Pries Almost Doubles Output with New Extrusion Press

Pries Enterprises is continuing to grow its capacity and capabilities through the expansion of its aluminum extrusion operations in Independence, IA. The current expansion includes the installation of the company's largest extrusion press to date, namely a 44 MN, 10/12 inch press. Once the press starts operation in April 2022, it will almost double capacity.

The COVID pandemic has created a number of challenges, including shutdowns, restrictions, reopenings, and inventory shortages across all markets. However, these challenges can also create opportunities. During COVID, Pries has seen significantly increased demand, with customers requesting up to 30% more products than they did prior to the pandemic. This increased demand combined with the continued strong growth of aluminum extrusions in the automotive, building and construction, and recreational products industries contributed to the company's decision to install a new press line.

"Getting our customers what they need to sell their products has been a big focus over the past few years," said Matt McMahon, president and owner of Pries. "We believe that the relationships we've built and maintained with our customers and suppliers, and the continuous communication we have had with them, has allowed us all to be nimble and succeed in these volatile times. Generally speaking, we are working to turn the challenges caused by COVID into opportunities. Because our customers have been asking for more metal from us, we decided to invest in the new extrusion line."

Continuous Growth

Founded by Merle McMahon and several project partners in 1976, Pries Enterprises started out with a 4 inch press in Waterloo, IA. As the company grew, it eventually moved to Independence, IA, where they consolidated operations into a single manufacturing complex. Over the years, Merle slowly bought out his partners and became full owner of the company in 2000. After his death in 2010, his son Matt McMahon took over the family business and has continued its pattern of growth.

Pries has four extrusion presses, including its 7, 8, and 9 inch presses and the 10/12 inch press currently being installed. In addition, the company has a die correction shop, anodizing, and fabrication, including six CNC machines for vertical and horizontal machining, precision saws, punch machines, and pour and debridge capabilities. The company primarily works with 6000 series alloys, producing high quality profiles for a variety of markets, including construction, furniture, transportation, electronics, agriculture, and more.

One of the company's recent expansion projects involved the investment of $40 million over the course of three years to double their footprint to over 300,000 sq ft. This includes the addition of an anodizing line from Palm Industries in 2019, as well as new automated packaging lines from emmebi that were installed around the same time period.

The anodizing line includes two 36 ft anodizing tanks, which enables the company to anodize up to 10-12 million lbs of extrusions per year. The line also includes open space available for up to two more tanks, which could increase anodizing capacity to 20-24 million lbs/year. The additional anodizing capacity is one of the reasons as to why Pries decided to install a fourth press line this year, as the new press will help the company to better satisfy its new customers. In addition, the new press enables Pries to supply profiles to a wider variety of markets.

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A new 100,000 sq ft building was constructed adjacent to the company's existing buildings in order to house the new press. The construction of the building and installation of equipment progressed as quickly as possible considering the challenges of the market. "Like many companies, we have faced supply chain challenges while building the new plant, ranging from the electrical components to the bay doors. Even the availability of basic building materials was difficult to secure," explained McMahon. "We also faced a shortage of shipping containers to transport the new press. Fortunately, we were able to develop good relationships with our suppliers and the people who could get the job done." Installation of the extrusion press and handling equipment is almost completed, with commissioning to follow immediately after.

New Press Line

For the supply of the complete 44 MN, 10/12 inch press line, Pries selected Cometal Engineering, in Montichiari-Brescia, Italy, as its project partner. "Our management team has worked with Cometal before. The company was able to customize a press that matched our specifications and purchasing the line from a single supplier would ensure a seamless install," said McMahon. "Also, they have local technical support in the U.S., in case we need service or assistance."

The new short-stroke extrusion press features variable speed drives that allow for lower power consumption (Figure 1). This advanced energy saving system will allow for an average energy savings of 25-30% compared to traditional systems available on the market. In addition, the press is outfitted with guards and stops to ensure the safety of the operating personnel and to comply with local and federal requirements. The new press will have a 10 inch container size when it starts operating, and will add the 12 inch capability a year later. "This press will allow us to explore new markets and be extremely efficient within them," said McMahon. "With the press, we will be able to produce 6063, 6061, 6005A, and 6082 alloys, as well as other alloys, depending on our customers' needs."

