Carbide Processors, Inc.

Northwest Research Institute, Inc.

Newsletter **January, 2006**

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President's Letter

Why we use the Sawfiler© name

The real expert is the man who uses the tools

We do a lot of science and many of our products have been developed by bringing advanced technology from other industries to the saw and tool industry. Most often we have had a sawfiler ask us to help him do things better. We spend a lot of time and money doing this but boy does it work well. Other times we will have a really good sawfiler tell us what he is doing and we will bring it to the rest of the industry.

In all cases our products are developed with, tested by and used by excellent saw filers.

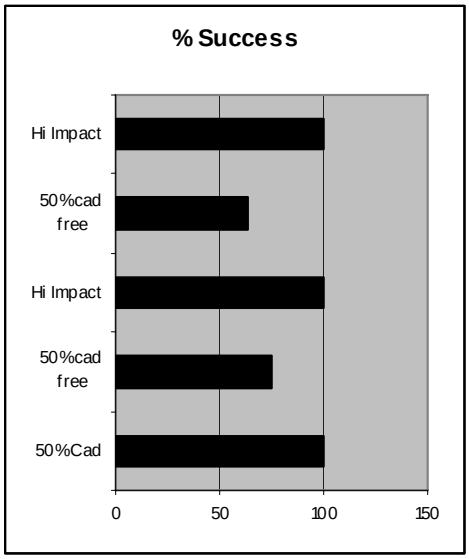
Call Emily for Saw filer T shirts & mugs

Safety & Health

We have had several requests for information on safety and health. We do not hold ourselves out as experts for liability reason but we are very happy to pass on the opinions of experts.

Tip Failure and Breakage Caused by OSHA Regulations & how you can fix it

The standard braze alloy used to be 50% silver with Cadmium and it worked very well. Then OSHA changed the rules on Cadmium exposure which made it very difficult to use legally. The industry went to the nearest Cadmium free alloy which was still 50% silver. However it didn't work very well. Test run at Weyerhaeuser showed that the 50% Cadmium free alloy had 36% tip loss in one test and 25% tip loss in another test. The Cadmium alloy had zero tip loss.



Carroll Sizemore of Cascade Southern refused to do anything that would make his saws worse so we spent years with him developing our Hi Impact braze alloy. See P. 2

Tempilstik for brazer training and quality control

See P. 2

We Are Great On Small Parts

Here are seven perfect tips on a penny with plenty of room left over.

Change Coolant Once A Year

The standard for coolant change is once a year. The secret is to check it and adjust it monthly and to keep it filtered.

The last two coolant analyses we did for customers showed one had the concentration much too low and bacteria was growing like crazy. The other one had coolant much too thick and they couldn't filter it because it was so thick

Really Good Coolant Test Instruments

It was Mike Riggs at Weyerhaeuser who pointed out that the standard optical refractometer was harder to use in a mill than in a lab. We developed an instrument package that is very easy to use and very accurate for not much money. See p. 5

Filter System Shipments

Yes, we are selling a lot of them but we can still usually ship a standard unit in a week. Custom units may take longer.

Hi Impact Alloy Weyerhaeuser / Systi Matic Test Results

Ten years ago the standard braze alloy was a 50% silver with Cadmium. Over the years the government tightened the regulations on Cadmium and levied some big fines on people using Cadmium. The use of silver solders without Cadmium resulted in increased tip loss and tip breakage because the 50% Cadmium free solder did not provide the impact protection. We did tests with Weyerhaeuser about ten years ago on the two alloys. The Cadmium free alloy was not as good as the Cadmium alloy but it worked pretty well and it was safer so it became the standard. Worker safety and avoiding government fines were considered important enough to put up with increased breakage and tip loss.

Don Anderson at Weyerhaeuser contacted Keith Dietrich at Systi Matic. Systi Matic laser cut and brazed some saw sections. Weyerhaeuser then ran impact tests. In the impact tests, the force was delivered by a sixteen-ounce arm traveling at eleven feet per second.

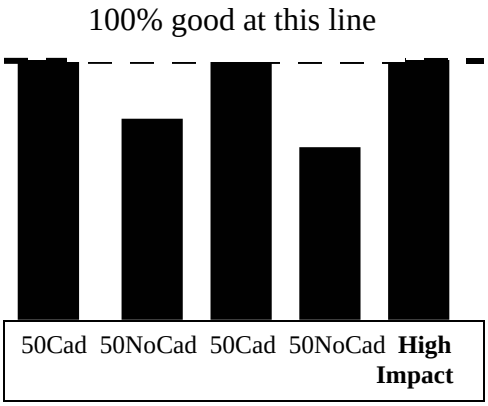
Report on tip breakage with 49% alloy with Manganese
The test results on this alloy were spectacular. In equivalent destructive tests the traditional Cadmium alloy had zero failures. The new alloy also had zero failures. The Cadmium free alloys had failure rates from 25% to 100%.

