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Customer Success Story:

Control Logistics soars with SDC's CrystalCoat® solution for plastics

High Performance Chemistry For High Performance Products

Executive Summary

The objective of high performance aircraft design is to maximize speed and fuel efficiency through innovative, lightweight, aerodynamic design. Stability, durability, safety, and visibility are crucial in all aircraft windows and other see-through components, especially at Mach-level speeds that military supersonic aircraft can reach. Control Logistics, Inc. (CLI), an award-winning manufacturer of premium aeronautical accessories, is at the forefront in using technically advanced materials to deliver on those needs. CrystalCoat MP-100 multi-purpose coating from SDC Technologies (SDC) is a vital part of ensuring that CLI products perform at the highest levels under the most demanding conditions.

Control Logistics, Inc. Custom Solutions for Air, Land & Sea

Established in 1986, CLI is a leader in the development of acrylic and polycarbonate forming techniques. Their state-of-the-art manufacturing processes allow them to create the most complex shapes for premium windshields, windows, canopies, lenses, doors, panels, skylights, chin bubbles, transparencies, and assemblies. Today they are a global player in the OEM and government procurement aerospace industry, as well as agricultural, automotive and transit, recreational and marine markets.

CLI's innovative products are used by the most technically advanced and respected manufacturers of private jets, commercial airplanes, civil and industrial aircraft, as well as military and search-and-rescue helicopters designed for high performance defense missions. Its technical resources provide complete flexibility to develop very specific requirements for any aircraft model, and it has an outstanding service reputation secured by taking near-impossible projects and fulfilling them to exceptional standards, often surpassing client's expectations.

"CrystalCoat MP-100 makes it possible for lighter acrylics and polycarbonates to efficiently compete with heavier glass substrates without sacrificing performance. Our hard coated see-through plastic aerospace transparencies are half the weight of glass, significantly decreasing fuel consumption, improving both profitability and environmental sustainability. Highly durable, MP-100 extends the product life expectancy two to four times, reducing downtime for aircraft repair and maintenance service."

Cleveland Passmore
Chief Operating Officer
Control Logistics, Inc. (CLI)

Products

- Cargo/Crew Door Assemblies & Transparencies
- Chin Bubbles
- Lenses: Inspection, Landing Light & Wingtip Lenses
- Windows: Observation, Search & Rescue Bubble
- Windshields

Technical Innovations

- Stretched Acrylics
- Polycarbonates
- Superior Optical Quality Forming Techniques
- Hard Coatings

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Industry-Leading Durability & Performance

Acrylic & Polycarbonates: An Accelerating Trend

For aerospace companies, the need to improve fuel efficiency and safety while reducing production costs has driven extensive R&D, exploring different window shapes and substrates. Hard coated acrylic and polycarbonate transparencies are lighter and more durable than glass. Windows can be coated with a hardness comparable to glass to resist scratching and optical distortion from hazing, and chemical exposure from hydraulic fluid and aviation fuel.

The Advantages

Aircraft designers seek to maximize the capabilities of acrylics as a superior alternative to glass. Their molecular properties, enable them to achieve far more radical shapes and compound curves, which are beyond the capabilities of glass.

Substrate Features Include:

- Superlative flexibility qualities for creating complex shapes
- Superior safety glass
- Incredibly tough
- Reduced aircraft weight - lighter than glass
- Favored aerospace substrate
- Improves fuel efficiency
- Lower production costs

The Challenges

Coated polycarbonate windshields offer superior load weight and impact resistance. However, polycarbonate windshields and canopies can be challenging for several reasons:

- The production process of extrusion makes achieving optical quality problematic
- Polycarbonate has a low hardness rating and can scratch easily
- Prolonged exposure to UV rays causes degradation (yellowing) and requires hard coating after being formed

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Need for a Solution

While acrylic is half the weight of glass and will not yellow over time, it should be coated to enhance impact resistance. Polycarbonate is more bendable, easier to work with (cut and less likely to break), 30 times more impact/chip resistant than glass, but it too should be coated to prevent scratching and yellowing from UV rays.

