In this interview, Tim Weber of Buehler, an ITW Company, discusses the applications of abrasive cutters and the best practices for using cutters in industrial production.

What are some of the various industry sectors that abrasive cutters are used in, and what types are items are cut with abrasive cutters?

Abrasive cutters are most commonly used in Aerospace and Automotive industries, not only at the OEM's but many of the suppliers that make the components that go into these products.

Types of samples cut with abrasive cutters vary considerably from automotive drive train and engine components to aircraft parts of most any type. Primarily these parts are metallic however many polymers and composites are also routinely cut using abrasive cutters.

What are the main applications of abrasive cutters in terms of preparing samples of large metals?

In the case of sectioning very large components as found in the heavy equipment or aircraft industries, abrasive cutting often slots between other cutting techniques, such as EDM or band saws, and grinding and polishing stages. This is due to the fact that while these alternate sectioning techniques are efficient in reducing the size of very large components, they induce far more deformation to the sample material than an abrasive cutter. This deformation must be removed prior to analysis of the sample, thus making it less practical to grind immediately after EDM or band saws. Abrasive cutters are the ideal compliment to these machines as they can be used to further reduce sample size quickly without inducing significant material deformation. Hence the addition of an abrasive cutter in such applications serves to reduce material preparation time and provide cost savings.

How important is abrasive sectioning in sample preparation?

Abrasive cutting is usually the last step prior to grinding and polishing. It serves the function of reducing sample size and removing material damage whether it is thermal damage from another cutting process or mechanical damage that might come from processes such as machining. Abrasive cutting thus enables one to very quickly grind and polish the sample surface to reveal the true structure without induced artifacts. Done properly, abrasive cutting has the potential to save a great deal of preparation time.

What are the most important considerations when selecting an abrasive cutter for a specific item?

Of course the machine must have the capability to cut the part, as importantly it must have the durability to do so over the long term. In high-volume cutting applications reliability is a primary consideration. Because the cost of down-time is considerable, it is paramount that this criterion is at the top of the list in abrasive cutter selection.

Has Buehler stayed on top of industry demands in regard to abrasive cutters?

Yes, industrial production in automotive, metals fabrication, and aerospace demands speed and quality. As part of ITW, Buehler adheres to customer backed innovation, so after talking to customers and seeing what their requirements were, Buehler engineered two new abrasive saws that were introduced this May.

What are the main features of the abrasive cutters and why are the new Buehler abrasive saws ideal for production quality control environments?

The primary features of a quality abrasive cutter are those that enable provision of cut surfaces with minimal deformation reproducibly, day in, day out. These include sectioning modes that minimize the area of contact (MAC) during the cut such as “Planar Mode”, capability of pulsing the cut to reduce potential for thermal damage and “Smart Cut”, which optimizes feed rate to ensure high quality cut surfaces when cutting materials of varying geometry and abrasion-resistance.

The AbrasiMet M saw is designed for heavy use and for labs that rely on sample cutting for production quality control and inspection of parts up to 25” (635mm) in the chamber. The compact AbrasiMet M is a manual saw with a powerful 5.5 hp (4kW) motor that can accommodate 10”[254mm] to 12”[305mm] blades with a maximized cutter chamber space and sliding hood design to provide customers with a quick, clean and simple cutting solution for sample preparation in any work environment. Buehler designed the casting to be durable with a corrosion resistant steel T-slot table. In addition, the hood design is reinforced for repeated opening/closing and the enclosed motor-cutting arm system to keeps debris and coolant out to maximize the life of the motor.

The AbrasiMet XL Pro™ a large abrasive cutter provides consistency and repeatability in cutting large samples for production environments of large heavy metal parts. This machine is managed by an intuitive touch screen which can be programmed for blade size, cut type, homing and tracking position, serial sectioning, Variable SmartCut and chamber wash-down. When processing a variety of parts, users can quickly load the specific program for their sample and begin cutting. The AbrasiMet XL Pro has a 13.4 horsepower (10kW) motor, the most powerful motor on the market for this size abrasive cutter, allowing it to cut through both large and high-strength materials quickly. It fits large parts up to 48” width (1220mm) in the chamber. It allows precise alignment of samples with three axis manipulation of the blade and table. Buehler designed an easy to clean recirculation system with a secondary filtration tank that can be cleaned without changing coolant. Its durable design, intuitive user interface and optimized chamber will make it the ideal cutter for customers using Chop, Y-feed or Planar cutting types.

