TECHNICAL INFORMATION ON BUILDING MATERIALS

TIBM - 49

FOR USE IN THE DESIGN OF LOW-COST HOUSING

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THE NATIONAL BUREAU OF STANDARDS
UNITED STATES DEPARTMENT OF COMMERCE
WASHINGTON, D. C.

July 8, 1937

WOOD AND SHINGLE STAINS

This is chiefly a digest of sections of the following publications of the National Bureau of Standards dealing with wood and shingle stains; their composition, preparation, and application:

Circular C69, "Paint and Varnish", (November 17, 1917).[1]

Letter Circular LC464, "Wood and Shingle Stains", (March 20, 1936).[2]

Wood Stains

Wood stains are used to change or modify the color, and bring out the grain and texture of the wood. They may be classified as oil stains, water stains, spirit stains, and stains resulting from chemical change.

Oil Stains are those in which the vehicle contains oil, with volatile thinners such as turpentine, mineral spirits, or solvent naphtha furnishing the penetrating agent. A stain consisting only of oil and color would not penetrate the wood fibers properly. As it is possible to make so-called oil stains without using any linseed oil, oil stains may also be considered as those in which the coloring matter is mixed with solvents for oil; namely, turpentine, benzine, or solvent naphtha.

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[1] Out of print and not available by purchase, but may be consulted in Government depository libraries.

[2] May be obtained, free of charge, from the National Bureau of Standards, Washington, D. C., Supersedes Letter Circular LC64, "Shingle Stains", (May 9, 1922).

The coloring matter for oil stains may be either pigment or solutions of oil soluble-dyes.

Pigment-Oil Stains: Pigments used in oil stains should be of good quality, very finely ground and of the highest color strength. Somewhat transparent colors are, in general, better suited for this purpose than the more opaque colors. If one desires to prepare his own stains, it is more convenient to use pigments ground in oil. Oil stains may also be made from colors ground in Japan.

Pigment-oil stains may be made from pigments of good quality ground in oil by thinning one pint of the pigment paste in oil with one gallon of a liquid composed of about two volumes raw linseed oil, one volume painters' liquid drier, and two volumes turpentine. With a supply of yellow ochre, raw sienna, burnt sienna, raw umber, burnt umber, Vandyke brown, Indian red, and Tuscan red, in oil-paste form, almost all stains commonly used for interior wood trim can be made.

Proportions of the different pigments vary, depending upon the colors desired and color strength of the pigments used. The following are given only as an indication of the proportions which may be used to produce certain stains:

Light Oak: Equal volumes of yellow ochre and raw sienna.

Dark Oak: Eight volumes raw sienna, one volume burnt sienna, and one volume burnt umber, or four volumes raw sienna, and one volume raw umber.

Mahogany: Six volumes burnt sienna and four volumes maroon lake.

Light Mahogany: Produced from burnt sienna alone. The color of genuine mahogany furniture varies widely. It is seldom lighter than burnt sienna stain, and may match either Vandyke brown, burnt or raw umber, Indian red, Tuscan red, or any mixtures of these pigments.

Walnut: Equal volumes of burnt umber and Vandyke brown. Colors shown in genuine black walnut wood furniture are the same as those in mahogany.

Cherry: Equal volumes of burnt sienna and yellow ochre or burnt sienna alone.

Dye Oil Stains: These stains consist of solutions of oil-soluble dyes (generally aniline dyes) in a liquid similar to that used for producing pigment oil stains. Much less color is required when dyes are used--seldom more than one-quarter pound per gallon.

Application and Characteristics of Oil Stains: Oil stains are applied with a brush, after which the wood is rubbed clean with cotton waste. Although oil stains are easy to prepare and apply, and do not raise the grain of the wood, they are apt to produce a muddy effect. They do not penetrate very deeply into the wood, but cover the grain to some extent. It is impossible to stain hardwood with oil stains and at the same time show clearly the grain and texture of the wood. By "furring" hardwood with ammonia or by adding a little ammonia to the stain just before applying penetration into the wood may be increased.

Water and Spirit Stains: These stains are solutions of dyes in water or alcohol; they are clear; penetrate deeply into the wood; do not obscure; but do raise the grain of the wood. Although water stains made from aniline dyes are likely to fade, it is said that the addition of vinegar to certain of them tends to hinder fading. Many brilliant dye-wood stains, whether oil, water, or spirit, are not only likely to fade, but they are sufficiently soluble in oil or varnish to cause bleeding; that is, they discolor paint applied over them. Wood stained a garish red, called imitation mahogany or cherry, is frequently subject to bleeding.

Stains Due to Chemical Change: Such stains are produced by the action of certain chemicals on constituents of wood. Moistening oak with water and then exposing it to fumes of ammonia in a covered box will produce the effect of aging or weathering. Iron salts, such as the acetate, form compounds having a dark-brown color when applied to certain woods such as oak, mahogany, and chestnut. Potassium or sodium bichromate gives a brown or red stain on certain woods such as oak, ash, and walnut.

Shingle Stains

Shingle stains differ from wood stains in that they are intended to uniformly color and preserve shingles and rough siding, but not to bring out the grain and texture of the wood.

Although a great variety of pigments may be used, the following are given merely as examples of those used to produce common shingle stains:

Brown: Raw or burnt umber.

Deep Red Brown: Indian red.

Red: Bright red oxide.

Green: Chromium oxide green or pure chrome green.

Gray: Zinc oxide, white lead, or a mixture tinted with lampblack.

Pigment-Oil Shingle Stains Without Creosote: Such stains may be made by thinning a good outside oil paint with turpentine and some boiled linseed oil, or by mixing about one pint of a suitable pure high-grade pigment ground in linseed oil with one gallon of a vehicle consisting of about four volumes boiled linseed oil, one volume liquid drier, and one volume turpentine.

Creosote Shingle Stains: Chas. L. Uebele, in "Paint Making and color Grinding" (1913),[1] gives the following formulas for producing creosote shingle stains:

Deep Green Stain (Chrome-Green Type): Fifteen pounds C. P. chrome green in oil, one gallon benzine Japan drier, four gallons creosote oil, and four gallons heavy benzine.

Mineral Red Stain (Venetian Red Type): Seventeen pounds red oxide (95%) ground in oil, one gallon benzine Japan drier, four gallons creosote oil, and four gallons heavy benzine.

Walnut Brown Stain: Thirteen pounds burnt Turkey umber in oil, one-half gallon benzine Japan drier, one-half gallon 160° benzol, five gallons creosote oil, and three gallons heavy benzine.

Silvery Gray Stain: Twenty pounds zinc white in bleached linseed oil, one-eighth pound lampblack, one-half gallon pale liquid drier, one-half gallon straw-colored cresylic acid, and eight gallons heavy benzine.

Characteristics and Application of Shingle Stains: With the exception of some dark-brown stains which are simply refined coal-tar creosote with volatile thinners, all shingle stains are made from very finely ground pigments, drying oils and volatile thinners. They should not cake or change color in the container, and when stirred they should settle very slowly. Most commercial shingle stains contain some creosote oil from coal-tar or water-gas-tar which is supposed to act as a wood preservative. Shingle stains are applied by either dipping or brushing, but are not wiped off as in the case of wood stains. Pressure treatments with creosote is one of the most efficient methods of preventing wood from rotting. The small amount of creosote that penetrates into the wood from a single dip or brushing with stain containing creosote oil, in all probability would have very little or no marked effect, while paint applied over creosote or a creosote stain is likely to be ruined by the creosote bleeding through. Pigment-oil shingle stains without creosote do not bleed.

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[1]Published by Adams & Grace Company, 22 Thames St., New York City.