

FROM EXTRUDER TO INTEGRATOR: SEKISUI KYDEX & Quick Response Manufacturing



50,000 VENTILATORS.

Backed by the power of Ford Motor Company in collaboration with GE Healthcare, the mission was clear: Produce 50,000 life-saving medical devices in response to the COVID-19 pandemic. Revere Plastics was named Ford's supplier with assistance from SEKISUI KYDEX, manufacturer of KYDEX® Thermoplastics. The goal was set. The clock was ticking. Lives were on the line and time was of the essence.

What happened next is a testament to Quick Response Manufacturing (QRM) and the power of rapid prototyping.

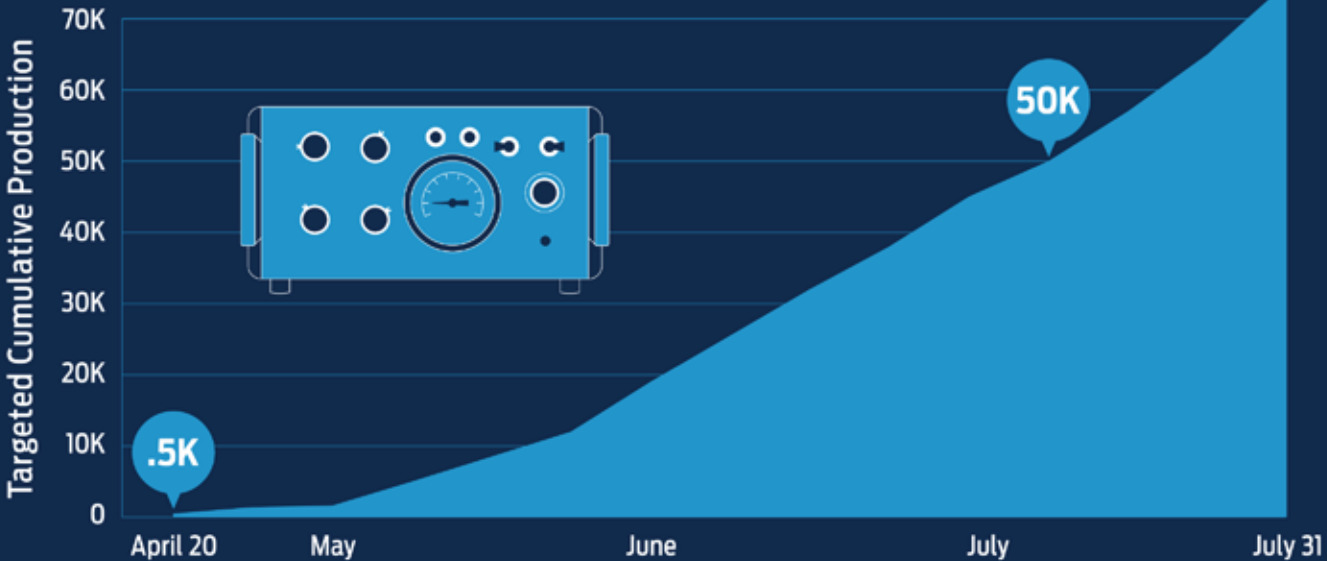
"Give me your prints, and I'll get you the parts," said Mark Denning, Medical Market Business Manager at SEKISUI KYDEX. With one sentence, multiple plans were set into motion to save lives. Denning's "can-do" attitude radiated from one email across multiple organizations to inspire and galvanize engineers, production operators, and other technical specialists.

PRELUDE – MARCH 30, 2020

Ford, in collaboration with GE Healthcare, announced it would leverage the design – licensed by GE Healthcare – of Airon Corp.'s FDA-cleared ventilator with production targeted to begin the week of April 20 at Ford's Rawsonville, Michigan Components Plant.

Airon's simplified ventilator design—the pNeuton A— is responsive to the needs of most COVID-19 patients and operates on air pressure without the need for electricity, which helps speed up production times. Ventilators were needed to help save lives of Americans across the country who had been affected by COVID-19.

MODEL A-E VENTILATOR PRODUCTION PLAN



EXTERIOR PARTS

KYDEX® T-MB
Right Hand Panel
Left Hand Panel

KYDEX® T-MB & T-IM
GRIP (4 per unit)

INTERIOR PARTS

ALLEN® 2091MG
Top Pad
Left Pad
Right Pad

KYDEX® T-IM
Purple Puck
(not visible in photo)

SEKISUI
KYDEX

DAYS 1 – 3

Mark Denning contacted Ford to ask how SEKISUI KYDEX could help with producing ventilators. Ford contracted Revere Plastics, as their supplier, to secure project materials and contract individual parts.

Mark and the SEKISUI KYDEX team collaborated with Revere Plastics on material requirements for both internal

and external parts, first utilizing SEKISUI KYDEX's ALLEN® ABS sheet and KYDEX® T-MB sheet. Later, the teams also added KYDEX® T-IM injection molding resin to the mix. Along with being the first time Revere Plastics and SEKISUI KYDEX had ever worked together, this was also the first project where all three SEKISUI KYDEX materials were harmonized in a single application.

