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## Multilayer Structure Optimization

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**Multilayer Structure  
Optimization reduces the cost  
of packaging while enhancing  
shelf appeal for Blow Molding  
and Flexible Film Processes.**

## Summary

Multilayer blow molded containers and flexible films may be optimized to achieve a balance of properties.

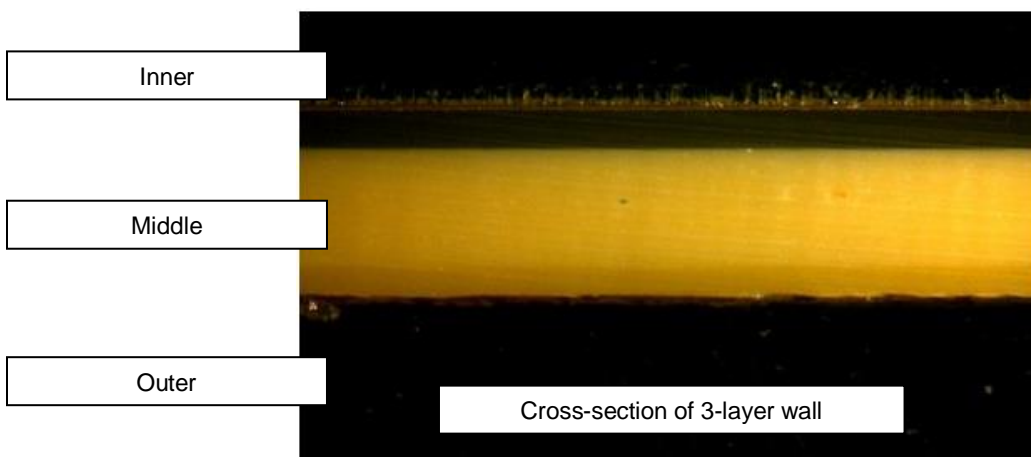
- Color space
  - The targeted color space of a container or film is achieved through a combination of the outer layer and inner layer colorants.
  - The interior colorant provides the opacity and base color of the package.
  - The exterior colorant provides the desired color effects.
    - Rich, saturated color tone
    - Pearlescent and metallic special effects
- Formulating opacity within a structure
  - Inorganic pigments such as  $\text{TiO}_2$ , carbon black and others generally provide better opacity than organic pigments, but the color space that can be achieved using inorganic pigments is not as rich and bright as the color space achievable when using organic pigments.
  - Inorganic pigments are well suited for an interior layer of a container where the color space can be modified or enhanced by using organic or special effect pigments in the outer layer.
  - Inorganic pigments are generally less expensive than organic pigments.
- Colorant cost
  - Here are a few general statements regarding multilayer colorant costs.
    - Interior colorant costs are less than exterior colorant costs.
    - Interior layers make up 60-90% of the bottle or film and exterior layers make up 10-30% of the structure.
    - Therefore, most of the container, or film (interior layer) uses less expensive colorant.
    - Layer structure should be optimized to achieve adequate opacity and the desired color space while minimizing the cost impact of the (generally) more expensive outer layer colorant.



## Formulation Tips

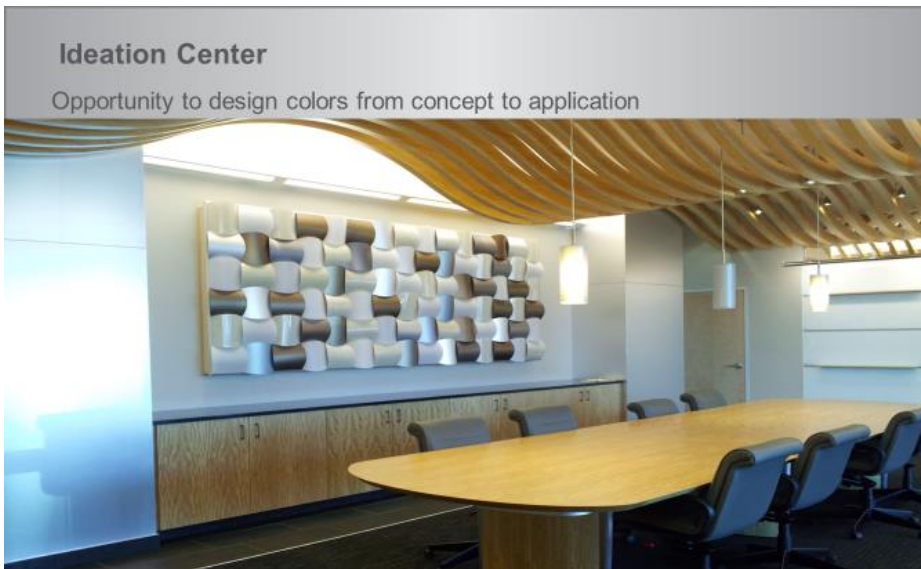
Add a high gloss resin like a metallocene or LDPE resin in the outer layer for enhanced gloss. Add a process aid with the outer layer color for enhanced gloss as well.

Place the special effect colorant in the outer layer and the base color below it in the core layer. This will provide for a greater color effect and color depth.



## Let Ampacet Help Reduce Packaging Costs

Onsite color development capabilities.



Three Layer Blown Film line within Ampacet's R&D facility in Terre Haute, Indiana where we can prototype film structures of various color effects and functional additives.



For more information on **Multilayer Structure Optimization**, contact your Ampacet Account Executive or visit [www.ampacet.com](http://www.ampacet.com).

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