

SUTHERLAND WELLES LTD. ®
P.O. BOX 1387
MORRISVILLE, VT. 05661-1387
TEL: (800) 322-1245
FAX: (802) 888-3346
www.tungoilfinish.com



EXTERIOR POLYMERIZED TUNG OIL

There are probably no greater challenges in formulating a wood finish than those posed by an exterior application. Many variables work in concert to destroy an exterior finish; heat, water and especially light.

The degree of protection of an exterior wood surface is a function of the type and amount of coating applied to the surface initially, a regular maintenance schedule, as well as the wood species itself. Some wood species weather better than others, but in time all wood suffers degradation due to outdoor weathering as do the coatings applied to protect them.

Ultraviolet radiation sets into motion a process known as photo degradation. Photo degradation begins when ultraviolet (UV) light causes damage to the polymers in either the coating or the wood fibers. The initial insult is fairly minimal, but with continued UV exposure and compounded by the second contributor to coating failure, moisture, the process soon escalates with rapid and extensive damage occurring to the coating and then to the wood substrate itself.

Formulating the best exterior wood finish begins with the essence of the coating. **Sutherland Welles Ltd. ® Pure Polymerized Tung Oil is the perfect wood preservative.** It has been used for centuries to waterproof all types of exterior woods. The ancient Chinese recognized the amazing qualities of Tung Oil. Throughout history, the Chinese have used Tung Oil to waterproof the masts and sails of junks and according to legend, to seal the Great Wall! During World War II, Tung Oil was used by the military in the Pacific to coat engine parts to prevent rusting. Tung Oil is resistant to many alkalis and acids as well. After its resistance to water, **Tung Oil's ability to remain flexible yet durable** makes it perfect for exterior applications where the continual expansion and contraction of wood surfaces as they are exposed to moisture and drying heat stress the integrity of the coating. Moreover, unlike linseed oil, which darkens with age and exposure to UV light, Tung Oil's light amber color is consistent throughout the life of the coating.

POLYMERIZATION AND FORMULATION

As Tung Oil dries and cures, the molecules join together in a tight complex formation. This process is the secret to Tung Oil's effectiveness as a finish. The cross linking of the oil's molecules makes the surface waterproof and impervious to many chemicals. The bonding also gives flexibility to the surface, making it capable of withstanding wear and tear.

Sutherland Welles Ltd.® uses a process called polymerization to intensify Tung Oil's natural cross-bonding tendency. Polymerization is a cooking process that changes the molecular structure of the oil and further improves the natural cross-bonding reaction of raw Tung Oil.

Many other manufacturers of Polymerized Tung Oil will claim they polymerize their oil, but their "cook" is not as extensive as ours and requires formulation which includes additives such as varnishes and urethanes to improve the hardness, durability, and lustre of the finish. This adds to the toxicity of the finish and inhibits the penetration of the oil into the wood fibers.

(Over)

The polymerization process used by Sutherland Welles Ltd.® is very sophisticated and "cooks" the pure, raw Tung Oil to its "**maximum thermal threshold**". Controlling the "cooking" and the "cooling" is an expensive process that at its perfect point produces an oil that has maximum durability and a gorgeous sheen. If the process isn't well controlled the oil solidifies to the consistency of an erasure and the entire batch is lost. The intricacy and therefore expense of the process is what leads most companies to formulate with modifiers. They believe they can achieve the same results with a cheaper process and formulation. In time, the varnishes and urethanes discolor and deteriorate and with it the wood.

Sutherland Welles Ltd.® has researched and implemented driers with the lowest toxicity available. We are now using solvents that are "cleaner" reducing the environmental impact and minimizing a finisher's exposure to toxic chemicals.

FORMULATING FOR THE EXTERIOR APPLICATION

The next step in producing a superior exterior finish is adding the best UV guards and mildewcides available that help preserve the finish. Sutherland Welles works closely with our chemical supplier to keep abreast of the latest research developments in coating additives to maintain the highest coating performance possible. At this point in time, we combine two UV additives. The first absorbs UV radiation converting the absorbed UV radiation into harmless heat energy that is then released across the coating. The second is a light stabilizer, which neutralizes the effects of the by products of photo degradation known as "free radicals" from continuing the chemical process of coating breakdown. The third additive, a mildewcide or algaeicide, prevents the colonization of fungal growth on and into the coating surface. Fungal growth produces discoloration, marring and eventually failure of the coating.

FINISHING CONDITIONS:

Ideal conditions are a temperature range of 55-75°F with humidity less than 65%. Whenever you finish in conditions out of these recommended ranges you may experience difficulty in applying the finish and you will need to allow for longer curing times. **Reapplying finish before the previous coat is adequately cured causes *STREAKING* and *FLASHING* of the finish.** This is evidenced by dull areas in the finish where moisture is trapped. Avoiding **streaking and flashing** in the finish is a function of adequate curing time. Curing time is a function of finishing conditions, thickness of coat applied, lustre being used, and number of coats previously applied.

INITIAL FINISHING SCHEDULE

The initial finishing schedule is what optimizes coating performance and longevity. Simply said; the more you apply, as deep as possible, to new wood provides the best protection. We recommend **multiple, thinly applied coats for best adhesion and maximum performance.**

The new wood surfaces should be sanded with no higher than 200 grit sandpaper to allow for maximum penetration of the finish into the wood pores. We recommend two coats of the **Exterior Polymerized Tung Oil Sealer** be applied according to the directions on the label. The topcoat is formulated in a Medium Lustre consistency for two reasons. First, the higher oil content is needed to protect the surface. Secondly, the sheen produced by the Medium Lustre helps to "bounce" UV light off the wood surface which offers some degree of UV protection. This is how the term "bright work" on sailing vessels came to be - the bright sheen of the wood finish has a function. Our Polymerized Tung Oil offers a lower sheen than our Marine Spar Varnish making it more suitable in applications where a hand-rubbed sheen is desired. We recommend four-six coats of **Exterior Medium Lustre Polymerized Tung Oil if the Tung Oil will be applied using a wiping technique**, that is applied, allowed to penetrate and then wiped off. This lowers the sheen as well as the amount of oil that resides on the surface; therefore more applications are required to maximize longevity. **If the Tung Oil is applied using a surface or film technique; that is applied with a brush in thin coats and allowed to cure between coats without being removed or wiped, then three coats offer adequate protection.** Please be sure to verify

cure of the previously applied coat prior to re-coat. Surface applied oil can take longer to cure due to the minimal amount of drier we add, number of coats already on the surface and the finishing conditions such as temperature and humidity.

MAINTENANCE

After the initial finishing schedule, the most important component to coating longevity is a regular maintenance schedule. No coating lasts forever. The maintenance schedule will be dictated by the degree of exposure the coating is subjected to. Consistent exposure to bright sunshine, high moisture, or high temperatures will require more frequent (annual maintenance). For other more moderate exposures, the average coating life is about three years. The flexibility of our Polymerized Tung Oil serves to reduce surface failure by allowing the finish to move with the wood. The fractures in the finish tend to be fine, microscopic lines, which minimize moisture invasion and are easily filled when another coat of Exterior Polymerized Tung Oil is applied. Coat after coat can be applied because of our Loc-Lamin® Finishing System that insures adhesion from coat to coat all firmly bonded into the wood pores, regardless of when it has been applied.

COVERAGE: Exterior Polymerized Tung Oil Sealer- 150-200 sq.ft /quart or 600-800 sq. ft/gallon Exterior Medium Lustre - 250 sq.ft /quart or 1000 sq. ft. /gallon after two coats of Exterior Sealer.

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