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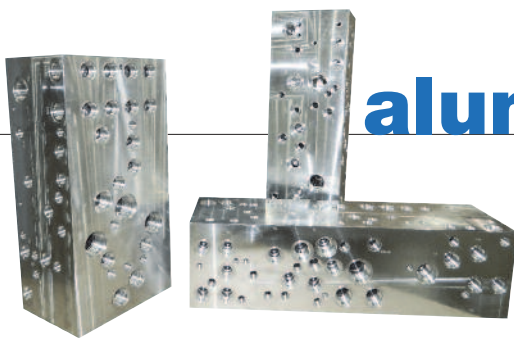
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# THE ALUMINUM REPORT

**ADVANCED ALUMINUM**  
MANIFOLD BAR CUTS  
MANUFACTURER'S  
MACHINING COSTS



aluminum

# Advanced aluminum

**Kaiser's top-shelf manifold bar cuts manufacturer's machining costs and time**

BY NICK WRIGHT

**T**he classic image of a switchboard conjures a room full of operators rapidly plugging jacks into lit-up lamps to maintain the flow of communication. Hydraulic manifolds serve a similar function: With the pull of a lever, an operator regulates the constant flow of fluid through a series of valves to actuate a hydraulic boom on a combine harvester.

However, these manifolds are exceedingly more complex than switchboards. With all the variables involved—multiple openings, valves, cavities—manufacturers need to focus on precision and quality control, rather than whether manifold block material is consistent and robust.

In the last year, manifold manufacturer Tomenson Machine Works, West Chicago, Ill., has not only improved quality but also reduced machining costs and preparation processes with an aluminum product that's the result of years of refinement. After testing the KaiserSelect manifold bar, a top-shelf aluminum bar produced by Kaiser Aluminum, Foothill Ranch, Calif., the company knew right away it was a superior product.

"At first look, the surface finish was better than other materials we had used that claimed to be manifold quality," says Jerry Blake, president of Tomenson. "This allowed us to be more within certain tolerance ranges of our customers."

Tomenson is a supplier of hydraulic manifolds. Among its largest customers are Eaton Corp. and Parker-Hannifin, both headquartered in Cleveland, which supply hydraulic systems for OEMs like



John Deere and Caterpillar. In turn, the OEMs supply hydraulic systems for applications such as agriculture, construction, mining and energy.

The KaiserSelect line of aluminum products, which includes plate tailored for aerospace, semiconductors, armor and general engineering, as well as specialized

rod, is intended to reduce cycle times, finishing and waste for end users. Blake notes that KaiserSelect manifold bar requires less deburring and produces less hanging chips after machining.

"What really sold us was its flatness and straightness. That's actually the key to KaiserSelect over others," he says.

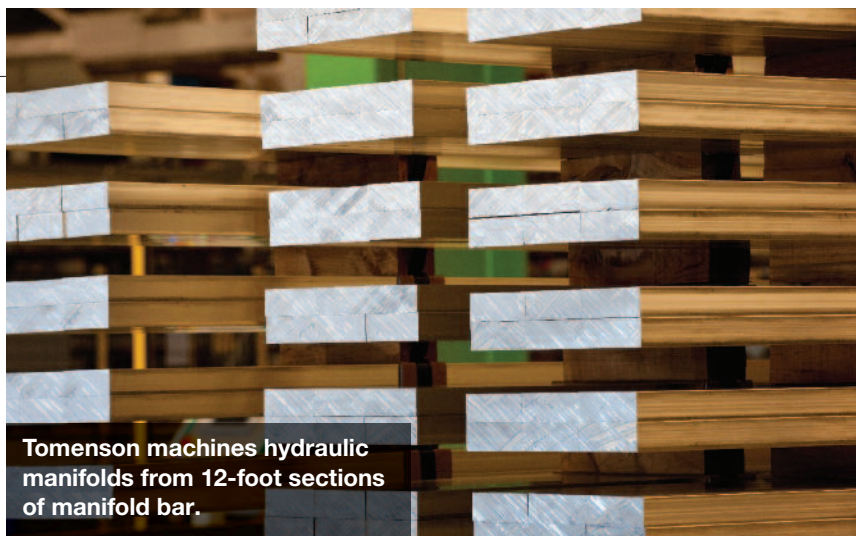




**KaiserSelect aerospace plate going into the heat-treat process.**



**KaiserSelect manifold bar being stenciled at Kaiser's plant.**



**Tomenson machines hydraulic manifolds from 12-foot sections of manifold bar.**

### Surface critical

The flatness and straightness of the KaiserSelect bar goes beyond its appearance. It makes the machining process more efficient. Before sourcing Kaiser, Tomenson would have to conduct squaring operations and pre-processes before the bar could be set up for machining,

Blake explains. That cost Tomenson money and time.

