Canadian Conservation Institute
Institut canadien de conservation

CCI Notes 1/9

Low-Cost Plastic/Aluminum Barrier Foil

Introduction

Wood[1] used to make supports or containers for artifacts is often sealed with commercially available aluminum barrier foils. This Note describes a low-cost method for making a similar product from readily available plastic and aluminum foil.

Use of Plastic and Aluminum Barrier Films

Wood emits volatile organic compounds that can harm some materials (such as metals); direct contact with wood can also stain objects (Tétreault 2003). To prevent these problems, it is generally preferable to use materials other than wood when making supports or containers for artifacts. However, in many instances wood is still chosen because it is strong, rigid, readily available, easily worked, and relatively inexpensive. If wood is used, it should be sealed to prevent unnecessary damage.

Wood can be easily (although sometimes inefficiently) sealed with paints. However, oil-based paints are not recommended because they emit high levels of organic acids, and they should certainly never be used inside enclosures (e.g. display cases or storage cabinets). Even recommended paints, which include emulsion paints (i.e. latex), two-part epoxies, two-part urethanes, and shellacs, emit some harmful organic compounds. When these are used inside enclosures, they should be allowed to dry for at least 4 weeks to allow all the possible harmful compounds to evaporate (Tétreault 2002).

As an alternative to painting wood, plastic-laminated aluminum foil can be applied as a seal or barrier. Plastic-laminated aluminum foil is one of the best vapour or gas barriers on the market (Burke 1992; Thickett 1998), and can be purchased from various distributors. One type commonly used by conservators is Marvelseal 360, an aluminum foil coated with nylon on one side and polyethylene film on the other. The nylon side is usually shinier than the polyethylene side and often has the brand name printed on it.

Plastic-laminated aluminum foils can be adhered to wood with heat. Place the polyethylene side adjacent to the surface of the wood and then apply heat with an iron or hot spatula. Because polyethylene melts at a fairly low temperature, about 170ºC (335ºF), domestic irons set to the "permanent press" setting are usually adequate to fuse the polyethylene to the surface beneath. However, the heat must be applied evenly to the entire surface to ensure proper melting and good adhesion. Any holes or tears can easily be repaired by ironing a patch of the same aluminum barrier foil over the damaged area.

Another option to attach the plastic-laminated aluminum foil to wood is double-sided tape. Apply the tape in a grid pattern to ensure that the foil is attached uniformly over the entire surface area.

Once applied, the surface of the plastic-laminated aluminum foil is susceptible to scratches. However, because the surface is usually covered with layers of padding and fabric or matboard (Figure 1), this does not generally cause problems.

Figure 1. A panel covered with plastic-laminated aluminum foil, polyester batting, and fabric.

1. Includes wood products.

1030 Innes Road, Ottawa ON K1A 0M5 Canada
Tel.: 613-998-3721 or 1-866-998-3721 • Fax: 613-998-4721

Low-Cost Alternative

A low-cost alternative to commercial products such as Marvelseal can be created using aluminum foil and polyethylene grocery bags, garbage bags, or sheeting (look for the triangle recycling logo with the letters LDPE or the numeral 4 to ensure the plastic is low-density polyethylene) (see Figure 2).

Figure 2. Recycling logo for low-density polyethylene.

To protect the aluminum foil from tearing when assembling the barrier, insert a paper sheet between the iron and the foil, as shown in Figure 3. If the plastic sheet is thin, up to 3 layers may be needed. Plain aluminum foil is even more susceptible to scratches than commercial products that have a nylon covering, so special care is important. However, if scratches or perforations do occur, they can be easily repaired by ironing on a patch of the same aluminum foil and polyethylene.

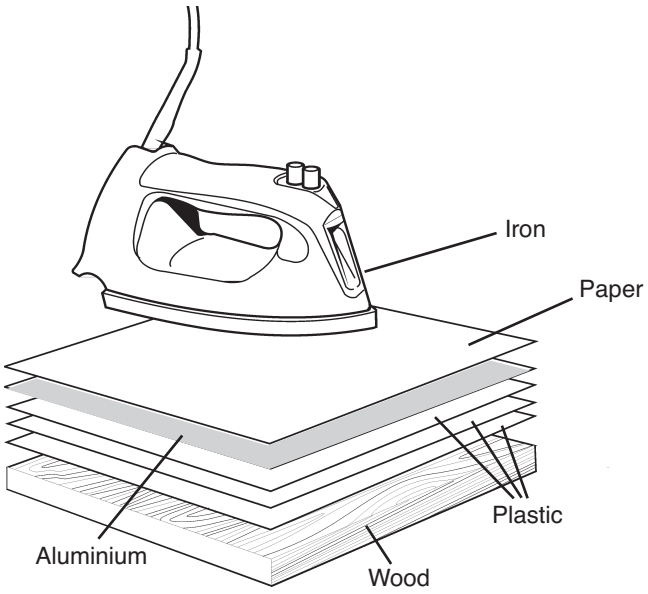

Figure 3. Applying aluminum foil barrier.

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by Jean Tétreault

Également publié en français.
Also available in French.

Cat. No. NM95-57/1-9-2010E
ISSN 0714-6221