Do you have any advice for achieving ideal cuts with the abrasive cutters?

Adequate coolant is paramount to prevention of thermal damage to cut surfaces and is perhaps the most often overlooked aspect of cutting. Always use good quality coolant, change it frequently and ensure coolant lines are unobstructed.

Choose an abrasive blade intended for cutting the material type one is cutting and ensure the blade is designed for optimum efficiency at the RPM the cutter is designed to operate. Mixing blades and cutters from different manufacturers can result in less than ideal cutting conditions. Our blades are designed for specific applications with our machines to ensure optimal results.

How can the blade of the abrasive cutters be applied to simplify and shorten the process of cutting?

Choice of blade has a tremendous impact on quality of the resulting cut. Because of this, blade selection not only impacts efficiency of the cutting process but can shorten the entire preparation procedure. For cutting abrasion-resistant materials such as refractory alloys for aerospace or hardened steel for the auto industry, it is important the resin that contains the abrasive is of the correct bond strength There are many abrasive blades on the market with very high bond strength with the intent of providing long life, however it is imperative the blade bond breaks down efficiently to continually expose fresh abrasive for continued cutting. If this does not occur, cutting is likely to induce thermal damage that will extend subsequent grinding time to remove it.

Will the new abrasive cutters be shown in any trade events in the near future?

Yes, Buehler is excited to bring the new AbrasiMet M and the AbrasiMet XL Pro to the following upcoming events this autumn.

Trade Show	Dates	Location	Booth

MS&T19 (http://www.matscitech.org)	Sep 29 - Oct 03 2019	Portland, OR	Booth 507
Heat Treat 2019 (https://www.asminternational.org/web/heat-treat-2019)	Oct 15 - Oct 17 2019	Detroit, MI	Booth 609
HK Köln (https://www.hk-awt.de)	Oct 22 - Oct 24 2019	Köln, Germany	Booth A-068/B-069

About Tim Weber

Tim Weber is a Senior Metallurgical Engineer at Buehler in Lake Bluff, IL. His career is focused on metallographic materials preparation, image analysis and materials characterization. Prior to joining Buehler, Tim was employed at Argonne National Laboratory conducting research in fabrication and characterization of thin films and coatings. Tim spent several years as adjunct faculty in mechanical engineering and mathematics departments at Northern Illinois University and Kishwaukee Community college. He has also been a private consultant in business process improvement. Tim received his BS in Physics and MS in Process Engineering from the University of Northern Illinois and Ph.D. in Materials Engineering at the University of Illinois.

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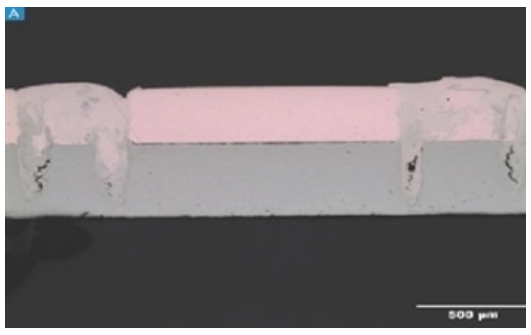

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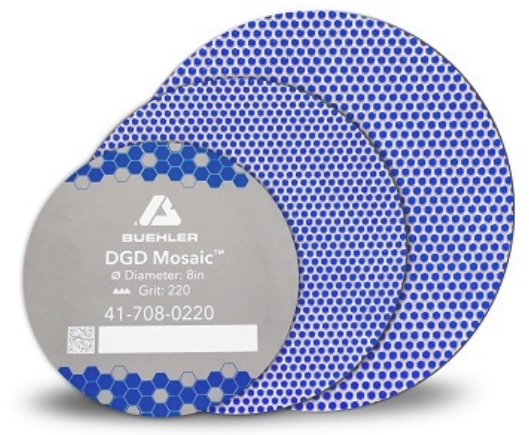

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