

# News to Use

## Design Requirements Manual

The formulae  $\frac{\partial \rho}{\partial x_i} + \frac{\partial}{\partial x_j} (\rho v_j) = -\frac{\partial p}{\partial x_i} + \frac{\partial}{\partial x_k} \left( \mu \frac{\partial v_i}{\partial x_k} \right) + g_i (\rho - \rho_0)$  for building  $\frac{\partial}{\partial x_j} (\rho v_j) = -\frac{\partial p}{\partial x_i} + \frac{\partial}{\partial x_k} \left( \mu \frac{\partial v_i}{\partial x_k} - \rho v_i v_j \right) + g_i (\rho - \rho_0)$  state of the art  $\frac{\partial}{\partial x_j} (\rho v_j) = \frac{\partial}{\partial x_k} \left( \lambda \frac{\partial T}{\partial x_k} - \rho v_j v_k \right)$  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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## Phenolic Resin Panels in Laboratories

The January News to Use provided an overview of plastic laminate, and its use in light-duty laboratory applications. Due to laminate's susceptibility to delamination a more durable material is often required. One of these materials is phenolic resin.

### Advantages of Phenolic Resin Panels

Phenolic resin panels are a more durable and moisture resistant alternative to plastic laminate. Phenolic resin panels and plastic laminate panels are similar in basic composition, consisting of a thin plastic-based surface sheet laminated to a rigid substrate. Phenolic resin panels, however, have a number of advantages over plastic laminate panels, including:

- Impervious core. Unlike the substrate of plastic laminate panels (typically plywood, particle board or fiberboard) phenolic resin panels utilize a cellulose fiber-reinforced phenolic resin core that is monolithic and impervious to water.
- Factory lamination. Plastic laminate is typically laminated to the substrate in a fabrication shop or in the field, using contact adhesive. Phenolic resin is laminated in the factory using thermosetting resins, heat and pressure, which results in a very durable bond which is resistant to moisture infiltration and delamination.

Phenolic resin panels were developed about 30 years ago, and have a history of use in a wide range of applications, including furniture, casework and exterior building cladding. Laboratory-specific phenolic resin panels are a more recent development, and are formulated to be chemical and heat resistant. The chemical and heat resistant properties of laboratory-specific phenolic resin panels compare favorably to epoxy and other benchtop materials for most laboratory applications.

### Uses and Versatility

Phenolic resin panels are available in thicknesses ranging from ¼" to 1". Benchtops and shelves are generally ¾" or 1" thick. Thinner panels can be used or ancillary items including pegboards, utility enclosures, divider panels and back and side splashes. Panels can also be used for casework construction, tabletops, lockers and other uses in the lab.

Phenolic resin panels are available in lengths up to 10' and widths up to 6' wide, so joints are required in long runs of benchtops and shelving. Joints are typically mechanically fastened edge joints using biscuits or splines, and adhered with epoxy or polyurethane adhesive. Phenolic

resin panels can be worked with standard carbide tipped carpentry tools, and can be secured with wood screws. Panel cores are impervious to moisture, so core edges do not need special treatment and can be left exposed. Exposed cores allow for field modifications and the installation of under mount sinks. Phenolic resin sinks are not available, so epoxy or stainless steel sinks are usually used.

Laboratory-grade phenolic resin panels are available in a limited choice of surface laminate colors, including black, white and a range of grays. White and grays are increasingly popular as way of introducing visually appealing hues and light, reflective surfaces into the lab. Non-laboratory grade panels, which may be appropriate for uses other than benchtops, are available in a wide range of colors and patterns including wood grains.

Panel cores are black, so unfinished edges will contrast with any other color surface. Exposed core edges can be concealed with applied banding that match the surface color. On benchtop edges, 'L' shaped banding can be applied to conceal the core and provide a marine edge (Figure 1).

### Sustainability

Phenolic resin panels are not recyclable, and have limited recycled content. Up to 70% of the volume of the core material is derived from renewable resources (cellulose fibers from sustainable forests). Greenguard® certified low VOC phenolic resin panels are available.

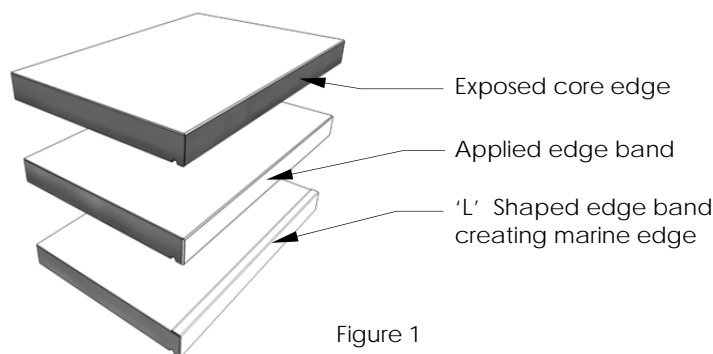


Figure 1

Although it is not a monolithic material like epoxy, the impervious core manufacturing methods give phenolic resin panels some of the same characteristics and properties. Phenolic resin panels should be considered for use in areas not appropriate for plastic laminate panels, but where the durability of epoxy is not required.

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