

In the Workshop with Charles
Neil

Finishing A to Z
Beyond the Books

This is a Companion Reference Manual
for the DVD Series

Using this Reference Manual

The manual is provided via pdf format which is read in Acrobat Reader (you can download the latest version of this software at www.adobe.com).

The reference manual may be downloaded from the website of Charles Neil (<http://www.antiquesbuiltdaily.com/finishingatoz.pdf>)

The format of the pages of this manual will allow you to print a hard copy and the margins are set to allow you to 3-hole punch and place in a binder.

If you have any questions regarding the DVD series or the information within this manual, please email Charles at his workshop. Email: workshopofcharlesneil@msn.com

Acknowledgments

Finishing is designed to do two things, protect and beautify wood.

No matter how beautiful something is crafted, if it is not finished properly with a quality finish job, it will not be appealing, nor will it be beautiful.

As a furniture maker, both beauty and endurance are demanded from me and to sacrifice either is not acceptable.

There is a lot of discussion about proper finishing, my DVD series represents my 30+ years experience and proof that my finishing has stood the test of time and use in client's homes. Much of the information in this series is from my own experience, however, when I embarked on making the video series I was in contact with many manufacturers to gain the most information I could about products that have come into the market in recent years.

I would like to take this chance to thank Kent Harpool of Woodcraft Supply, LLC for all of his assistance in seeking out the proper people to speak with at a multitude of finishing manufacturers. A special thanks to Todd Detamore of Gemini Coatings, friend and source of good debate for 15 years and co-developer of my special colors. I also would like to thank Rob Szwedo and the gang at General Finishes, Al Holste at RPM Finishes (Mohawk & Behlen), W.D. Lockwood, Gemini Coatings, Waterlox, Hock Tools, Jeff Weiss of Target Coatings, Mixol, Zinsser, Timbermate, Woodcraft, Famowood, Fuhr Industries, ML Campbell and Lawrence- McFadden (Bartley Gel Stains), all manufacturers of finishing products who gave me their time and product to insure that I was able to give you the best information. In addition, Peter Kern of Mirka, Norton Abrasives and Klingspor who contributed the latest in sanding products and last but not least, SATA, Excel-Kremlin, Earlex and Turbinaire whose spray equipment was used in the video series and who gave me infinite support in giving you good and current information.

Just so you know, all of the manufacturers listed make products that I use in my shop, every day so it wasn't a fluke that their products were in this series.

Charles Neil on Finishing in General

Today there is a great deal of discussion concerning the finishing of both sides, top/bottom, inside/outside. It has always been my practice to finish both and so it shall remain, it has yet to fail me. In addition, there are a lot of claims in favor of the ture and pure oils, I have not found them to be valid. Their initial enhancement of the wood soon gives way to a dried-out lack luster appearance which requires constant maintenance and rejuvenation. Modern day “oils” are in fact varnish blends of oils and resins with one or more driers. These finishes do a good job.

The use of traditional finishes, i.e. the pure oils and its association with the thinking that the old masters used such is not a valid point, if they had what we have today, they would have used these products. Shellac has been used as a finish for thousands of years and its revitalization today supports its timeless contribution to the finishing world. For the old masters, shellac was difficult to obtain and very expensive, oils were readily available and inexpensive, thus oil is what they chose.

Oils today remain a staple in finishing for the same reasons they did in the days of old, cost, ease of use and availability, but just as the candle, fireplace cooking and horses have been replaced, so have wood finishes.

Few antiques remain in original condition, despite the hype and most have been re-done several times. To allow beautiful work to deteriorate because of fear of value loss is not sound thinking and quite frankly, not done. It is unintentional deterioration of value by the unknowing do-it-yourself folks who don't comprehend the difference between refinishing and restoration/conservation and it is noted that the most deterioration is on oil finished pieces whose oil finish formulas remain today.

It is with this understand that we recognize techniques such as dovetails and pegged mortise and tenons have withstood the test of time and are in no need of repair. Finishes are not the same, so to proceed with a known inferior product is not to my way of sound thinking.

CHARLES NEIL'S RECOMMENDATIONS

Through the many years of crafting and finishing furniture, Charles has grown to rely on several products and product brands as well as color mixes for certain wood species. Here you will find those recommendations and some “color recipes” for different brands that he uses in his shop.

Cherry

For a medium dark red I use Gemini Coatings Black Cherry #S297

For a light/natural look, I spray with Gemini Coatings #229 Equalizer and then stain with Gemini Coatings #114 Honey Pine; if I want a little more aged look, I use Mohawk #M4777 - Raw Sienna NGR Dye as a base, then Mohawk #M14356 - Burnt Umber Stain until I have the look I am going for. Mohawk's M100-0382 Natural Cherry Toner matches.

