

Maximizing design opportunities within aircraft interiors

PLASTICS IN
AEROSPACE

by KYDEX, LLC

Especially for the design of aircraft interiors, choosing materials for thermoformed components at the start of a project is the best way to maximize design opportunities. This allows you to design within the parameters of your materials instead of having to revise your design to meet restrictions at a later date.

Compliance to federal aviation requirements and aircraft manufacturer regulations related to fire retardancy, flammability, smoke density and toxicity are the number one driver in material selection. Any material that does not meet the standards required for aircraft components will not be allowed in your final piece.

Different materials have different processing capabilities, and understanding these is essential for budgeting and efficiency purposes. The details that follow are intended to help designers of aircraft interiors and part processors select the best plastic materials at the start of every project.

“The best design is one that works. Designs requiring revision in production result in compromise, delays, additional expenses and, ultimately, disappointment.”

Glenn Johnson, Director of Design at B/E Aerospace



First class seat with thermoformed parts highlighted.

Trends: enhanced ambiance and increased regulations

As airlines continue to enhance their interior ambiance and extend their brands into the cabin interiors, there has been a trend toward production of more demanding and complicated part designs. As a result, particularly in premium seating, more plastic and larger plastic parts have been used. In addition, the complexity of the parts, including the use of decorative laminates and undercuts has increased.

Aircraft regulations have also advanced significantly in the past decade, especially those related to smoke density and flammability testing. While the government does not mandate toxicity ratings, the major airframe manufacturers, Airbus and Boeing, do. This combination of more plastics on seating and stricter regulation requires an interior designer to consider different ways to solve design issues.

As a result of these trends, due to their versatility in processing and fabrication and their ability to meet strict regulations, pressure forming with thermoplastic materials has become more common. Additionally, vacuum formed thermoplastic sheet is now being used in a large variety of aircraft applications.

Selecting aircraft interior materials

The questions outlined below are intended to help with initial materials sourcing for aircraft interiors. It is recommended that you answer all questions below and then prioritize your needs and desires.

Aircraft regulations and design standards:

1. What regulations must you meet?
2. What design standards must you uphold?

Processing and formability requirements:

1. Do you want to plan for complicated shapes? For secondary processing?
2. Do you need consistent color, texture or thickness?



Life vest compartment cover for Boeing 787 Dreamliner pilot's seat, KYDEX® FST in Diamond Silver.

“Every new trend delivers a new challenge. Make sure you pay close attention to how modern textures look post-processing and consider other options if necessary. For example, the use of a textured female tool that provides the final visual surface is a possible solution to more difficult parts that lose texture under heat and vacuum.”

Glenn Johnson



Inside shell for first class seat shroud, KYDEX® 5555.



Cup holder and storage pocket shroud for first class seat, KYDEX® 5555.

Budget, quantity and time parameters:

1. What is your budget?
2. What quantity do you need? Will there be a need to replicate parts at a later date?
3. When do you need the parts completed?

Planning for intended use:

1. How durable do the parts need to be?
2. What types of cleansers must the parts withstand?

Environmental standards:

1. Do you need recyclable parts?

Thermoforming plastic sheet

For fast set-up and production of plastic parts, especially large parts in quantities from 500 to several thousand, thermoforming is commonly selected over injection molding; tooling costs can be 90 percent lower and parts can be completed two- to three-times more quickly.

If you choose thermoforming as your method of processing, the chart below details optimal material specifications to meet most aircraft interior needs and regulations.

Conclusion: choose materials first to maximize design

Maximizing design for aircraft interiors is all about understanding parameters at the onset. By identifying specifications and selecting materials at the start of a project, your constraints become design challenges to work around. ■

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Optimal Specifications for Aircraft Interior Applications

Compliant to aircraft regulations	<ul style="list-style-type: none"> • Meets FAR 25.853 (a) and (d) • Meets Airbus ABD-0031 and Boeing D6-51377 toxicity emission limits
Formability	<ul style="list-style-type: none"> • Forming temperature of 163-200°C (325-390°F) • Can be formed on standard presses and cut on standard die-cutting machines • Able to form complex shapes and contours • Provides crisp detail with minimum rejects • Drying time of no more than 4 hours at 120°C (248°F) • Does not require painting
Secondary formability	<ul style="list-style-type: none"> • Easy to perform machining, sawing, blanking, punching
Aesthetics	<p>Available in:</p> <ul style="list-style-type: none"> • Repeatable custom colors, including emerging colors preferred for modern aircraft • Range of gloss levels • Decorative surfaces and can be used in combination with other decorative materials • Variety of thicknesses
Durability	<ul style="list-style-type: none"> • High chemical resistance to withstand harsh industrial cleansers • Does not require paint, which can chip and crack
Availability	<p>Available in:</p> <ul style="list-style-type: none"> • Short runs of custom colors • Quick lead times
Environmental	<ul style="list-style-type: none"> • Recyclable

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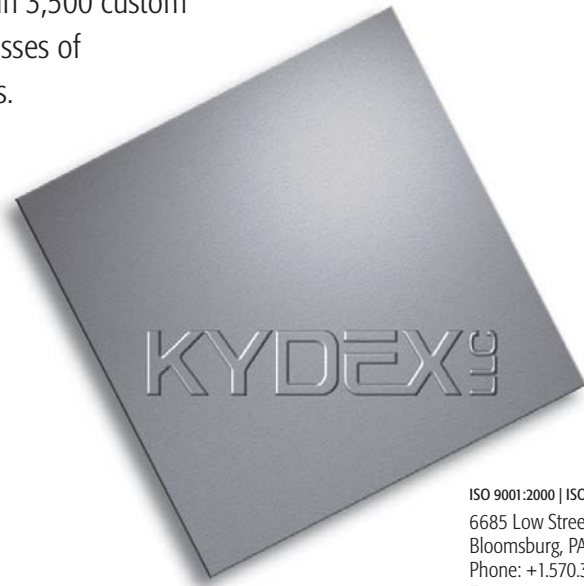
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Used to describe what KYDEX, LLC
can create — especially in a short run

A color that didn't exist yesterday? **No problem.** In a short run? **Of course.**
With a lead time that's beyond belief? **Piece of cake.**

Our versatile, durable thermoplastic materials meet the environmental and compliance needs of the medical, aircraft, mass transit and building industries. Plus, we have more than 3,500 custom colors and a variety of textures and thicknesses of RoHS-compliant sheet available within days. It's all designed so you can get exactly what you want, exactly when you want it.

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for the **unimaginable**, call KYDEX
at 800.325.3133.



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