Varnish Encyclopedia Article

Varnish

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Varnishes are coatings that are applied as liquids and dry to hard film finishes. They are used to protect wood, metal, and masonry from water, abrasion, and other damage. They consist of a resin, either natural or synthetic, and a drying oil, which *polymerizes* as it absorbs oxygen from the air. Spirit varnishes are dissolved in a thinner, which evaporates when the varnish is applied, leaving a transparent finish behind. Moisture-cure varnishes are suspended in a water base and dry upon reaction with air.

The earliest varnishes were produced by cooking plant resins with natural oils (such as linseed oil, still used in varnishes), then diluting the mixture with turpentine. By 1000 b.c. the Egyptians had developed a varnish based on the gum of the acacia tree. The Japanese used the sap of a tree known as the varnish tree to produce lacquer, a highly polished coating with a durable, water-resistant finish. Shellac is a spirit varnish made from a resin secreted by the lac insect. First used in Asia, the resin was collected from the trees, washed, melted, dried into sheets, and then dissolved in alcohol. Shellacs dry quickly and have a light color. They are not moisture resistant, but still find use in sealing wax, hair sprays, and furniture finishes.

Natural resins were eventually displaced by synthetic varieties. Phenolic resins similar to Bakelite were first developed for use in varnishes by chemist Leo Baekeland. Spar varnishes, an example of this type, are extremely weather resistant and are used for finishes on marine vessels. Phenolics in turn were deposed by alkyds, which have become the most widely used type of varnish today. These resins are combined with an alcohol, an acid, and an oil such as castor, coconut, or soybean, to produce a versatile coating that can also be mixed with colors. Polyurethane resins are used in moisture-cure varnishes that require good abrasion resistance and a high gloss. The varnish industry is a growing market which contributes a significant amount to the approximately $16 billion paint, varnish and coatings market.