CLI Chief Operating Officer Cleveland Passmore recounts the decision-making process:

"Initially we had a military customer whose drawings required SDC coatings in their product development specifications. Before 2006, we outsourced the coating application of our transparencies. In 2008, we decided to invest and bring coating in-house to enhance our competitive edge. It took a couple of years of diligent quality testing before we could deliver premium coated transparencies which consistently passed all OEM industry standards for long-term weatherability, Taber abrasion for scratch testing, and chemical resistance."

Testing and Implementation

"Hard coating is a technical science involving skill and precision," says CLI's Passmore. "There is not a lot of best practices instructional documentation on the coating application process available. This results in extensive trial and error which creates a barrier to new entrants in the market place. CLI began using SDC's CrystalCoat because it was mandated on a Government specification. We decided to invest in in-house training and development. After a couple of years of testing and clean room set up, we achieved repeatable results. We explored other coatings, but received the best product performance and technical support from SDC.

From the very beginning, SDC provided training, testing, and technical support. They patiently assisted with extensive trial and error troubleshooting to overcome issues, helping us set up our development process and coating facility. CrystalCoat was successfully integrated into CLI's production process environment with good results as a coating application; establishing ground breaking protocols and standards for product consistency."

Recommendations

Cleveland Passmore is unequivocal in his recommendation about CLI's commitment to using the highest quality coatings for maximum performance and durability. "To be successful in implementing stable coating solutions," he notes, "be willing to invest heavily in a clean room, ancillary equipment, and testing time. CLI has invested a substantial amount of capital in R&D to develop state-of-the-art innovative, high performance coating applications."

Certifications:

CLI facilities are certified to the exacting quality standards of AS9100. Acrylic fabrication certifications include MIL-PRF-25690, MIL-PRF-8184, and MIL-PRF-5425. As a US Government contractor, our facilities conform to the exacting quality standards of ANS1/ISO/ASQC Q9002. CLI holds more than 150 US Department of Defense Qualified Product Listings (QPLs), and has been a Department of Defense medalist for quality and on-time delivery for the past 20 years.

Awards:

In 2009, Bell Helicopter Textron and CLI were presented with the Nunn-Perry Award from the Department of Defense (DOD) for outstanding achievement in the Mentor-Protégé Program.