Prior to extrusion, the line features efficient die ovens and billet heating and handling systems. The die ovens are designed to be thermally efficient and use thermocouples to reliably heat the dies to the correct temperature (Figure 2). The gas-fired billet oven has the capacity to process up to 7,000 kg/hr (15,419 lbs/hr) of billet, while achieving an accurate temperature tapering effect. This is due to the oven's improved burners and gas recirculation, which also minimizes heat loss from the exhaust fumes, reducing the gas consumption per extruded ton up to 30-35% depending on the product mix. Billets are transferred from the oven to the press using a fully electric billet loader, which drastically reduces the heat loss and improves billet temperature accuracy.

Figure 2. Thermally efficient die ovens.

Following extrusion, the profiles are carried through a balance intensive cooling system (BICS) with a double runout table (Figure 3). The automated water quenching system uniformly cools the profiles down from 500°C to the ambient temperature in only a few meters. The BICS concept allows for flexible adjustment of the distance between nozzle and profile, minimizing water and energy consumption.

Once cooled, the handling system moves the profiles to the Cometal-designed, 150 tonne stretcher, which is outfitted with two stretcher heads that are able to lift up during the stretching operation in order to reduce profile deformation, decrease the load on the loading belts, and avoid putting marks on the profile surface. This also increases the life time of the belts and decreases scrap.

Handling of the profiles after stretching is achieved with the Cometal's Big Basket racking technology (Figure 4), which includes an automatic stacker and destacker system along with an innovative multi-chamber aging oven. A benefit of the technology is that it completely eliminates the need for an expensive foundation and aerial cranes. The stacking/destacking system is designed to provide fast and stable handling of the profiles that are loaded into the baskets.

Figure 1. The new 44 MN, 10/12 inch extrusion press in the process of being installed.

Figure 3. Following the press exit is the BICS quenching system with a double runout table.

Figure 4. Pries is currently installing a Big Basket stacking/destacking and handling system of the type pictured here.

The specialized baskets completely eliminate the use of spacers, while providing better support for each layer of profiles, which reduces scrap. Each basket can contain up to 4 tons of aluminum (compared to the 700 kg in a typical basket design), enabling the plant to run with fewer baskets. The lack of spacers also reduces operation and maintenance costs.

An automated guided vehicle (AGV) delivers the full basket to the low-consumption aging ovens with lateral doors. The floor-mounted ovens feature high efficiency heating combined with a special airflow system that is able to decrease the overall cycle time. Inside the furnace, the spacer-less basket design allows for easy, homogenous airflow between the layers of profiles, which further reduces the number of fans and amount of power required in the oven, consequently lowering electrical consumption.

A key feature of the press line is the high level of automation, which makes it possible for only three to four employees to operate the entire line. "Automation is the future of our industry," said McMahon. "It provides improved safety for our employees by ensuring less injuries, as well as providing repeatability, resulting in less mistakes."

In order to establish the quality of every extrusion that it produces, Pries conducts regular tests on its profiles and has invested in iNOEX scanning technology to ensure that the parts conform to the customers' requirements. The company is able to also conduct full ASTM certification of the products as needed. "We rely on our team members' many years of experience," noted McMahon. "We also conduct producibility reviews for new quotes, working closely with our customers to communicate our ability to hold the tolerances requested or recommend changes based on industry standards and experience."

Conclusion

Pries is close to completing the installation of the fourth press at its extrusion operations in Independence. The installation of the new press positions the company to meet increased demand with high quality aluminum extrusions. "We continue to grow with our customers needs," said McMahon. "If a customer asks us to invest in a certain process that would help them be successful, we will do it. In recent years, we've invested in additional CNC equipment, a new anodizing line, and now the larger press. These are just a few examples of Pries' commitment to serving the industry and our customers." ■