Tests	Number good	% good
A50N (std. Cad free)	6/8	75%
S50N (50% w Cad)	8/8	100%
A56 T (56% w tin)	0/8	zero %
A49MN (Hi Impact)	8/8	100%

Once the parts are properly pretinned they are extremely easy to use. The brazer in the tests made the following comments:

1. It seemed to be more liquid than the standard solders.
2. It sort of felt like there was a cushion in the middle of the joint.
3. It seemed to slide in a bit differently.

Generally there was just a difference in feel but no problem converting to the new alloy.



Brazing High Impact Alloy
Hi Impact alloy melts between 1260 - 1290 F.

50% with Cadmium melts at 1170 – 1270

50% Cadmium free melts at 1220 - 1305

A good brazer will notice the difference and adjust to it. It does take a bit of adjustment. The alloy needs some heat to get the Manganese bumps fully melted. When you drop an ice cube into boiling water it takes it a bit to melt. Brazers who helped us develop this alloy recommend a little slower heating cycle. Watch the heat. Do not let the tip get red. Put the heat into the alloy. Try to bring it up to temperature slowly and then hold it at temperature for a couple seconds. Use just enough heat to keep the temperature in the 1320 – 1340 range without getting it any hotter.

Hi Impact Braze alloy is a little more expensive but eliminating just one saw change a year puts you way ahead.

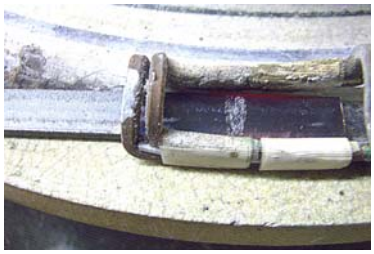
The Best Braze Joints

are a combination of a butt braze and a fillet braze. In saws and tools you want .003” to .005” between the steel and the carbide for impact protection and stress relief.

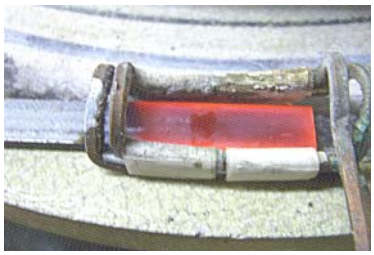
Tempil Stick for Braze Training and Quality Control

A Tempil Stick is a stick of special chalk in a metal tube. To use it you rub a little chalk next to the area where you want to measure the temperature.

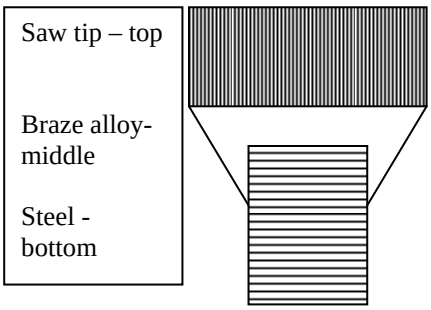
As the area gets hot the chalk stays chalk.



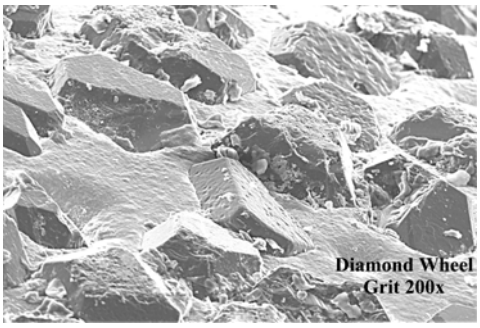
Once you reach the rated temperature (Here 1300 F) the chalk melts and turns into a smear.



Buy one of these at 1400 F for $19.50. Rub a little on the steel plate next to the braze area and control the temperature.



Grinding Difficult-to-Grind Materials



Diamond wheel grit 200x

Certain materials, such as ceramic and cermets, are difficult to grind for two reasons. First, they are very hard. This causes the diamond grits in the grinding wheel to dull, resulting in larger forces, excessive heat generation and higher temperatures. Second, because they are brittle, they are very sensitive to high temperatures, which can lead to cracking.

The key to grinding these materials is to keep the temperatures down.

First, improve the cooling by using coolant exit velocities that match the surface velocity of the wheel. This will enable coolant to penetrate the air barrier and get between the grits in the wheel, i.e., into the wheel porosity. For example, a wheel running at 8000 surface feet per minute requires a coolant pressure of 120 psi at the exit. Not only will this reduce temperature by taking away the heat more efficiently, it will reduce temperature by improving lubrication at the grit-workpiece interface, reducing the amount of heat generated.