"We don't have any little waves in the material," he says. The long end of the rectangle-shaped manifolds is where Tomenson notices straightness, in addition to the top (narrow) side. The company uses horizontal fabricating, so when bar is inserted into a fixture, the top side is used for indexing the parts.

"The straighter that side is, the more perfect the indexing is, which keeps us in tolerance," says Blake. "What we were finding with other materials is we were having to pre-process more and more."

By eliminating pre-work, Tomenson keeps tighter tolerances during and after machining. The aluminum's consistent grain structure provides a uniform anodized surface, and its lower residual stress during machining reduces distortion. Compact, dry chips allow for less interruption during machining.

"It looks better, is better, our deburring time has gone down, so it was an all-around no-brainer once we started really using it," he says.

In a shop setting, it's easy to see the differences in those dimensional tolerances with KaiserSelect, says Chuck Strong, vice president of sales at Kaiser.

"When you start to machine it, in the case of manifold applications where there's lots of deep drilling and other processes, it makes operators' jobs easier," says Strong, noting that Kaiser has documented reduced hand deburring time. "From an owner's perspective, it helps the bottom line, so we get buy-in quickly."

In instances where Kaiser invites companies to test KaiserSelect, either through

its distributors or directly, the company finds its customers "really begin to recognize a difference when we take them through the process and document that with data," says Strong.

### Precise production

Kaiser produces its KaiserSelect manifold bar products at its facilities in Kalamazoo, Mich., Los Angeles and Sherman, Texas, from which the company can supply manifold bar customers throughout the country. It's offered in squares from 1.246 inches through 7 inches, and rectangles 0.875 inch by 3 inches through 6 inches by 8 inches.

According to a Tomenson press release, Kaiser chose Tomenson because of its data-driven manufacturing practices and continual process improvement. With those processes in place, Tomenson reliably could verify the manifold bar's performance. After testing the material, Tomenson presented its findings on the material's machining quality.

"Manifold quality is tough," Blake says. "We've shown them that there's a difference in our machining."

The development of KaiserSelect has evolved during the last 10 years, says Tom Gannon, vice president of marketing at Kaiser. The most recent addition to the product line is a continuation of meeting customer needs. Kaiser's knowledge of machining was previously applied to machining aluminum plate for aerospace applications, where customers needed a material with less distortion after machining.

"The rolling parameters and thermal processing, along with key parameters that control final microstructure and residual stress—things that will cause it to go out of

tolerance—were all identified, isolated, controlled and tested,” Gannon says.

After years of research and development, Kaiser locked in critical production steps, the metallurgical recipe and tests impacting grain structure, stability and straightness. “Kaiser manages the production process with recipe-controlled PLCs that significantly reduce the variation in the aluminum final product, lot to lot and piece to piece,” says Gannon.

“For customers that are able to come through our new Kalamazoo plant, they really understand our recipe control because every step of the process is controlled,” Strong says. “It’s unlike any extrusion plant in North America.”

The KaiserSelect brand goes beyond the material. “It’s a process, a product and a discipline. It’s all of these things that come together to make a product that meets a specific customer need and meets it every single time,” Gannon adds. “It’s really gaining momentum, especially the manifold bar, in the marketplace.”

## In the shop

Tomenson typically receives Kaiser’s 6061 T6511 manifold bar in 12-foot sections, which it cuts down to size. There are a number of processes going into the manifold, such as milling, boring, drilling, reaming and tapping. The company houses about 50 Mazak milling machines at its 100,000-square-foot facility located about 30 miles west of downtown Chicago; however, it uses about 80 percent of that space currently.

Blake says he’s recently adjusted shifts from 24-hour days, seven days a week to six days a week—not because of slowing business but “because we have new equipment and efficiencies that allowed us to do that and not lose anything in terms of capacity.”

From Kaiser’s end, its goal is to grow the product line through its distributors that deal directly with end-use customers. That way, Kaiser can have a better forecast so it can work with suppliers to deliver its many sizes quickly, particularly in manifold bar, Strong says.

“That drives our distribution partners to get out in front of these machine shop owners, managers and operators and inform them about enhanced characteristics of these products,” he says. “When we come in and talk about an enhanced product for marketplace applications for KaiserSelect, we get their attention.”

Tomenson’s success with KaiserSelect prompted Blake to urge his multiple suppliers to stock KaiserSelect with availability in all sizes.

“They started with larger sizes, but now we’re pushing them to carry all sizes that we use,” Blake says. “That’s been the goal in the last six months or so, to get everyone on board. As you can tell by the fact that we’re using it, we are impressed.” ■

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