



New uses for traditional plastics

PLASTICS IN THE
SIGN INDUSTRY

by John Hirsch

Sign manufacturers have historically relied on acrylic, impact-modified acrylic and outdoor grade polycarbonate when thermoformed faces or shapes are part of sign design. Over the past few years, the convergence of several technologies has enhanced the effectiveness of one of the most versatile thermoplastics — high impact, easy-to-fabricate ABS (acrylonitrile-butadiene-styrene).

This is where you say “Wait! ABS has very poor weatherability, and has to be painted to be used outdoors.” Although primary surface painting has long been the most common way to protect ABS, the advent of more sophisticated co-extrusion capabilities, new resin developments, and improved thermoforming techniques has resulted in a breakthrough. By combining ABS sheet with a top surface layer containing more UV-stable plastics, most often an acrylic or ASA (acrylonitrile-styrene-acrylate) terpolymer, weatherability can be achieved.

Unique balance of properties

When properly specified and constructed, these composites can offer a unique balance of properties — the formability, toughness and simplicity of fabrication of ABS — and the inherent high gloss, ease of pigmentation and decoration, and great UV resistance of acrylics. It is vitally important, however, to discuss all end use parameters with your sheet suppliers. Many variables, including final part thickness (the thinnest section after forming), thickness and opacity of the top surface layer (clear acrylics, while they can be modified to minimize UV light penetration, will allow some light wavelengths to pass through to the ABS layer, which could result in fading and embrittlement), flammability, heat resistance and aging requirements, etc., can affect the final performance of the sign or sign component.

Depending on the sheet construction, a wide variety of decorative effects can be achieved. The most common method is coextrusion, utilizing different extruders for the different materials, and combining the layers in the sheet die. When the protective top layer is acrylic, very bright, deep colors can be produced, as well as metallic, granite and pearlescent appearances.

The lamination of relatively thin acrylic films, which can be printed in almost endless designs, is also widespread. Remember, though, that opacity of the top layer is a major factor influencing UV resistance. Less prevalent, but growing, is the lamination of a thicker acrylic to ABS, offering marble, granite and metallic effects as well.

Applications

However, as always, there is no perfect plastic. The nature of these composites requires them to be completely opaque, on both the top and bottom layers, so use is limited to non-backlit requirements. Typical applications for both flat

and thermoformed sheet include fascia, end caps for architectural signage, canopy decoration and components, decorative striping, thermoformed opaque letters, letter housings (formed backs for channel letters or small signs such as menu boards. But, if the inner surface is exposed to harmful light rays, it's imperative that this surface be UV-protected also), and other nonlit applications. ABS readily lends itself to fairly complex vacuum-formed shapes, so structural requirements and your imagination are the limiting factors.

Relatively new to the outdoor sign industry, acrylic- and ASA-capped ABS have been used in other industries for years, specifically sanitary ware (bathtubs, sinks, and wall surrounds), recreational (pool steps, truck camper tops and luggage), and transportation (utility vehicle parts, RV components, etc.). We are all searching for ways to eliminate heavy painted metal parts, FRP, glass, wood and other less flexible raw materials. Several custom sheet extruders offer variations of weather-resistant ABS for your consideration, and though many sign manufacturers do not perform in-house thermoforming, ABS is very familiar to custom thermoformers, and parts can be easily sub-contracted.

Conclusion

The key to successfully incorporating any material into your sign design is, as it always should be, stringent testing of the product in the final application. Raw material selection, definition of end use requirements, and thorough consultation with your sheet supplier are imperative. Once it is certain there are no flaws in implementation, these new generation composites can be very flexible and exciting in design. ■



Column cladding is an excellent application for WeatherPro™ high-impact acrylic/ABS sheet manufactured by Spartech Plastics.

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