I also have these formulas for other products which give me the same look:

Dark Natural:

Use General Finishes Water Base Stain:

2 parts Black Cherry
1 part Cranberry

or Use W.D. Lockwood Dye Water Base Dye¹:

2 parts Standard Red Mahogany #54
1 part Honey Tone Amber #145

¹All W.D. Lockwood Dyes were mixed at their maximum concentration before using in these formulas. This concentration applies to each formula listed using W.D. Lockwood.

Figured Maple

By far my favorite to use is a color I developed with Gemini Coatings which I named New England Maple #D-S64.

Here are recipes for other brands that will get you close to this color:

W.D. Lockwood Water Base Dyes²:

36 parts Golden Amber #144

1 part Standard Red Mahogany

(Example: 36 oz. Golden Amber & 1 oz. Standard Red Mahogany or 3 tablespoons Golden Amber & 1/4 teaspoon Standard Red Mahogany)

General Finishes Dye Stains

12 parts Amber

12 parts Cinnamon

2 parts Cherry

1 part Yellow

These are other products that look good on figured maple:

Water Base Dye

W.D. Lockwood - Honeytone Amber #145

W.D. Lockwood - Brown Amber #141

W.D. Lockwood - Golden Amber #144

NGR Dye

Gemini - New England Maple - #D-S64

Mohawk - Light Walnut Brown (Light Brown) - #M2067

Mohawk - Colonial Maple (Darker Brown) - #M

²All W.D. Lockwood Dyes were mixed at their maximum concentration before using in these formulas. This concentration applies to each formula listed using W.D. Lockwood.

Walnut

Again, my favorite color is Gemini Coating's New England Maple #D-S64. I also like to use Gemini Coating's Yellow #NG1703 as a base prior to using the New England Maple

These are other products that look good on walnut:

Water Base Dye

General Finishes - Amber Dye with a Splash of Cinnamon to taste

NGR Dye

Gemini - New England Maple - #D-S64

Mohawk - Light Walnut Brown (Light Brown) - #M2067 (you can also use Raw Sienna #4777 as a base.)

Mohawk - Medium Brown Walnut (Darker Brown) - #M2077

Also, a nice color for walnut that is clean and clear is a couple of coats of orange shellac.

Red Oak

I don't build with red oak a lot, but when I do, I favor these colors:

Water Base Dye

W.D. Lockwood - Light Golden Oak with a Van Dyke Brown Glaze

NGR Dye

Mohawk - Light Golden Oak - #M4167 with a Van Dyke Brown Glaze

White Oak

For the Mission Oak look, you want to use a dark color, I suggest:

Water Base Stain

General Finishes - Brown Mahogany

Gel Stain

Bartley Gel Stains - Brown Mahogany

Bartley Gel Stains - Dark Brown Mahogany

NGR Dye

Mohawk - Light Walnut - #M2067

Mohawk - Colonial Maple - #M2407

Mahogany

Light Brown Look, I suggest:

NGR Dye: Mohawk Light Walnut #M2067

For a Red/Burgundy Look:

NGR Dye: Light sprayed base of Mohawk Raw Sienna #4777 with Mohawk Dark Red Mahogany Dye #M2277. Mohawk's M100-0384 Deep Red Mahogany toner matches this. I then glaze with a Van Dyke Brown Glaze or Deep Red Mahogany Glaze.

For a Medium to Dark Red/Burgundy:

NGR Dye: Use a sprayed base coat of Gemini Coatings Yellow #1703 then dye with Gemini Coatings Black Cherry #S297; Glaze with Van Dyke Brown or Deep Red Mahogany.

Water Base Dye: W.D. Lockwood Standard Red Mahogany #54 and glaze with Van Dyke Brown or Deep Red Mahogany.

Suggested Tints

Mixol - Pigment - You can purchase a kit from Woodcraft.

Transtint - The following colors I find useful:

Primary Colors:

Red #6021
Yellow #6020B
Blue #6022

Additional Colors I have on hand:

Amber Additive #6000
Black #6023
Honey Amber #6001
Bordeaux #6027
Green #6028

Wood Fillers

Famowood Water-base Fillers
Timbermate Water-base Fillers
Mohawk Epoxy Sticks

Grain Fillers

Timbermate Water-base Filler - Neutral Base

Touch Up Markers

Mohawk/Behlen
Gemini Masters

Shellacs

Hock - Flakes
Seal Coat - Pre-Mix
Zinsser - Spray Can

Sandpapers

Mirka (Abranet)
Klingspor
Norton
3M (Auto Body Grade)

Spray Guns

Excel-Kremlin
SATA
Woodcraft Supply

Turbines

Earlex
Turbinaire

Waxes

Renaissance Micro Crystalline
Briwax
Goddards (Someone told me they have discontinued making their paste wax)
General Finishes - Satin