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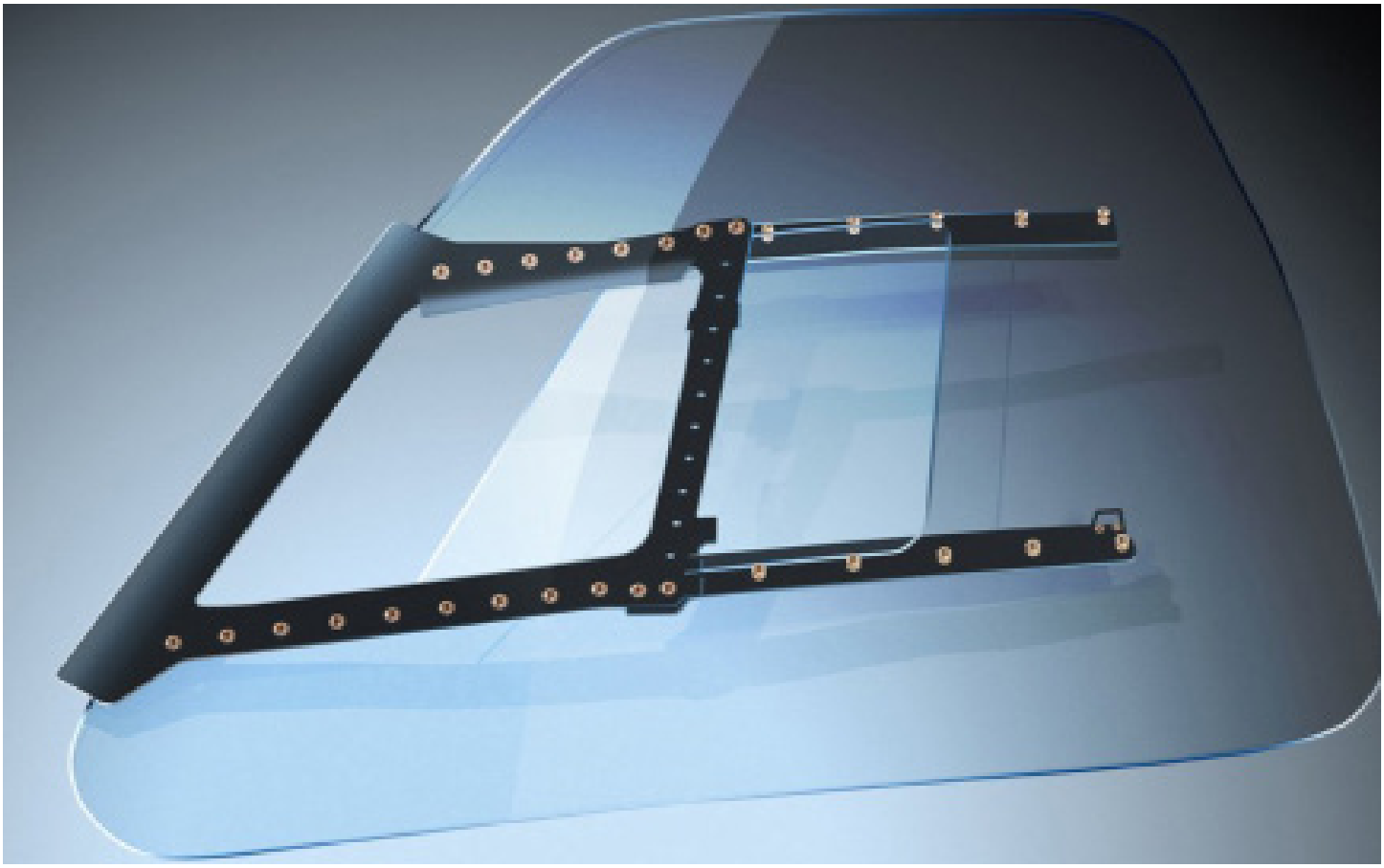

Quality Transparencies Through Innovation

Business Impact

CrystalCoat MP-100 multi-purpose coating is ideally suited for acrylic and polycarbonate substrates. Optically clear and durable, this coating provides abrasion and chemical resistance, outdoor durability as well as primer-free adhesion to PMMA. This one-part system also helps to streamline set-up and processing time.

"Our customers are looking for lightweight transparencies that are scratch and chemical resistant at a reasonable price. Becoming a 'one-stop-shop' offering innovative stretched transparencies with high performance coating at one location was an industry game changer. We have streamlined the supply chain with a high degree of market penetration, especially in the higher end aircraft segment. Significantly increasing our ability to bid on civilian, commercial, and military aircraft with innovative lighter weight, high performance coated acrylic and polycarbonate transparencies—Windshields for instance that without coating might otherwise haze within a matter of days."

"Before using CrystalCoat MP-100 hard coating, CLI was competing against glass windows and windshields in the aerospace market. Not only is glass a heavier substrate, but the tooling process is more expensive, requiring higher volumes to break-even. The development of a technology to protect lighter weight plastics was a milestone."

The Results

"In the last ten years, we have begun to use large amounts of CrystalCoat MP-100 in aerospace. It offers superior abrasion resistance, essential in regions where sand and dust storms occur. Hard coating protection easily doubles product life cycle, and reduces repair and service downtime, especially critical with military aircraft missions."

Cleveland Passmore
Chief Operating Officer
Control Logistics Inc.

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For More Information

To find out on how CrystalCoat can improve the performance of your products and enhance your competitive edge:

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CLI Aerospace & Defense Customers:
Serving OEM and aftermarket in Commercial, Military and General Aviation industries such as:

- Augusta Westland - A Finmeccanica Company
- Bell Helicopter/Textron Corporation
- Boeing
- Cessna
- EADS
- Lockheed Martin

Images courtesy of Control Logistics.