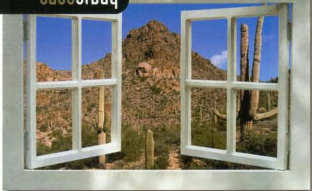


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Window, door fabricator finds quality gains, storage in unexpected spaces

Nowhere to go but up

By **Kate Bachman,**
Associate Editor

Tashco Industries Inc. custom-fabricates its Heritage brand aluminum windows and doors for the luxury home market segment in this continent's most stunning strip of the Sun Belt—southern Arizona, southern California, southern Colorado, and Sonora, Mexico.

The windows are specially designed and fabricated to stand up to the region's hot climate, intense sun, and extreme temperature changes (see *Fabricating Windows to the Soleil*).

Tashco—with \$6 million to \$7 million in annual sales and 75 employees—is located in what CNN identified as the country's fastest-growing city—Gilbert, Ariz. When Fred Tashman, the company's president, planned the company's growth apart by expanding its product offerings to include another color and another product type, he had to confront space and storage problems, as well as quality, safety, and material utilization issues.

Storage, Retrieval Nightmare

No Room to Grow. "For more than two decades, we stored aluminum stacked on top of each other in steel cradles, the cradles side by side, with only gravity to hold them," Tashman said. "And heightwise, for stability and safety, we couldn't go higher than 8 feet. And there was an overhead crane moving these cradles back and forth for storage and retrieval. This was a very low-cost solution; however, it was space-hungry, because everything was on a horizontal plane."

Tashman wanted to add another color and another product category to the company's line. "When we add a new color, we are talking about more than 80 extrusions because we have a very diverse product line. On top of this, we wanted to design a new product, a thermal break system. So that necessitated tremendous storage capacity."

Safety Issues. Tashman said he worried about the safety of the current system of retrieving the stored parts. "Imagine all these cradles

on top of each other, and the metal is in between. To fill the cradles, we had to take them out—sometimes empty, sometimes full. And in doing this, if we would hit one of them, it would be a perfect case of the domino effect. I mean, maybe hundreds of them would collapse on top of each other, and injure or even kill people—all those kinds of horrible things! That was my nightmare every night."

Material Utilization. Because Tashco is a custom shop, it cuts the components to specification. The window sizes, colors, decorative features such as muntins, and glass types are too varied to produce all the combinations for stock, Tashman explained. "We don't produce anything for inventory."

Therefore, cutting the metal to specific sizes from extrusion stock generates cutoffs. "What to do with these cutoffs is a big issue," Tashman said. "Let's say from out of a 25-foot stock length, we have a cutoff of 48 inches, which most of the time is reusable. In the past the lineal, the 25-foot stock length, was stored in cradles in a different place than the small pieces of cutoffs. In

order to recycle these cutoffs, the saw man or his helper would have to go into that pile of cutoffs, then find these materials, retrieve them, put them into a cart, and then take them to the saw. So the saw man spent 65 percent of the time searching or waiting for the retrieved material. As you would imagine, with the best motivation, this was achieved only marginally. Almost impossible!"

Tashman said many of those cutoffs then became waste. At the year's end, all the cutoffs were dumped into a scrap pile for recycling.

Quality of Prepainted Surface. Surface quality was an issue too. Tashman said that a manual storage system was not able to keep the surface of the prepainted extrusions intact. The extrusion stock would be scratched and damaged even before fabrication began. "We spent a tremendous amount of time repairing them, patching, polishing, and filling the deep scratches."

Space Limitation Drives Decision

"We were absolutely out of storage space," Tashman said. "At that point we had two choices, I felt. One, continue what we are doing—just add more rows and rows of square footage and, of course, expand the roof and walls and the concrete floor—or invest in a system that utilizes the vertical space. That area of the building is up to 26 feet high. In terms of the cost of the building, the maintenance of the building, in terms of taxes, amortization, the space is already there. All we needed to do was fill it up vertically."

Tashman said he set some goals and requirements for what a new storage system would have to do. In addition to utilizing existing space better, the new system would have to be able to store, inventory, and retrieve cutoffs. He also hoped that a more careful handling of the stock would protect the surface quality of the prepainted extrusions. Last, the software had to integrate into the company's current manufacturing software systems in different areas like glass cutting, five-axis metal machining, metal bending, and primer-sealing.

He installed a Unitrop 1.0 automatic storage and retrieval system (ASRS) with 134 cassettes from Kasto-Racine Inc., Export, Pa. Each cassette holds extrusions up to 25 ft. long as one piece or different lengths, Tashman said.

"With the system we chose, each cassette can hold 2,000 pounds. They're stacked on top of each other, with a short space in between, up to 24 feet



Fred Tashman, president of Tashco Industries Inc., was an emigrant from Turkey when he and his brother began the business in 1978. The company manufactures the Heritage brand of aluminum windows and doors for the luxury home market segment in the scorching Southwest Sunbelt. Immigrating to the U.S. was not difficult, he said. "Going up is easy." "Up" became the direction he looked to expand his storage capacity as well.



high. A high-speed robot is running at the top, going down and in between them, and picking up one cassette and taking it directly to the saw man who then picks up the painted extrusion—with no damage whatsoever—and then cuts it. If there is a cutoff, he sends it back in the cassette, and then the next cassette comes in with the next shape to cut. That is how it works."

