAUSE | REMEDY |
|---|---|
| **A.** Air and fluid not balanced. | **A.** Reduce width of spray pattern. |
| **B.** Air cap or fluid tip dirty. | **B.** Remove and clean. |

## 48 EXCESSIVE MATERIAL USAGE

| CAUSE | REMEDY |
|---|---|
| **A.** Not triggering the gun at each stroke. | **A.** It should be a habit to release trigger after every stroke. |
| **B.** Gun held at wrong angle to surface. | **B.** Hold gun at right angle to surface. |
| **C.** Gun held too far from surface. | **C.** Work gun 6 to 10 inches from surface. |
| **D.** Wrong air cap or fluid tip. | **D.** Use correct combination. |
| **E.** Depositing material film of irregular thickness. | **E.** Learn to calculate depth of wet finish film. |
| **F.** Air pressure too high. | **F.** Use least amount of air necessary. |
| **G.** Fluid pressure too high. | **G.** Reduce pressure. |

## 49 MATERIAL WON'T SPRAY FROM SPRAY GUN

| CAUSE | REMEDY |
|---|---|
| **A.** Exhausted paint supply. | **A.** Add paint. |
| **B.** Grit, dirt, paint skin, etc., blocking air cap, fluid tip, fluid needle, or strainer. | **B.** Clean spray gun thoroughly and strain paint. Always strain paint before using. |

## MATERIAL WON'T FLOW FROM SUCTION CUP

50

| CAUSE | REMEDY |
|---|---|
| **A.** Dirty air cap or fluid tip. | **A.** Remove air cap and fluid tip and clean thoroughly. |
| **B.** Clogged air vent on cup cover. | **B.** Remove obstruction. |
| **C.** Wrong air cap. | **C.** Ascertain and use correct set-up. |
| **D.** Leaky connections on fluid tube, air cap, or fluid tip. | **D.** Check for leaks and repair. |

## MATERIAL WON'T PUMP FROM PRESSURE TANK OR PRESSURE CUP

51

| CAUSE | REMEDY |
|---|---|
| **A.** Lack of proper air pressure in pressure tank or cup. | **A.** Check for air leaks or lack of air entry. Adjust pressure for sufficient flow. |
| **B.** Air in-take opening inside pressure tank or cup lid clogged by dried up paint. This is a common problem. | **B.** Clean air in-take opening periodically. |
| **C.** Leaking gasket on tank cover or pressure cup lid. | **C.** Replace with new gasket. |

## GUN SPUTTERS CONSTANTLY

52

| CAUSE | REMEDY |
|---|---|
| **A.** Fluid tip not tightened to spray gun. | **A.** Tighten securely, using a good gasket. |
| **B.** Leaky connection on fluid tube or fluid needle packing (suction gun). | **B.** Tighten connections and lubricate packing. |
| **C.** Lack of sufficient material in container. | **C.** Refill container with material. |
| **D.** Tipping container at an acute angle. | **D.** If container must be tipped, change position of fluid tube and keep container filled with material. |
| **E.** Obstructed fluid passageway. | **E.** Remove fluid tip, needle and fluid tube then clean. |
| **F.** Material too heavy (suction feed). | **F.** Thin material. |
| **G.** Clogged air vent in cup lid (suction feed). | **G.** Clean. |
| **H.** Dirty or damaged coupling nut on cup lid (suction feed). | **H.** Clean or replace. |
| **I.** Fluid pipe not tightened to pressure tank or pressure cup cover. | **I.** Tighten and check for defective threads. |

## 53 MATERIALS LEAK FROM SPRAY GUN

| CAUSE | REMEDY |
|---|---|
| **A.** Fluid needle packing too tight. | **A.** Loosen nut and lubricate packing. |
| **B.** Fluid needle packing dry. | **B.** Lubricate needle and packing frequently. |
| **C.** Foreign particle blocking fluid tip. | **C.** Remove tip and clean. |
| **D.** Damaged fluid tip or fluid needle. | **D.** Replace fluid needle with correct size for fluid tip being used. |
| **E.** Broken fluid needle spring. | **E.** Remove and replace. |

## 54 MATERIAL LEAKS FLUID NEEDLE PACKING NUT

| CAUSE | REMEDY |
|---|---|
| **A.** Loose packing nut. | **A.** Tighten packing nut. |
| **B.** Dry fluid needs packing. | **B.** Remove and soften packing with a few drops of light oil. |

