



Case Study: Plastics Unlimited 2014 - 2015

Plastics UNLIMITED

Plastic processing with unlimited potential



Plastics Unlimited of Preston, Iowa is located in the heartland of the agricultural market in more ways than one. First and foremost, the owners are farmers; they brought that work ethic and background when starting a “plastics” business in 1992. Originally the business was primarily involved with thermoformed sheet goods, but they have since turned the family business into a true “composites business”, often marrying thermoplastics and thermosets into the same “composite” part. **Plastics Unlimited** thinks as a thermoformer but designs many of their parts for strength, stiffness and versatility, utilizing thermoset, fiber reinforced resins from Polynt Composites. This has led to multiple awards from both the thermoplastics side: SPE (Society of Plastics Engineers); as well as from the thermoset side: The American Composite Manufacturers Association (ACMA’s ACE Award).

Thinking as farmers has led to many of their contributions in radically changing the components used in agricultural products. Historically these components have been made from stamped steel that requires many small parts being welded or bolted together and then painted for corrosion protection. Painted steel scratches and damages easily as it gets abraded and eventually rusts, especially when exposed to insecticides and herbicides often used in farming. Composite versions of these parts, manufactured by **Plastics Unlimited** can be



pre-colored, UV resistant, thermoformed, Class A skins that have been selectively reinforced with FRP. More recently, this has included molded in brackets and anchoring devices, all done using their patented TEC (Tool-less Engineered Composite) process. The TEC process can best be described as a closed mold, lite-RTM process where the A-side mold is a thermoformed skin. Vacuum bagging and infusion can also be employed. Other than during the handling of the specialized Polynt Composites RTM resins, styrene emissions have virtually been eliminated by the TEC process. Bond between the thermoplastic skin and the thermoset reinforcement is excellent and patented under **Plastics Unlimited** process technology, which utilizes Polynt



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Composites resins. Composites One supplies the Polynt Composites resin and the vast majority of ancillary materials, such as Vectorply and Chomarat glass fiber stitched materials. The combination of an acrylic skin, resin and reinforcing glass fiber results in a stiff, strong, extremely durable product that does not rust or corrode, is much lighter in weight, with unmatched finish quality.



An excellent example of the **Plastics Unlimited** engineering and design capabilities was recently demonstrated in a grain extension cover project for a combine that not only decreased combine weight, but increased grain storage capacity by 38%, while also providing a watertight cover during poor weather to protect previously harvested grain. These panels range in size from 4.5'x 9' and 6' x 5'. The monolithic panels employ a high tech, thermoformed shell made from an acrylic skin for UV protection, co-extruded with a second layer of ABS for improved impact resistance, durability, and toughness. In addition to fiberglass being bonded to the thermoformed shell, localized stiffeners made of closed cell foam structural ribs were encapsulated within the fiberglass; as were metal brackets that later are used to bolt the extension covers to the hydraulic lifters and canvas connectors and eventually to the actual combine itself. Polynt Composites thermosetting resin is injected/infused (under vacuum) into the glass fiber, that when cured, provides the "glue" that holds the glass fiber in place. The resin/glass fiber also encapsulates the stiffeners and brackets and allows for the bond to be completed to the thermoplastic shell. These light weight extension covers replace much heavier, higher maintenance, steel covers previously used in this application.





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Although agriculture products are a big portion of **Plastics Unlimited's** business, industrial products can also be made from the TEC process, with the same advantages of small to large parts being made that can have molded in color, tailored part stiffness and mounting brackets included. The TEC process is not limited to glass fiber, but can use combinations of engineered glass, aramid, and carbon fiber for specific properties, while utilizing low viscosity polyester, vinyl ester or urethane ester technologies from Polynt Composites.



Several examples of these are engine covers chosen for their parts consolidation, resistance to abuse and damage on construction sites such as the road grader above and the lift truck to the left. In addition to the TEC process that utilize thermoformed skins, reinforced with fibers, **Plastics Unlimited** also has the capability at its' Fabri-Glass division in Moline, IL to fabricate traditionally gel coated, FRP parts that utilize Polynt Composites gel coats and resins. This can be seen in the Radius FRP car wash cover (below), chosen for its lightweight and resistance to moisture and chemical attack through tens of thousands of car washes



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