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News to Use
Design Requirements Manual
The formulae for building state of the art biomedical research facilities.
'Design Requirements Manual (DRM) News to Use' is a monthly ORF publication featuring salient technical information that should be applied to the design of NIH biomedical research laboratories and animal facilities. NIH Project Officers, A/E's and other consultants to the NIH, who develop intramural, extramural and American Recovery and Reinvestment Act (ARRA) projects will benefit from 'News to Use'.
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Laboratory Plastic Laminate

Plastic laminate is a common finish material for benchtops, shelving and other surfaces in light duty labs. In labs with moderate use of chemicals and infrequent wash-down, plastic laminate can be an economical alternative to epoxy, phenolic resin, stainless steel and other more costly finish options. Plastic laminate is available is in wide range of colors and patterns, and can present an opportunity to add color to a lab. Note that plastic laminate is not allowed in many types of labs, including containment labs and animal facilities. A moisture proof, monolithic material should be used in lieu of plastic laminate at sinks and other wet locations.

Overview

Plastic laminate is composed of compressed Kraft paper layers, a decorative or colored core layer and a top melamine overlay bonded with resin and sandwiched together to make solid plane sheets (figure 1). The sheets are then adhered with adhesive to a substrate. Particleboard is the most popular substrate used for plastic laminate, though medium-density fiberboard and plywood are also used. The laminate surface provides a thin, lightweight, and simple construction to appear as a seamless monolithic finish for shelving, countertops and other surfaces. Laminate surface performance depends on its grade, its environment and its properties.

Figure 1:
Plastic Laminate Construction

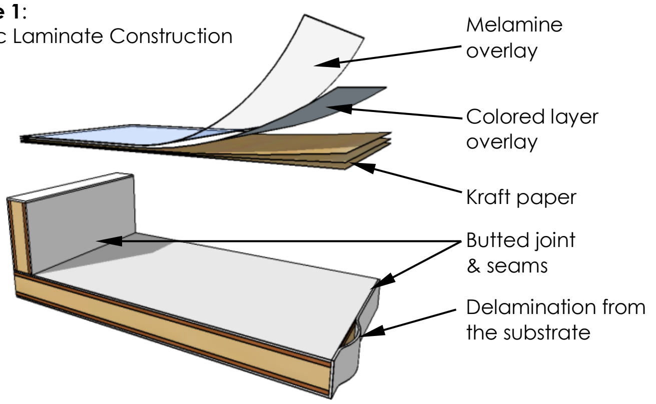

Figure 2:
Traditional Plastic Laminate Detailing

Standard laminates are susceptible to scratches, chips, burns, and stains and can warp if exposed to excessive moisture and humidity. High quality, chemical resistant laminates are more resistant to harsh acids, alkalis, corrosive salts, and other destructive and staining substances, and should be used for all laboratory projects. Plastic laminate must be applied to all exposed surfaces, and must be completely sealed.

Delamination

The most common problem with plastic laminate is delamination from the substrate due to moisture infiltration. Most plastic laminate is installed with exposed butted joints at edges (figure 2), which can provide a pathway for moisture to migrate to the underlying substrate. Because the substrate is wood-based (typically plywood, particle board or fiberboard), moisture will cause the substrate to swell, which will ultimately lead to delamination of the plastic laminate from the substrate. Once delamination occurs (figure 2) the surface is not suitable for laboratory use and must be repaired or replaced.

Successful Plastic Laminate Installation

To reduce the chance of failure, the use of plastic laminate should be reviewed with laboratory users and facility managers, and only installed in appropriate locations. When used, plastic laminate should be installed on a rigid and stable substrate, and with a minimum of joints.

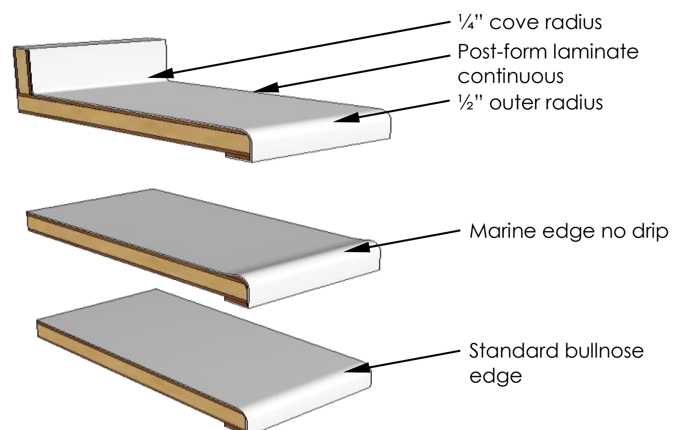

Figure 3:
Typical Post-form Laminate Detailing

One way of minimizing joints is to utilize post-formed edges. Post-forming wraps the plastic laminate around inside and outside edges, eliminating butted edges (Figure 3). Post-formed edges provide fewer opportunities for moisture to infiltrate the substrate, and fewer joints to seal. Another advantage is that post-formed benchtops edges can be constructed in a variety of profiles, including bullnose and marine edge.

Although it is not as durable as some of the alternative materials, plastic laminate can provide an economical laboratory finish surface in the appropriate locations if carefully detailed and installed.

Further details on this month's topic are available on the DRM website
http://orf.od.nih.gov/PoliciesAndGuidelines/BiomedicalandAnimalResearchFacilitiesDesignPoliciesandGuidelines/Pages/DesignRequirementsManualPDF.aspx
DRM Chapter 4 Section 4-5 Casework and Equipment