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ALUMINUM COATINGS FOR MOISTURE PROOFING WOOD

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Where it is desired to insulate wood against changes in atmospheric conditions in order to minimize alterations in form or dimensions, aluminum coatings are particularly effective. Of these a coating of aluminum leaf is best, but the various aluminum paints are nearly as good and are more easily applied.

Aluminum Leaf Coating

Essentially the aluminum leaf coating is prepared by gluing thin aluminum foil over the entire surface of the object to be made proof against moisture, using varnish for the glue. The process is not nearly so slow or difficult as laying leaf in sign-making. It has proved entirely practicable for protecting aircraft propellers against change in form and balance.

Aluminum leaf coating is applied as follows: Coarse-textured hardwoods like oak should receive a wood filler of silix paste; fairly even-textured hardwoods like birch may receive a liquid wood filler; very even-textured hardwoods like maple and any of the softwoods may receive a varnish primer. One or two coats of spar varnish are applied next and allowed to dry thoroughly. This should provide a smooth, non-absorptive surface to receive the aluminum coating. A coat of spar varnish, thinned with one-fourth its volume of turpentine or mineral spirits, is then brushed on and allowed to dry almost to the condition known as "dust free." The workman will soon learn to judge the proper condition of this coating by touching it lightly with his finger. For the usual spar varnishes, the right condition is reached in about one and one-half to two hours after application. The aluminum leaf is then laid on the surface directly from the book, with-

out the aid of gilders' tips or the necessity of skilled workmanship. Overlapping edges of leaf are brushed off and small gaps in the coating are filled by patting them lightly with a wad of waste that has been dipped in aluminum bronze powder. The time required to apply leaf to an airplane propeller should not be more than 40 or 50 minutes. The aluminum coating is further protected by one or two additional coats of spar varnish or, better, two coats of exterior enamel.

Aluminum Paints

Aluminum bronze powder, with almost any drying oil or varnish liquid as the vehicle, serves admirably as the pigment for paint. Such paints are characterized by remarkably high opacity (one coat will hide the underlying surface completely) and by great effectiveness in preventing the passage of moisture. These properties are due to the fact that aluminum powder is made up of very thin flakes that are not thoroughly moistened by paint or varnish liquids. As a result, as soon as aluminum paint is applied, the aluminum flakes rise to the surface and form a nearly continuous coating of metal.

Some of the liquids that have been used for vehicles for aluminum paints are:

- Gloss oil
- Shellac (commercial "4-pound cut")
- Nitrocellulose wood lacquer
- Asphalt paint
- Pitch paint
- Interior varnish
- Spar varnish
- Kettle-bodied linseed oil
- Boiled linseed oil

Of these gloss oil is the cheapest. It dries rapidly, but is not very durable if the coating comes in direct contact with excessive moisture. Shellac and nitro-cellulose wood lacquer are also fast drying and

much more durable than gloss oil, though not satisfactory for use out of doors. Asphalt and pitch paints alone are very effective coatings for preventing moisture absorption, but they do not withstand constant exposure to sunlight. When they are mixed with aluminum powder an exceedingly effective and much more durable coating is obtained, though it is still inferior in durability to paints made with spar varnish or treated linseed oil. The flakes of the aluminum powder usually obscure the black color of such liquids. Aluminum paint made with interior varnish, which is high in resin content, is used particularly for preventing "bleeding" of undercoatings and has even been recommended for painting over creosote-treated wood. Aluminum paints made with long-oil spar varnish (an "80-gallon" varnish is recommended) or kettle-bodied linseed oil are very durable and are especially serviceable for exterior work. Where neither of these liquids can be obtained, ordinary boiled linseed oil may be substituted.

For the first coat of aluminum paint on previously unpainted wood, one and one-half to one and three-fourths pounds of aluminum bronze powder, "varnish grade," should be added to one gallon of liquid. Subsequent coats should contain two pounds of powder per gallon of liquid.

Aluminum paint is mixed by merely stirring the powder thoroughly into the liquid with a paddle. It is best to mix the paint just before use because after standing the aluminum flakes do not readily rise to the surface.

Two coats or more of aluminum paint should be applied when effective protection against changes in moisture content of the coated wood is the principal objective. On the other hand, when only a single application of any paint is possible and it is desired to select a coating material that will be the most effective, aluminum paint is also recommended.

The color of aluminum paint may be altered by incorporating small amounts of suitable tinting pigments,

but the metallic luster of the aluminum is usually retained. The addition of material quantities of granular pigments interferes with the formation of the coating of aluminum flakes and thereby decreases its effectiveness as a barrier against the movement of moisture. The best way to use aluminum paints for making material proof against moisture and yet obtain the color and sheen of ordinary paints and enamels is to apply two coats of plain aluminum paint followed by one or two coats of a paint or enamel that will produce the desired appearance. Aluminum paints prepared in the way described afford a satisfactory foundation for the application of customary finishes.