

MS3 Varnish	Carl Willis Senior Conservator of Paintings National Gallery of Victoria Melbourne, Australia	Michael Swicklik Senior Conservator of Paintings National Gallery of Art Washington, DC	Peter Van de Moortel Chief Conservator Kimbell Art Museum Fort Worth, Texas	Shan Kuang Conservator of Paintings Kimbell Art Museum Fort Worth, Texas
Main solvent:	Shellsol D-40 Shellsol Odorless Mineral Spirits	Stoddard solvent (mineral spirits 66 7.5%, Univar Solutions)	Distilled Turpentine (a refined, double-distilled, and crystal clear turpentine)	Stoddard solvent or Winsor & Newton turpentine
Secondary solvent	Isopropanol (a dash)	A few droplets of xylene if the solution is cloudy		
Solution:	48 g in 152 mL D-40 (24% weight resin / 200 mL volume solution = approx. 30% weight resin / volume solvent) a dash of isopropanol 0.48 g Tinuvin 292 (1% of resin weight)	15% in Stoddard solvent (weight resin / volume solvent) for initial brushing and subsequent sprays.	8-10% in rectified turpentine (weight resin / volume solvent) with Tinuvin 292 added.	10-12 g in 100 mL Stoddard or 8-10 g in 100 mL turpentine with Tinuvin 292 added. Note: due to turpentine's working properties, the solution forms a proper film with lower resin concentrations.
Technique of application:	Brush application preferred.	Build up the varnish in thin layers.	* Repeated light spray application because it allows for a nice and gradual buildup. * Turpentine allows for a longer badgering time, to locally work the varnish's gloss.	* Build up the varnish in thin layers. * If sections have trouble saturating, I prefer to target the individual causes, rather than increasing the concentration of the initial brush application (E.g., an intermediate thin spray of 5% AYAB in ethanol does wonders in cases of absorbent lined paintings or extensive retouchings).
Recommendations:	* Always use a magnetic stirrer. * If using the resin for retouching purposes, I now rely on isopropanol as main diluent, with a small quantity of D-40 to slow down the evaporation rate and therefore allow more working time on the brush.			

About Solutions (from Jill Whitten and Rob Proctor)

w resin to w <u>solution</u> 20%	w resin to v <u>solution</u> 20%	w resin to w <u>solvent</u> 20%	w resin to volume <u>solvent</u> 20%	Other method
20 grams of resin <u>80 grams of solvent</u> 100 grams of varnish	20 grams of resin Solvent filled to 100 mL mark	20 grams of resin <u>100 grams of solvent</u> 120 grams of varnish	20 grams of resin 100 mL of solvent	20 grams of resin 80 mL of solvent

w = weight v = volume

These mixtures are very different from each other and yet they are referred to as “20%.” Remember to specify how you prepare the recipe, especially when sharing.

Tips

Concentrations in the literature and as used by colleagues vary from 8% to 30% for brush application and 7% to 15% for spray application. **Start at low concentrations because it's easier to control the sheen if you slowly build it up.**

If your solution is cloudy or if the resin falls out of solution, add a few drops of a polar solvent (i.e. isopropanol) or a few drops of an aromatic solvent (i.e. xylene or ShellSol A100), up to 10% of the volume of your main solvent. Use the magnetic stirrer to prepare the solution.

When MS3 is thickly applied or too quickly applied, it may appear very glossy, it may reticulate or crack, it is brittle and easy to scratch. **Build up your varnish in thin layers, badgering after each application.** This technique of application will control the sheen and achieve saturation without excessive gloss and without excessive thickness of the varnish layer.

Add 1%-2% w/w MS3 resin of **Tinuvin 292** (1 mL = 1 g approx.)

References

Boron Molecular Pty Limited, “BM1746 Technical Note: Solubility Data,” Rev 01, prepared by KB, August 8, 2024

Deborah Lau, Simon Saubern, David L.J. Alexander, Oliver Hutt & Carl Villis (2023) The Next Generation of MS2A Resin: MS3, *Journal of the American Institute for Conservation*, 62:3, 188-198

Villis, Carl. “Introducing MS3: the New Generation of a Much-Loved Varnish Resin,” *WAAC Newsletter* 2021 (obsolete)

Samet, Wendy, Barbara Buckley and Catherine Metzger, compilers. *Painting Conservation Catalog, Volume 1: Varnishes and Surface Coatings*. Sarah Fisher, “Low Molecular Weight Varnishes”, pp. 84-88. American Institute for Conservation, Paintings Specialty Group: Washington D.C., 1998.

Fisher, Sarah et al. “Varnishes and Surface Coatings: Low Molecular Weight Varnishes.” “MS2A”

AIC Wiki www.conserva-tion-wiki.com/wiki/varnishes_and_surface_coatings:_low_molecular_weight_varnishes, accessed August 24, 2024

Cost

As of August 2024

Talas		
MS3 resin	\$ 175.00	50 g
expedited shipping	\$ 15.68	
Total	\$ 190.68	
per gram	\$ 3.81	

Talas		
Tinuvin 292	\$ 14.95	2 oz
per mL	\$ 0.26	1 mL = 1 g approx.

(Shipping included with MS3 resin)

Museum Services		
Stoddard solvent	\$ 34.00	1 gallon = 3.7854 liter
shipping	\$ 50.00	
	\$ 84.00	
per liter	\$ 22.19	

Total initial cost \$ 289.63 minimum inventory

10% concentration

Components	Qt	Unit	Cost
Stoddard solvent	100	mL	\$ 2.22
MS3 resin	10	g	\$ 38.14 10% w/v resin/solvent
Tinuvin 292	0.2	g	\$ 0.05 2% weight of the resin
Total Cost	100	mL	\$ 40.41

\$ 8 for 20 mL
\$ 10 with 20% inefficiency

15% concentration

Components	Qt	Unit	Cost
Stoddard solvent	100	mL	\$ 2.22
MS3 resin	15	g	\$ 57.20 10% w/v resin/solvent
Tinuvin 292	0.3	g	\$ 0.08 2% weight of the resin
Total Cost	100	mL	\$ 59.50

\$ 12 for 20 mL
\$ 14 with 20% inefficiency

Case Study: 22" x 18" portrait

1 brush application + 1 light spray application

20 mL = \$ 8.08

with 20% inefficiency: less than \$ 10