Water Base Finishes

Gemini Coatings
M.L. Campbell
Target Coatings
Fuhr Coatings
General Finishes

Water Base Dyes

W.D. Lockwood - powder
Transfast/Transtint - Homestead Finishes - powder & concentrate
General Finishes

NGR Dyes

Gemini Coatings - Masters
Mohawk/Behlen - RPM Finishes

Brushable Finishes

Deft Brushing Lacquer
Mohawk/Behlens Brushing Lacquer
General Finishes - Polyacrylic (water base)
Seal Coat Shellac
Hock Shellac

Brushes

Corona - available at Woodcraft Supply

Glazes

Mohawk - RPM Finishes
Gemini Coatings
General Finishes

Stains

General Finishes - Water Base/Oil/Gel
Bartley - Gel
Gemini Coatings - Water Base/Oil/Lacquer
Mohawk - Lacquer/Oil
M.L. Campbell - Water Base/Oil/Lacquer

Spray Toners

Mohawk/Behlens
M.L. Campbell
Gemini Coatings - Masters

Rubbing Pads

Mirka - Abralon

Sanding Sponges

Klingspor - Ultra Flex
Norton - Soft Touch
3M - Scotchbrite

Buffing/Polishing Pads

Surbuff - available at Woodcraft Supply

Oil Finishes

Waterlox - tung oil/varnish blends
General Finishes - Arm-R-Seal, Danish Oil & Seal-a-Cell
Mohawk - Tung and Polywipe
Gemini - Polywipe

Sanding Schedules

The key to sanding is always the same - moving up through the grits. It is not a good idea to skip more than one grit.

The stage your project is at determines where you start.

Construction Sanding

Construction Sanding is exactly what it says, you are using the heavier grit sanding papers to shape and blend and begin the smoothing process making it easier for the finer grit papers to do the best job possible. Construction grits don't care about hard and soft grains. If a construction grit hits a glue area it cuts right down whereas finer grits will ride over and cause an uneven area in the surface.

Sandpaper Grits from 36 to 100 fall into this category.

Sandpaper Grits from 100 to 120 are semi-construction.

For instance, if I am sanding a chair seat that has been shaped with an adz and grinder, I'll start with a 36 or 40 grit paper, then move to a 60 grit, then 80 grit, then 100. By the time I reach the 100 grit paper, my chair seat will be shaped and will only need to be sanded additionally to remove sand scratches and smooth.

Currently Sanding with	Next Grit to Use
36 grit/40 grit	60 grit
60 grit	80 grit
80 grit	100 grit
100 grit	120 grit

My objective in construction sanding is to always wind up with everything clean and level at the time I have finished using 100 or 120 grit papers.

Sanding to Smooth

The next sanding process is smoothing. After determining that everything is clean and level I begin using the finer grits.

It is never a good idea to jump more than one grit when sanding

Currently Sanding With	Next Grit to Use
100 grit	150 grit
120 grit	180 grit
150 grit	220 grit
180 grit	220 grit

Now, having given you the chart above, rarely do I sand to 220 and never beyond when sanding raw wood. Now, the exceptions when I would in fact use 220 on raw wood is on woods that blotch easy or where a natural finish will be used and on end grains.

The finer you sand, the more the wood becomes sealed, thus allowing some help in adverse absorption of stains/dyes and blotching.

End grains are always sanded with 220 - 320 and burnished with 600. On heavy porous woods like oak, ash, mahogany and some walnut, a coat of 1 lb. Cut of shellac is wiped on the end grain only, then sanded with 320 to 600.

Please note that there are several grading systems for sandpaper and I talk about them in the video. On the next page is a chart showing these systems.

MICRON GRIT COMPARISON CHART

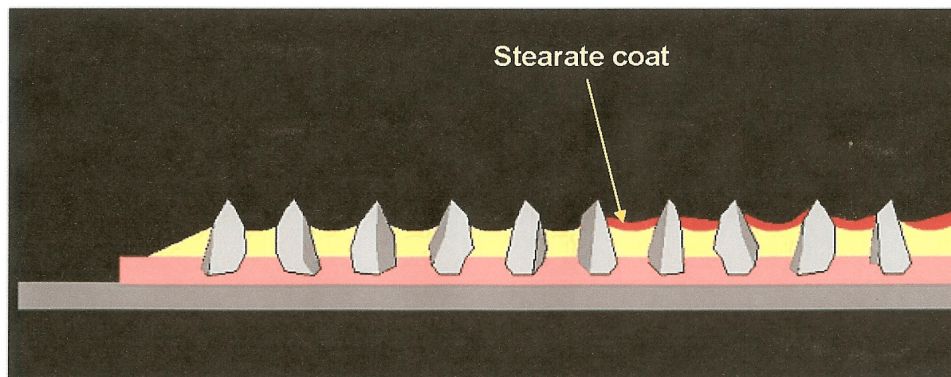
MICRON	US CAMI	FEPA 'P'	JAPAN JIS
500	36	36	36
430	40		
425		40	
350	50		40
336		50	
300			50
270	60	60	
260			
250			60
210			70
200		80	
192	80		
177			80
162			
149			90
140	100		
125		120	100
116	120		
100		150	120
93	150		
82	180	180	150
68	220	220	180
60		240	240
52	240	280	280
46		320	320
42	280		
40		360	360
35	320	400	400
30		500	
28	360		500
26		600	600
22	400	800	700
18	500	1000	800
15	600	1200	1000
13		1500	1200
10		2000	1500
8		2500	2000
7			2500
6			3000