## 55 SPRAY PATTERN TOP-HEAVY

| CAUSE | REMEDY |
|---|---|
| **A.** Horn holes partially plugged (external mix). | **A.** Remove air cap and clean. |
| **B.** Obstruction on top side of fluid tip. | **B.** Remove and clean. |
| **C.** Dirt on air cap seat or fluid tip seat. | **C.** Remove and clean seat. |

## 56 PUMP FREEZE-UP

**(Latex)**

| CAUSE | REMEDY |
|---|---|
| **A.** Heat build-up in pump causes latex to coalesce. | **A.** Switch to diaphragm pump. |

# POST CATALYZED PRODUCTS APPLICATION GUIDELINES

- **All M. L. Campbell post catalyzed coatings:** (except catalyzed vinyl sealer) require a 10% (13 oz.) by volume ratio of M.L. Campbell CareCatalyst C149 1 per gallon. Catalyst should always be added to the coating before any reduction of the coating takes place. No sweating in (reduction period) is necessary before the use of catalyzed M.L. Campbell products.

- **Proper catalyzation amounts:** All catalyzed products are formulated with the proper amount of resin to lock up with the recommended amount of catalyst. Adding more than the recommended amount of catalyst allows for free catalyst in the coating that can not lock up with the resin. This can lead to color changes, hazing in the finish and/or possible acid damage (burning) to the wood surface.

  Undercatalyzation can effect the catalyst cross linking reaction (cure) and dramatically effect the hardness and durability of the finish.

- **Finish curing:** To insure the proper catalyst reaction, after application, these sprayed materials should be cured in a drying room where the temperature is 68˚ F-70˚ F. If the drying area is lower than this temperature, it is possible to have a cold cure take place and the finish will not exhibit the durability and chemical resistance of a properly cured finish. The drying room area should be kept at the recommended temperature for 6 hours to allow for proper cure.

- **Sanding:** M.L. Campbell Post Catalyzed products are extremely solvent resistant and hard. Because of this, the surface must be sanded in between coats to assure proper intercoat adhesion. We recommend sanding between coats within two hours of the product being recoated. The reason we recommend sanding within two hours of recoating is that there is an ongoing acid cure reaction that continues to harden the film and if too much time passes between sanding and recoating, it is possible the surface will reharden and improper intercoat adhesion may result. A 320 grit no-fill type sand paper is recommended and will provide a good intercoat bond. Remove sanding dust before recoating.

- **Recoating:** M. L. Campbell products with the exception of Clearlite Plus do not have recoat windows. Clearlite Plus should be recoated within 1 hour after it is dry to the touch, or after 8 hours. Care should be taken with all post catalyzed finishes when sanding, not to sand through the previous coat as this can lead to lifting of the coating in the sanded through areas when the next coat is applied.

- **Pot Life:** The pot life on all M.L. Campbell post catalyzed finishes is 24 hours. Materials used within this time period will exhibit the best chemical resistance and hardness. To use coating after the recommended 24 hour period up to 72 hours, store the coating in a cool area. Catalyze an equal amount of fresh coating and mix with the old coating. Use the mixed material as a first coat. As a general rule, for best chemical resistance and hardness, always try to use catalyzed material within an 8 hour working shift.

- **Film Build:** Catalyzed coatings obtain their excellent chemical and wear resistance by the hardness of the film. If too much coating weight is applied, the thickness of the coating weight combined with the film hardness will not allow the finish to expand and contract with the natural wood substance it is applied to. This will lead to film wrinkling/cracking. Recommended dry film build on all post catalyzed product after sanding should be 4-5 dry mils. Heavier applications of finishes are not necessary to obtain either chemical resistance, long term durability or hardness.

- **Viscosity:** High solids post catalyzed coatings are very susceptible to viscosity changes due to temperature, product aging, or catalyzation. After establishing satisfactory application results with these types of products, always know the viscosity of the product that had produced the best application characteristics for you. In the case of any future application problems, always check viscosity to make sure it is the same as when the product's application was proper.

Founded in 1914, the M.L. Campbell Company has built an 81 year reputation of dependability and product excellence as a supplier of quality coatings for the wood and metal products finishing industry.

The heritage of commitment is evident today as M.L. Campbell continues to offer customers the highest quality of finishing products at a value conscious price. Eight decades of experience and today's most advanced lacquer coatings technology is a major part of every product M.L. Campbell offers.

For every quality finishing job, you can depend on M.L. Campbell..."The Finisher's Choice".

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