Next, use a diamond grit that is i) smaller (for example, switch from a 220 to a 320 grit); ii) more friable (a grit that fractures more easily); and iii) angular-shaped (as opposed to blocky-shaped). All three of these will result in a wheel that is self-sharpening, which will generate less heat. And, the angular-shaped grits will attack the workpiece more aggressively, resulting in more efficient cutting.

Third, if using a resin- or metal-bonded wheel, be sure to "stick" the wheel aggressively and frequently to get it to open up.

Fourth, grind more gently, meaning smaller depths of cut and lower table velocities. This more gentle grind will generate less heat. If creep-feed grinding, emphasize reducing the table velocity. If shallow-cut surface grinding, emphasize reducing the depth of cut.

Finally, reduce the wheel speed. This will allow the grits to penetrate more deeply into the workpiece, improving the cutting and chip-formation efficiency and reducing rubbing and excessive friction. The deeper penetration will also place larger forces on the grits, getting them to self-sharpen better.

The downside of all of this is that cycle times will be longer and wheel wear will be greater. That's a fact of life when grinding difficult-to-grind materials. Get over it and get grinding.

Dr. Jeffrey A. Badger is a specialist in grinding. He works independently as a consultant, visiting toolmakers and companies doing grinding, helping them improve their grinding operations. He is also author of the regular question/answer column "Ask the Grinding Doc" in Cutting Tool Engineering. He can be contacted at badgerjeffrey@hotmail.com. His webpage is www.TheGrindingDoc.com.

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http://www.cuttingtoolengineering.com/

In the next issue he has a very good article on over dressing diamond wheels.

For Sale

1998 Walter Woodtronic NC4 – Excellent condition
Duel Wheel face and top in set up.

He is asking $20,000
Contact Dave Strom at Super Thin Saws
800-541-7297

Help Wanted - Sawfiler

Carbide and/or resaw filer
Marty (714)847-1416
SCS Industries
17682 Metzler Ln.
Huntington Beach, CA 92647

Ray - All American Carbide
917 Meridian East
Puyallup, WA 98371
(253)927-8319
(253)927-8061
(253)927-4468
rl_industries@earthlink.net

You Think Your Job is Tough


This is a black bear on a clothesline. Honest.


He is going after a bird feeder. This is on the Internt. Search for Long Lake Bear. This was first sent to us by John Schultz of Super Thin Saws.

Grinder Coolant Analysis - Sawmill

	Standard	# 1 Vollmer
pH	8	8
Concentraion	5% - 10%	**0.41%**
Bacteria	100,000 *	**10 million**
Fungus	10,000 *	**100,000**
Tramp oil %	None	None
Particulate %	None	None
Cobalt Conc.	under 10	0 mg / L
* CFU (Colony Forming Units) / gram		

The coolant used is much too weak. It is being used at the level of make –up coolant. Coolant is ordinarily mixed in the range of 20:1 to 30:1. Water evaporates faster than coolant so the make-up coolant is largely water and is usually mixed about 10% of the level of new coolant. You need to add additional coolant since the rust prevention, lubrication and bacteria control properties in coolant get used.

The bacteria and fungus levels are very high because the coolant concentration is much too low. The cobalt levels are too high in some units and you need to use cobalt remover and filter system to reduce the cobalt levels.

Grinder Coolant Analysis – Saw Shop

Cimstar® 40B in PX 1000 & Saw Grinder

	Standard	PX 1000
cobalt	none	none
pH	9.0	9.0
Refractometer	1.6 - 3.2	**3.9**
Coolant %	5% - 10%	**11.78%**

	Standard	Saw Grinder
cobalt	none	none
pH	9.0	9.0
Refractometer	1.6 - 3.2	**5.5**
Coolant %	5% - 10%	**17.05%**

The coolant concentration is too thick. Recommended range is 5% to 10%. The original coolant dilution is 1:17 which is approximately 6% which is very good. What typically happen is that this concentration is also used as make up coolant. Water evaporates much faster than the coolant additive does. As the water evaporates out of coolant it gets thicker. Make up coolant is generally used at somewhere around 10% of the original dilution so that you are adding mostly water to replace evaporation loss and also a little bit of coolant to keep up corrosion, etc. values.

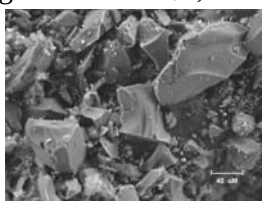
The coolant does not filter well because it is too thick. The PX 1000 coolant at 12% did filter but the Saw Grinder coolant at 17% was too thick to filter. Ordinarily coolant is run at the lower end of the range unless thicker is more desirable. Water transfers the heat and the coolant provides anti-rust, lubricity, anti-corrosion and ant-biotic (both bacteria and fungus).

