# Case Study: Ingenuity and Expertise Deliver Cost and Time Savings

For SensorLink, a manufacturer of high-voltage sensing units used in the utility industry, plastic components are a critical aspect of the products they design and manufacture. The company works with several plastics manufacturers because of their diverse capabilities and specializations. One plastic injection molder SensorLink has a long-term relationship with is SEA-LECT Plastics.

## Bending the Rules When "No" Isn't An Option

Plastic injection molded parts are popular for many products because, compared to other materials, plastics are lightweight, durable, and versatile and can create water-proof barriers to protect sensitive components. Part quality depends on understanding all elements of injection molding — the part design, mold and tooling, resin, process, and injection molding machine — and how all these elements work together. To successfully injection mold a component, there are standard design rules that must be understood as they relate to the other elements. For example, gates are required to allow the molten plastic to flow into the mold as part of the process, but the type and placement of the gate can vary depending on part geometry and resin characteristics. Another example is the nominal wall thickness, which depends on resin characteristics, design, and machine capabilities. Plastics tend to have a high thermal expansion, so warpage and shrinkage can occur if adjacent walls vary in thickness beyond what is recommended for that resin.

There are times when the desired part design goes against these design principles. This has often happened for SensorLink, and they turn to SEA-LECT for guidance.

"There are rules of thumb for injection molding and common practices for making these parts," said Colten Johnson, mechanical engineer, SensorLink. "But in many cases, there's some area of a part where it isn't exactly how the rule should be done. I'll ask somebody over at SEA-LECT, 'What do you think of this? Can this be done? What is my risk?' I'll go back and forth with them before we ever go to the mold maker. Some rules can be bent, and there is value in knowing when you can bend the rules and how to bend them."

Colten has found that this level of willingness to try isn't the case with other injection molders. SEA-LECT is experienced with injection mold engineering and design, including design for manufacturability (DFM), part defect troubleshooting, machine requirements, and resin characteristics, but more importantly, they are problem solvers. So when other molders say something can't be done, SEA-LECT takes it as a challenge to find a solution.

"There are a lot of other manufacturers who will just tell me, 'no, we don't want to deal with that, or no, that's not going to work,'" explained Colten. "Very rarely do I ever get a no from SEA-LECT. They respond with, 'here's your risk. Let's see if we can't work through the problem.' It's a quality you don't find very often."

## Solving Design Challenges Saves Time and Money

Complex components often face design challenges that make them more difficult to mold. Sometimes design changes can be made with little impact on the component. Other times redesigning a part can have significant costs associated with it.

Only a couple of companies in the world create products similar to SensorLink, so design challenges are a common theme. They require a partner who will look at different and unconventional ways to attack a challenge.

"They will look to see if something can be done differently - can we change how this part is cooling or the cycle time, or maybe they will build a fixture to hold it while it cools, those kinds of things," said Colten. "For example, we have specialized ultrasonic inserts for quarter-turn latches on battery doors. They do the injection molding and the insert inhouse. They were happy to figure out how to do that for us."

Another time SensorLink needed to lean on SEA-LECT's experience and expertise was with one of its product's housings. The housing must be watertight with an IP rating between 65 and 68, so it will function in wet environments. A robust plastic injection molded housing is the perfect solution for this. Although plastic is great for keeping water out, it also traps the radio signal in, which is a major issue. To combat this, Colten designed the part with a thin-walled cup area that the radio signal can penetrate. However, this type of design goes against the "rules" and makes manufacturing it much more difficult.

"We had a part that needed to have a very, very thin area so that a radio signal could be pushed out more efficiently. The rule of thumb is that you don't go below 50% nominal thickness. Anything close to 30% shouldn't be possible," said Colten. "In some injection molding companies, whenever you break those rules, they won't even attempt to make the part for you. They will tell you straight out that it's not going to work. But SEA-LECT made this part with an area that is 30% nominal thickness, and it came out fine despite all the risks. Not every injection molding company will do that for me."

Without SEA-LECT's expertise and willingness to think beyond what is typically done, SensorLink would have used thicker walls that would have required a more expensive, more powerful radio to penetrate the walls. Various countries also have restrictions regarding how strong a radio signal can be. Plus, getting specialty electronics can be a challenge with supply chain delays. Being forced to use a different radio would have created additional issues that would have extended the time it took to get the product to market. Although there is no real way to quantify what might have been, it is safe to assume there were significant time and cost savings.

## A Trusted Partner

SEA-LECT prides itself not only in its expertise and ingenuity but also in its high-quality manufacturing, strong communication, and on-time deliveries. These characteristics have led to a strong relationship being developed between the two companies, and SEA-LECT has become a trusted partner to SensorLink. When another supplier couldn't meet SensorLink's quality requirements, the business was moved to SEA-LECT because SensorLink knew SEA-LECT would deliver what was needed when needed and had the expertise to take on the challenging jobs.

"In terms of expertise, SEA-LECT's knowledge makes them a very invaluable resource for us. Getting somebody who knows what can and cannot be done before we even try, or if we are going to try, knows the success rate that we will see makes them my go-to experts."