First, orders are entered into the system daily, he said. The computer generates all the cutting reports, including plans to optimize yields and material cutting (metal and glass). The reports compute cutting and bending directions—the radius or angle for bends; length of arch or the degree of angle of the cut on the corners, the mitre, and the compounding of degrees.

The automated system is integrated into the company's manufacturing software system. The software does the scheduling. On the day the order is entered, each product carries an estimated fabrication time on it. And then all these are accumulated and consolidated for the production management in the form of a production schedule for that day. The schedule indicates how many hours it should take each department to build all the line items in those orders.

The next morning that data is on the shop floor on the saw operator's screen, on the machining center's screen, on the glass cutting layout, and on the assembly lines. So materials are cut, the components are machined, the subassemblies are installed into the other assemblies, and then they move into final assembly, he said.

"The idea is to build different products originating from different production lines all at the same time, because they are all going to be needed all at the same time, and the goal is to be complete 100 percent, no back orders. Most of the time orders are complete—I would say 97 percent of the time," Tashman said.

Tashman said the installation of the ASRS is somewhat complex and requires a strong plant engineering support, but he feels that the productivity, quality, and safety improvements compensate for the complexity.

Space Gained; Time, Cost Saved

"Even at this first stage, as a result of this, it has generated for us empty space. That was really one of the biggest gains—production floor space," Tashman said.

The company has been able to realize a great deal of time and cost savings as a result of the ASRS, Tashman said. "It's been tremendous! Before we installed this system, on the manual mode, we needed three saw men and had a tremendous amount of overtime, almost two shifts working. With this system, our production volume is up, I would say, 70 percent." Now Tashco needs only two saw operators on one shift.

Tashman said the system's sophisticated software makes it easier to do inventory and makes the cutoffs accessible. "It monitors everything by length and also by corresponding weight. In our system, everything is measured by length, eventually. So the weight provides an excellent control mechanism for the consumption of the aluminum, especially at the time of physical inventory."

Tashman said the time savings have been realized not only because retrieval is so much faster, but also because the operators no longer have to repair scratches and damage on the pre-painted extrusions. "I would say we were spending 20 to 25 manpower minutes per window, and we are not spending any right now." He added that the components' paint quality is better now that they no longer have to apply touchup paint.

Additional Benefits

Having ample storage and an efficient retrieval system helped the company increase sales as well, Tashman said. "Being able to introduce new lengths to improve yield and to add a new color [rust] helped us. Also, improving the surface quality definitely helped us in terms of increasing sales. Introducing a new product line, the thermally broken line, just by itself helped us enormously, especially to get into other markets. For example, in Colorado, you cannot sell anything else; it has to be a thermal break system. Otherwise, a tremendous amount of condensation occurs inside, and then when the condensation drips to the floor, it can cause a lot of damage."

Tashman no longer has concerns about shop safety related to the storage system. The whole system is fenced and sensors are installed throughout. When it is in operation, the motion detectors will shut the whole system down right away if a person enters the area. "It's very safe. That nightmare is gone now," he said.

In the future Tashman wants to add all the other hardware items to the system, and he plans to purchase more, and some longer cassettes to complete his ASRS system—about 300 cassettes in all. But for now he is happy with the result.

Fabricating Windows to the Soleil

"There are 340-plus sunny days a year here, so in the residential home designs, the window openings are quite large," Tashman said. "The glass openings are quite large, which necessitates making them of aluminum. Metal can handle these high temperatures and extreme temperature changes. Under such conditions, other materials—plastic or wood—do not work well," Tashman said.

"Also, the temperature changes 30 degrees in a 24-hour period. To give you an example, we have a 60,000-square-foot plant, and so a 60,000-square-foot steel roof. I was told that in a typical day, it expands and contracts up to an inch. And I believe that, because in seven or eight years, we lost it entirely and had to replace it with better-quality steel."

The windows are constructed using the company's patented Alu-Max™ thermal break system, which improves the thermal performance substantially, Tashman said. Two sections of aluminum extrusions—one exterior and one interior—are connected by a composite strip of fiberglass-reinforced polyamide. The hollow cavity generates an air space between the aluminum sections. The U-shaped composite strip reinforces the window's structural strength. Because the polyamide strip's coefficient of expansion is close to aluminum's, the bond between the strip and extrusions retains its mechanical integrity, even in the extreme daily temperature fluctuations, he added.

"First, we cut the aluminum extrusions with a conventional circular saw, machine them, make subassemblies, and make cross-assemblies. And then we have to process the glass—again by cutting it and then fabricating it into a double-sealed unit. Depending on the order, the windows will have different decorative muntin patterns between two panes of glass. Sometimes it has to be high-performance glass, sometimes tinted glass. The variables are numerous. And sometimes we have to fill the cavity with argon gas for better energy efficiency. And we also have to fabricate the mesh screen. And then the whole thing has to come together at the same time with the other hardware components."



Tashco manufactures a large array of custom aluminum window types and sizes, as well as standard, entry, sliding glass, multislide, and French doors. Adding just one color to the line requires storing 80 additional extrusion components.



Tashman's safety nightmares ended when he installed a Kasto automatic storage and retrieval system. The whole system is fenced and sensed throughout, and it will not operate when a person is inside the area.

Tashco Industries Inc., 1503 W. San Pedro St., Gilbert, AZ 85233, 480-892-2600, fax 480-892-0951, info@heritagewindows.com, www.heritagewindows.com
Kasto-Racine Inc., 3002 Venture Court, Exton, PA 15632, 724-325-5600, fax 724-325-5611, www.kastoracine.com