



Metalworking

Carbide Recycling: Making High-Strength Tools Sustainable

Kip Hanson | May 07, 2024

Cemented carbide inserts, end mills, drills and other cutting tools are made primarily from tungsten carbide and cobalt. The first gives the tool its hardness and wear resistance, while the latter acts as a binder, holding the individual grains of tungsten carbide and other trace materials together.

The problem? Availability of the elements involved is limited.

For example, the lion's share of the world's tungsten—about 80 percent—is mined in China. Most of our cobalt comes from the Democratic Republic of Congo.

And while only traces of titanium, tantalum and niobium—materials added to heighten certain properties of cemented carbide—are used in its manufacture, here again, the supply bases are often located in war-torn countries or those that are less than friendly to the West.

Further, and in some ways more importantly, these essential products should never end up in a landfill, no matter where the raw materials come from.

Not only are they quite expensive on a per pound basis, but due to their great hardness and durability, they will never decompose on their own.

A Second Life for Cutting Tools

The solution to all this is an aggressive recycling strategy, with cutting tool suppliers welcoming worn or broken products back for reprocessing and their customers being vigilant about returning them.

Maybe your shop is already engaged in such a program or is actively searching one out. As you'll soon see, there are plenty of options.

Or perhaps there's a coffee can sitting inside the tool crib door, a Post-it note affixed to the front advertising "USED CARBIDE HERE" and an attendant wondering what to do with the contents once it's filled.

"Many people are interested in carbide recycling but don't know how to go about it."

Karen Puente
Sandvik Coromant

It's also quite possible that everyone just tosses their worn carbide cutters and inserts in the bottom of their toolbox; worst case, they might end up in the trash.

If that's the case, Dan Paradis has a piece of advice: "Don't do that."

The president of *GreenTech Specialty Metal Recycling* in Clemson, South Carolina, he's more than happy to take all that scrap carbide off your hands, and he'll pay you for it.

"In addition to carbide, we also recycle high-speed steel, cobalt, and powdered metal cutting tools like drill bits, taps, end mills and dies," Paradis says.

GreenTech was once a sister company of cutting tool manufacturer Greenfield Industries but has since spun off into a stand-alone entity following Walter Tools' acquisition of Greenfield Industries earlier this year.

GreenTech continues to work with Greenfield Industries, MSC Industrial Supply Co. and other suppliers.

"Recently, I've started getting calls out of the blue from companies saying they want to recycle, which is fine by me," Paradis adds. "Sustainability is very important."

How Carbide Recycling Works

Excepting GreenTech being the only recycler to accept high-speed steel, the process is fairly similar across the four companies cited in this article:

- After contact information has been exchanged, the recycler delivers however many empty pails, buckets or drums the customer requests.
- Once the containers are full, a phone call or email begins the return process. A certain number of containers or minimum poundage is usually required.
- Pickup via less-than-truckload shipping or common carrier is then scheduled and the scrap material is delivered to the recycling facility, where it is sorted and weighed.
- From there, a settlement proposal is made based on the current market value, and if acceptable, a check is delivered a few weeks later.
- Freight charges in each direction are typically prepaid.

Here's one more GreenTech exception: "We recycle several million pounds of grinding sludge each year, which we filter, clean and dry, then sell the resulting metal powder all over the world," Paradis says.

Cash for Carbide Scraps

Autumn Crain is the scrap recycle carbide manager and buyer at Kennametal's recycling facility in the Huntsville, Alabama area, responsible for the company's *Direct Buy* web portal program.

"We use a zinc reclaim process here," Crain says, explaining how old carbide is made new again. "The scrap carbide is placed into graphite crucibles and exposed to molten zinc, reaching temperatures of 1,000 degrees Celsius (1,800 degrees F) for several hours."

The heat “breaks down the binders within the carbide and causes the material to swell or bloat, after which it’s put through a vacuum distillation process that makes it brittle and easy to break apart,” she adds. “It’s then crushed and screened through particular sizes of mesh, making it into usable material and feedstock for our powder plants.”

While scrap carbide prices are fairly volatile, Crain indicates that \$5 to \$10 per pound is a reasonable ballpark price.

Reducing Carbon Dioxide Emissions

Seco Tools in North America is opening a self-service carbide recycling option sometime later this year that will sit inside its *My Pages* gated portal, says Damien Pakula, compliance officer and recycling coordinator.

“It’s basically a one-stop shop for our customers, where they can not only find product information and place orders, but receive a price offer for their scrap carbide, arrange for pickup, and so on. With that is a carbon dioxide calculator that will quantify your emissions reduction based on how much carbide your shop has recycled with us.”

Seco Tools is committed to the SBTi (*science-based targets initiative*), a corporate action group whose goal is to combat climate change, Pakula says. Participants commit to reducing greenhouse gas emissions by 50 percent by 2030 and reaching net zero by 2050.

“Speaking for Seco, our goal is to reach 90 percent circularity by the end of the decade,” he adds. “Our recycling program plays a central role in achieving these reductions.”

Strategic Sustainability

Like Seco Tools, Sandvik Coromant is setting up an online portal to streamline the recycling process; it’s expected to go live later this year.

“I know many people are interested in carbide recycling but don’t know how to go about it,” says Karen Puente, who’s responsible for *recycling* at the company, managing an area from Canada to Argentina. “This solution should make it much easier.”

Sandvik Coromant has local storage locations in the Americas and other regions, and scrap carbide is gathered regularly and shipped to a reprocessing facility operated by sister company Wolfram, in Austria.

The company sold almost 200,000 kilograms of carbide products in 2023, and 68 percent was collected afterward, Puente says. Within six years, Sandvik Coromant hopes to bring that figure to 90 percent.

“One of our main KPIs [key performance indicators] centers around sustainability and the environment, and it’s a central pillar of our corporate strategy,” she says. “We receive scrap carbide from almost any company, and whether it’s 1 pound or 1,000, just send it to us and we’ll give you a fair price.”