DAY 4

All office employees at SEKISUI KYDEX began to work from home the week of March 15, to keep everyone, including essential employees on the manufacturing floor safe and limit in-person contact during the COVID-19 pandemic.

Mark Denning's workspace was a flurry of activity. His cell phone was buzzing, Microsoft Teams app was chiming, and emails were entering his inbox at lightning speed. He was coordinating with the internal team at SEKISUI KYDEX, mobilized from living room couches, kitchen countertops, and from within the innovation center at their Bloomsburg campus— appLab™.

After exploring fabricator and distributor options, the teams decided the best way to get Revere, and ultimately, Ford, the parts they needed on such tight timelines was to manufacture not only thermoplastic sheet, but also

provide the fabricated finished parts and coordinate with all partners for a seamless supply chain experience.

"It was exciting to see everyone coming together to be a part of this historical event. Our partners wanted to know how they could contribute to make it happen. Everyone saw the big picture on how important this project was," said Mark Denning.

A cross-company and cross-departmental effort, SEKISUI KYDEX employees from sales, quality, engineering, appLab™, designLab®, scheduling, production, supply chain, R&D, information technology, finance, and customer collaboration teams worked together to help Revere Plastics supply not only durable, antimicrobial KYDEX® Thermoplastic sheet, but also fabricated parts for immediate use and assembly.

appLab™

designLab™

FSTLab™

SEKISUI | **KYDEX**



HOW?

Their Quick Response Manufacturing (QRM) model and rapid prototyping.

SEKISUI KYDEX does not simply manufacture sheet that is later cut into plastic rectangles. Fueled by 400 dedicated professionals, SEKISUI KYDEX is committed to delivering more than their customers can imagine, including stepping in when needed to produce fully finished, ready-to-use parts. This was a complete change

from SEKISUI KYDEX's traditional model, where a typical customer purchase is considered complete after the sale of thermoplastic sheet – a journey from extruder to integrator.

This opportunity was one to try something new and help Ford Motor Company and GE Healthcare meet their aggressive timelines.

DAYS 5+

Amidst arranging logistics for shipping, creating new systems and purchase order processes to track orders, and serving as the point of contact for materials and fabricators, the SEKISUI KYDEX team also shifted into a new domain. Instead of simply manufacturing the thermoplastic sheet to later be CNC routed into parts for each ventilator, SEKISUI KYDEX was forging a new path to serve as point of contact with fabricators to provide ready-to-assemble parts.

Even with distributor and fabricator help, it was clear this project was going to be challenging. Luckily, the expert teams at SEKISUI KYDEX were eager to leverage newfound relationships to help provide finished parts.

“We turned around most of these parts within a day to send them to Revere Plastics. There was a learning curve, especially with the ‘go/no-go’ gauges. We prototyped

about five or six different parts with the same concept in mind: ‘If this fits, it works. If it doesn’t, we can make a new one or find a fabricator who can,’” said Shawn Gum, appLab™ Applications Engineer.

“This was a unique project outside of the realm of what we usually prototype in the appLab™. It was interesting to understand the need for each part and how it fit into the final design. The collaboration was the most inspiring part of this project. Everyone was working on prototypes and designs simultaneously to see what would work best. If someone ran into trouble, another person or partner stepped up and said ‘I have a solution for that,’ and got it done quickly. We all wanted to move the project forward as quickly as possible to manufacture these ventilators and save lives,” explained Gum.

A ONE-WEEK TIMELINE

The project that began on March 30 had aggressive timelines. SEKISUI KYDEX embraces the “now” culture of the Amazon era, where expectations for service and delivery hinge on very short lead times. In the case of these ventilators, it was even more critical to design and create parts and source them to save lives.

“Prints were developed, parts were quoted, quality documents were developed and put into place, accounts were set up with our finance team, go/no-go gauges were developed, POs were cut, material was produced, material was shipped, first articles were made and approved, all over a period of one week,” explained Denning.

He continued: “It was incredible. With our teams in Holland, Michigan extruding the ABS to teams in Bloomsburg, Pennsylvania extruding the KYDEX® T-MB the team was moving like a well-oiled machine. The team knew this was a big deal – people’s lives were at stake and they wanted to be a part of the solution. I get goose bumps every time I share the story of everyone’s involvement.”



WHERE ARE THEY NOW?

Revere Plastics and SEKISUI KYDEX exceeded expectations to assist Ford Motor Company and GE Healthcare with their mission. Thanks to the vast internal network of people at the ready because of Denning’s optimism and spirit, what could be considered “overly ambitious” or “too challenging” was welcomed with open arms by the SEKISUI KYDEX team and partners.

“It was exciting to see us pivot as a company and immediately jump into a project that leveraged people’s previous experiences. This project is unlike any other we’ve taken on at SEKISUI KYDEX. I am so proud that Ford and Revere Plastics gave us the opportunity to partner with them and show that we are not just a ‘sheet manufacturer,’ we’re a strategic partner who can provide a full solution,” said Denning.

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® Thermoplastic 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. The KYDEX® portfolio also includes injection molding resins, proprietary

Infused Imaging™ Technology, integral special effects, unique textures, and custom products and design. 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 400 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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