CASE STUDY

KYDEX® 1100UV — MATERIAL SOLUTION FOR EV CHARGING SECTOR

A collaboration with Ray Products and SEKISUI KYDEX

appLab™ designLab™ FSTLab™

SEKISUI | KYDEX

Ray Products collaborated with SEKISUI KYDEX to develop an innovative EV Charging Station (DC Block) using new KYDEX® 1100UV material. This case study highlights the challenges, solutions, and successful outcome of this partnership.

The collaboration between Ray Products, the OEM, and SEKISUI KYDEX originated from a shared vision: to develop a material solution that would exceed the demanding requirements of the DC block housing application in the EV charging sector. With decades of expertise in custom thermoforming and a commitment to solving complex manufacturing challenges, Ray Products took a proactive approach to this project. From the outset, Ray Products recognized the innovation potential not only in material selection but also in advanced processing techniques that would simplify production and reduce costs.

CHALLENGES

Ray Products' client previously used various manufacturing processes such as injection molding, structural foam, reaction injection molding (RIM), and sheet metal for their equipment covers. However, they struggled with these methods, either failing to meet the stringent outdoor requirements or with required secondary finishing processes. Specifically, the RIM process fell short of meeting outdoor UL requirements, while sheet metal and structural foam required additional painting, which introduced higher costs and susceptibility to scratching.

Considering the charging unit contained eleven parts with an average part size of 3'x3', the client sought a solution with lower tooling costs than injection molding. The project required material that would not only meet the UL746C F1 and V-0 standards but also match the aesthetics of aluminum and withstand UV exposure and severe weather conditions. In addition, the goal was to simplify assembly by minimizing attachment points, which required molded-in features to eliminate the need for secondary bonding of blocks or bosses.

SOLUTIONS

With a legacy of innovation and a reputation for tackling complex challenges, Ray Products has consistently been a solution-oriented partner to its clients. For over 75 years, Ray Products has specialized in designing custom thermoformed solutions, focused on optimizing material selection, manufacturing processes, and product fitness for use. This customer-centric approach ensures every project is crafted to meet stringent requirements while maximizing quality and durability.

When Ray Products was approached with the DC Block project, the team leveraged their extensive experience in thermoforming and long-standing partnership with SEKISUI KYDEX. The challenge required a thermoplastic material that could withstand outdoor conditions, meet stringent UL standards, and offer a high-quality, in-mold color finish to eliminate the need for secondary painting. Drawing from its history of identifying and executing the most effective solutions, Ray Products saw an opportunity to elevate the project by utilizing its advanced pressure forming capabilities, 6-axis robotic trimming, and 3D inspection technology.

To find the right material, Ray Products collaborated with SEKISUI KYDEX's appLab™ and designLab® Innovation Centers and engaged their R&D teams. Together, they developed KYDEX® 1100UV—an innovative cutting-edge material that meets UL 94 V-0 flammability and UL 746C F1 weather ability requirements while also providing UV resistance and durability in extreme conditions. By employing color measurement software throughout production, Ray Products maintained exceptional color consistency in each part, achieving quality control that would have been more difficult to achieve with painted components.

RESULTS

Ray Products successfully developed the pressure-formed DC block housing unit using KYDEX® 1100UV, addressing the client's need for a durable, weather-resistant enclosure that meets stringent aesthetic and functional requirements. The final 11-part enclosure was engineered for easy assembly with minimal attachment points, streamlining installation and eliminating the need for secondary processes. This design approach not only enhanced assembly efficiency but also contributed to the long-term structural integrity and reduced maintenance costs for the client.

Leveraging the advanced capabilities of pressure forming, Ray Products produced several thousand units with consistent quality, showcasing the effectiveness of KYDEX® 1100UV as a thermoplastic alternative to traditional materials in EV charging unit components. Using KYDEX® 1100UV allowed for greater design freedom, enabling Ray Products to deliver parts with integrated features and an exceptional finish that aligns with the brand and performance standards.

In keeping with Ray Products' commitment to high standards of quality and efficiency, the production process included thorough in-line inspections and quality checks, ensuring every unit met the necessary UL certifications for safety and durability. Packaged and shipped directly to installation sites, the DC block enclosures arrive ready for immediate deployment without the need for inspection or repackaging by the OEM – a process improvement that redefines "dock-to-stock" efficiency, saving time and reducing handling costs.

From material selection to streamlined assembly, Ray Products demonstrated its role as a strategic partner capable of delivering innovative, end-to-end solutions that support the evolving needs of the EV charging market.

INNOVATING FOR THE FUTURE

Leveraging their state-of-the-art pressure forming technology, Ray Products worked closely with SEKISUI KYDEX to co-develop KYDEX® 1100UV, a thermoplastic material offering unique advantages for outdoor applications. This collaborative effort was guided by Ray Products' goal to push the boundaries of what's possible in custom thermoforming, enabling the replacement of traditional materials like metal with durable, aesthetically versatile thermoplastics. The solution aligned perfectly with the OEM's requirements, offering in-mold color to eliminate the need for painting, improved weatherability, and a high-quality finish—all produced efficiently with Ray Products' advanced equipment.

As the market for EV charging stations continues to expand, Ray Products is poised to develop innovative, end-to-end solutions to meet new demands and support the ongoing evolution of electric vehicle infrastructure. The success of the DC block project underscores Ray Products' ability to adapt and grow alongside emerging markets. With their expertise in high-precision thermoforming, Ray Products is well-positioned to support future advancements in charging station technology, providing faster, more flexible manufacturing options that reduce time-to-market and open new possibilities for product customization.

RAY PRODUCTS

CUSTOM PLASTIC THERMOFORMING

ABOUT RAY PRODUCTS

Founded in 1949, Ray Products is a trusted, third-generation family-owned custom plastics manufacturer. As a progressive leader in the industry, Ray Products has continuously invested in their 48,000 sq. ft., ISO 9001:2015 certified manufacturing facility. Using the most advanced equipment available, including the largest thermoforming capabilities on the West Coast, Ray Products is driven by the obsession of high quality from fully robotic six axis trimming and 3D scanning measurement systems. Focused on workplace safety first, Ray Products employees are technically proficient problem solvers, delivering complex thermoforming solutions with unmatched durability and precision. To learn how Ray Products makes customers proud, visit www.rayplastics.com.

SEKISUI KYDEX innovates and creates sustainable thermoplastic material solutions for the next generation of product design.

SEKISUI Chemical's corporate commitment to Speed, Service, and Superiority is realized through the KYDEX® Thermoplastics' business model of manufacturing bespoke materials with short lead times in small quantities. This Quick Response Manufacturing (QRM) model at three manufacturing campuses expands beyond thermoplastic sheet. Our mission is to challenge what's possible and deliver beyond imagination. SEKISUI KYDEX is more than a raw material supplier; we are a solution provider.

The material portfolio also includes injection molding resins, proprietary Infused Imaging™ technology, integral special effects, unique textures, and custom products and design. As a collaborative partner and the world's leading pioneer of thermoplastic solutions – done responsibly, we put innovation at the forefront, guiding you from beginning to end.

The SEKISUI KYDEX appLab™ and designLab® Innovation Centers are collaborative spaces for clients and customers to bring the supply chain together for rapid prototyping and design development. These spaces are the bridge between engineering and art. More than 300 dedicated professionals in Bloomsburg, PA, and Holland, MI, working with a global network of sales and distribution partners, are committed to delivering more than their customers can imagine.

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