

## Gidman Design

Designer touts versatility of KYDEX® sheet in product development

### Prototyping with KYDEX® Thermoplastic Sheet

TORONTO – Prototyping is a critical phase of product development. Designers and engineers must determine how best to combine form and function, aesthetics and ergonomics, durability and performance in an appealing package that's coordinated with market needs. Multiple iterations of product design are often necessary before the right balance of properties is achieved. And herein lies a challenge: Many design teams work with tight budgets. This means there is little leeway in the product-development cycle for experimentation and adjustment, especially when it involves costly delays due to redesign.

Nevertheless, says Claude Gidman, an award-winning industrial designer and founder of Gidman Design Associates Ltd., Toronto, engineers and designers can greatly improve the properties and performance of a product by refining key features, including its shape. "At Gidman Design, we find that the more we experiment with shape, the greater the strength and quality that can be obtained without increasing cost," he says. "Failing to take advantage of creative shaping opportunities can result in product coverings which can be bland, less effective functionally, and less appealing in the marketing process."

Gidman says his company has found efficient ways to quickly and economically develop, test, and make changes to product-design concepts. "We fabricate prototypes and tooling of KYDEX® sheet, a thermoplastic alloy that can be readily shaped with thermoforming."

Gidman has been at the forefront of product design since the 1950s, and is a recognized master of the craft. His opus includes the design of Toronto's iconic "Red Rocket" streetcars and hundreds of other products ranging from heavy machinery to household appliances. Gidman has also taught design to college students, and was chairman of the Industrial Design program at the Ontario College of Art and Design.

KYDEX sheet, manufactured by Kleerdex Company, LLC, Bloomsburg, PA, is effective for prototyping, notes Gidman. The material can be heat-fabricated or thermoformed into complex shapes, making it suitable for designs where it houses, supports, protects, or decorates products. It can also be used like stamped or pressed sheet metal to create covers and enclosures, but without the need for surface treatment, complex tooling, or painting. It is rigid, durable, fire-rated, resistant to impact and a variety of chemicals, and comes in a range of standard and custom colors, sizes, thicknesses, and surface textures. Kydex sheet also meets or surpasses code requirements for many applications, such as those in most transportation interiors, Gidman says.

When properly designed, tooled, and formed, parts fabricated of KYDEX sheet don't thin out at the edges. Product developers can thus use the material in a relatively low-cost process like thermoforming to improve and test a design and undertake pilot production before transferring it to a more expensive process like injection molding for commercial manufacture.



*The ability to mold this complex shape from thermoformed Kydex sheet reduces the time and cost of product development. Prototype tools formed from KYDEX sheet can be used until a decision is made to build epoxy or fiber-reinforced plastic molds for trial production.*



*Thermoformed component incorporates indentations, stiffeners, and other details that conform to clearance and attachment requirements of finished part. Designers used wood and body filler materials to build the design prior to casting a mold for larger-volume production.*



*The shape of this prototype part was hand-sculpted. Once the design is approved, it will be used to thermoform developmental parts of Kydex thermoplastic sheet, from which further refinements will be made to its lines.*

### Kleerdex Company, LLC

ISO 9001 and ISO 14001 Certified

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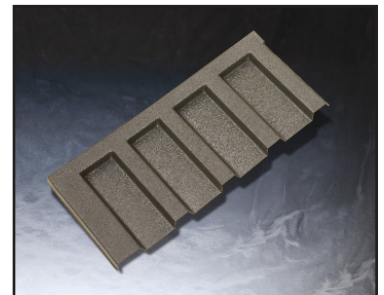
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The sheet can also be thermoformed into tooling at minimum expense. Gidman Design has been able to make up tooling, adequate for 10 to 20 parts, and sometimes more, in its design studio and model shop and repeatedly modify it with simple wood and body-filler materials to develop the shapes needed for testing. From prototyping it's a simple step to thermoform parts of KYDEX sheet in quantities of 50, 100, or into the thousands. For higher volumes it is necessary to have epoxy or reinforced tooling made. Gidman says this type of tooling can usually be fabricated by casting resin into the back sides of prototype parts made of Kydex sheet rather than producing patterns from drawings and complex computer-aided design work, an expensive and time-consuming process.

As with any material, there is a learning curve involved when working with KYDEX sheet, Gidman says. Its chemical resistance, for example, means it rejects most adhesives, so double-sided tapes and glues need to be used when attaching fasteners and other hardware in applications like seat parts and some types of covers and shrouds. Finding the right thermoforming temperature depends on various factors like part shape, he notes, and requires trial-and-error adjustments. Deep draws are achievable, providing the shaping and lead-up tooling are prepared appropriately and according to how the sheet behaves when formed, Gidman adds.

Once designers learn how to work with this sheet, however, prototyping becomes more versatile and more effective, Gidman says. "It is possible to quickly and economically create unique, creative forms for prototyping and testing."



*Panel with structural ribs is one example of a design that is thermoformed with Kydex thermo-plastic sheet. After forming, part can be trimmed manually or with automated routing equipment.*

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