Stearate Coating

The main purpose with stearate coating, is to minimize clogging (Stearate=supersize)

1. The stearate makes the abrasive surface dirt and dust repellent.
2. The stearate has a lubricating and cooling effect on the sanding, i.e. it minimizes the friction.
3. The stearate fills the structure and cavities where the dust sticks.
4. This results in a more consistent surface finish over the life time of the product as the stearate gradually gets worn off, meanwhile the abrading grains worn.
5. The stearate enables the change in color for the material.



The sandpapers I use most in my shop are Abranet by Mirka, Klingspor, Norton and 3M auto body grade papers.

THINNING SHELLAC

2 # Cut

Flakes	Denatured Alcohol
1 lb.	2 quarts
½ lb.	1 quart
¼ lb.	1 pint

1 # Cut

Flakes	Denatured Alcohol
¼ lb.	1 quart

½ # Cut

Flakes	Denatured Alcohol
1/8 lb.	1 quart

Remember that shellac is a weight to volume measurement and Denatured Alcohol is always the solvent. Be sure and date your shellac after you mix it as it has the ability to deteriorate over time. I never keep it longer than 6 months.

My favorite shellac is flake form and is Hock Shellac; my favorite ready mix is Seal Coat and my favorite rattle can is Zinsser.

CHARTS

The following pages are duplication of charts used throughout the DVD series for you to reference and refer to.

PRIMARY COLORS

RED - **YELLOW** - **BLUE**

SECONDARY COLORS

ORANGE - **GREEN** - **PURPLE**

COMPLIMENTARY COLORS

Color	Compliment
RED	GREEN
ORANGE	BLUE
YELLOW	PURPLE
GREEN	RED
BLUE	ORANGE
PURPLE	YELLOW

RED WARMS
YELLOW BRIGHTENS
BLACK COOLS/SUBDUES

BLOTCHING WOODS

PINE

ALDER

FIR

CHERRY

BIRCH

MAPLE

POPLAR

ASPEN

DRY RATES

SLOWEST to FASTEST

OILS
(WIPE ON)

GELS
(WIPE ON)

WATER BASE DYE
(BEST SPRAYED)

LACQUER BASE STAINS
(BEST SPRAYED)

WATER BASE STAINS
(BEST SPRAYED)

ALCOHOL BASE DYES
(BEST SPRAYED)

NGR DYES
(BEST SPRAYED)

BEST STAINS/DYES
FOR BLOTCH PRONE WOODS

GEL

WATER BASE STAIN

SPRAYED DYES

VISCOSITY	NOZZLE/NEEDLE
THIN WATER/SKIM MILK	1.0 (DYES, STAINS, THIN SHELLACS & LACQUER)
MEDIUM WHOLE MILK/COOKING OIL	1.5 (LACQUER - WATER BASE STAINS & DYES)
HEAVY HEAVY CREAM/MAPLE SYRUP	2.0 (HEAVY WATER BASE)
VERY HEAVY	2.5 (LATEX PAINTS - HEAVY ENAMELS)

.43 = 1.1 Nozzle Size

RUBBING OUT

SANDPAPER GRITS TO ACHIEVE SHEEN

SHEEN	SANDPAPER GRIT
FLAT	600 to 800
SATIN	800 to 1200
SEMI-GLOSS	1200 to 1500
GLOSS	1500 to 2500

RUBBING OUT

Easiest to Rub to Hardest to Rub

LACQUERS - SHELLACS

WATER BASE ACRYLICS

OIL, VARNISH & POLYURETHANE

SPAR VARNISHES

RESINS

ACRYLIC - HARD/NON-YELLOWING

PHENOLIC - HARD/BRITTLE

URETHANE - TOUGH/FLEXIBLE

COMMERCIAL SHEEN SCALE

(Rated 0 TO 100)

GLOSS	80 +
SEMI-GLOSS	50 to 65
SATIN	35
DULL	15
FLAT	0

BRUSH TYPES & USES

SYNTHETIC - WATER BASE

NATURAL HAIR - SOLVENT/OIL

FOAM IS A SYNTHETIC
NEVER w/Shellac or Lacquer