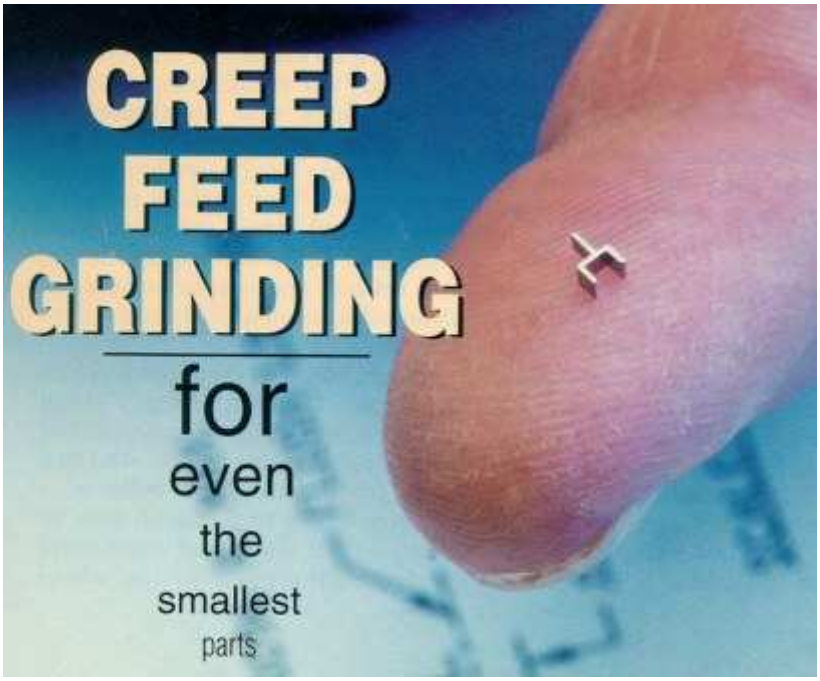


**Creep-feed grinding… A partnershop's way**

Abrasive-Form Inc, Roselle, IL, bills itself as the "partnershop" for a national customer base of more than 125 companies based on its ability to become "an extension of our major customers' plants," according to president, Ken Kummer.

The creep-feed (CF) grinding job shop has built its reputation on the value-added services it provides such as process engineering, fixture design, handling systems, grinding wheel development, and the high-precision capability of its creep-feed grinders. Included in the company's equipment inventory are about two dozen Maegerle and Blohm high-precision machines from United Grinding Technologies Inc, Miamisburg, OH.

Abrasive-Form employs all the disciplines of the complete manufacturing process to make it more than a "make me this part" job shop. Every project is started from scratch and relies on its own extensive library of information compiled from previous creep-feed grinding, fixturing, and parts handling solutions, as well as machine and operator capability.

"We take the part design and develop an optimal creep-feed process including dedicated fixturing and part handling, establish a correlated gaging operation, and set up CF equipment to run the job," Mr. Kummer explains. The company has even set up, totally debugged, and perfected CF grinding operations in customer plants while continuing to serve as a subcontractor.

Examples of Abrasive-Form's creep-feed grinding expertise abound, such as the tiny terminal clip for a radar computer board shown on the cover. The finished dimensions of

these parts, which begin as a 12 ft long bar of aerospace alloy and are run in batches of 120,000 each, are 0.098" high and 0.062" wide.

For another "partnershop" customer, Abrasive-Form developed a single fixture that held a six-surface part and established six critical datum lines and points. Clamped on a Maegerle with a continuous wheel dresser for the surface forms, consecutive CF passes on each of the six surfaces yielded a completed part without any refixturing. Batch production was cut from a few months, using multiple setups for a single 100-part order, to a few days.

For another customer, Abrasive-Form developed a mini (12" long) grinding transfer fixture with eight stations. Beginning with a tool steel casting, parts are oriented and moved ahead one station after each pass of the grinding wheel across the eight stations. A finished part is delivered every two minutes. The grinding wheel has a special creep-feed porosity and graining size developed by Abrasive-Form with the wheel manufacturer for this particular job. Maegerle's rigidity and high precision are credited for grinding all eight surfaces in a single pass while holding a 32 RMS maximum surface finish with 0.005" maximum radii in the part's corners.

Based on its experience with solving customer problems over the last 20 years, Abrasive-Form has accumulated an extensive reference library for recognizing possible solutions and benchmarking performance. Established parameters are used as references in quoting jobs. They include material to be ground, wheel selection, handling and fixturing requirements, and critical specifications such as close tolerances and tight corners that must be held.

There's more to creep-feed grinding than the fantastically high metal removal rates and exceptional accuracies that can be achieved in a single pass, Mr. Kummer believes.

"They forget to focus on how to shorten cycle times and lower costs by presenting parts to the wheel more efficiently," he says. Unlike milling, where multiple operations could require multiple setups with different tooling, Abrasive-Form can often complete all operations simultaneously in one setup with creep-feed grinding.

"Presenting more parts to the wheel in less time makes the whole operation more efficient and is how the total cycle time can be considered optimized," Mr. Kummer explains.

In one instance, more than a half dozen machine tools were replaced by one Maegerle CF grinder with multiple fixtures and a fast station-to-station handling system. Queue time at machines was zeroed out. Scrap was reduced from 20% to less than 1%, and the customer eliminated a $20,000 a month expenditure on encapsulation.

Nearby, a CNC Blohm Profimat continuous-dress CF grinder is producing aerospace alloy turbine vanes in a shuttle-fixture operation that delivers a completed vane every 15 minutes. In the first fixture, the wheel grinds a nib, top step, wall, and bottom step on root ends. Two steps are ground in the second fixture. In both fixtures, "angel wings" are

ground using the side of the wheel. Production is non-stop, with overall tolerances held as close as ±0.0002."

As "partnershop" relationships mature, customers work very closely with Abrasive-Form to plan machine time for their projects.

"Most partnershop customers schedule their work well in advance. They know when they can have their work done on their machine," says Mr. Kummer.

In a real sense, Abrasive-Form's machines, technicians, and engineers are "integrated" into the customers' production capabilities, says Mr. Kummer. "Dedicating our CF grinders, operators, and technicians to our customers' jobs is about as integrated as we can be without actually being on their floor," Mr. Kummer says. "This is why we call it partnershopping. We build a partnership relation with a customer to the point where they feel our shop is an extension of their own facility. As a result, they are very loyal. They stay-with us."