PX 1000
Each filter was used until liquid wouldn't pass though it anymore.

Saw Grinder – the liquid was so thick that very little was filtered out.

Dirty Coolant Is Expensive And Dangerous

10% annual loss of machine value
Dirty coolant is most expensive for the damage it does to machines. Dirty coolant can cause a loss of as much as 10% of the cost of the grinder. With a $50,000 grinder this is $5,000 a year.

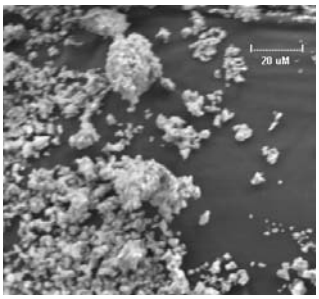


Diamond particles from carbide grinding at 1,000x
These are broken bits of diamond. They get into bearings, valves, controls and everywhere else. They are very small, about the size of fine sand.

Dirty coolant tears up grinders like dirty oil tears up car engines.

Clean coolant makes money

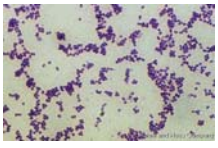
The cost of filtering coolant is more than recovered in longer diamond wheel life, longer coolant life, less labor and faster cleaner grinds and better cuts with the tools.



Diamond and carbide grit glued together by oil and grease.

We received coolant from a shop that was unusually cloudy. Under a microscope, we found these growths. These are mold and bacteria colonies with millions of individual members.

We took samples to two labs for analysis. The first lab said it had 1 million to 10 million per cc. The next lab identified heterotrophic bacteria. These are bacteria that eat organic carbon and live at human body temperatures. Organic carbon includes rubber, plastic, Plexiglas, insulation and human flesh. The count was 240,000 per ml. They definitely identified two disease-causing organisms. We took Pictures of both that were stained for clarity and photographed at 1,000 x.



Staphylococcus Bacteria (left)
Staphylococci cause abscesses, boils, and infections of the skin. They produce infection in any organ of the body. These bacteria are largely resistant to antibiotics.

Aspergillis Niger Mold (right)
Severe reactions may occur among workers exposed to large amounts of molds in occupational settings. Aspergillis can produce severe disease involving a variety of body tissues. Superficial infections are generally limited to the outer layers of skin and hair. Cutaneous infections are deeper in the epidermis, hair and nails. Some infections involve muscles. Infections may be systemic, originating in the lungs. Some mycoses are opportunistic, and may involve a variety of body sites.

Coolant Testing Recommendations for a Good Filer

Mike Riggs of Weyerhaeuser asked me to recommend some coolant test instruments. I went down to see him and I had a standard refractometer with me. Mike pointed out that it was hard to read and hard to train. He was polite about it but he made me realize that lab instruments aren't always easy to use in the shop and aren't always necessary. What follows are some instruments and tests we found that do all a filer needs to do. They are very easy to use in dim light, wearing gloves, with the floor shaking or in whatever other circumstances a filer has to work. Thanks, Mike.

Coolant Testing Kit
All You Need, Easy to Use & Accurate

Digital Brix Refractometer $369.00 complete
Cobalt Test Strips $75 per tube of 100
pH Test Strips$25.90 per box of 100
Bacteria & Fungus Test Kit - Box of 10 - $91.40
Graduated Cylinder $19
Complete starter kit $559.30 save $21

Digital Brix Refractometer
0-53% $369.00

Easy to use with Safety goggles and gloves

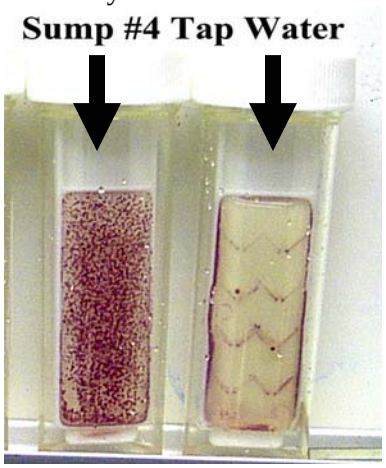
This is a new unit. It is very easy and simple to use and very accurate.

Bug Check BF - Bacteria Test Kit

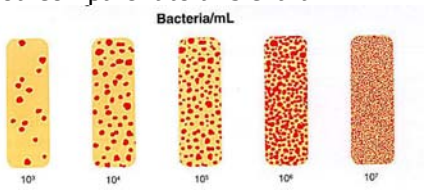
BF test kit for counting bacteria and fungi - Simple, Quick, Easy-to-Use And Self-Contained

You get little bottles with a two sided strip in them. One side grows bacteria and one side grows fungus. You get them wet with coolant, shake of the excess and then put them in the bottle and seal it. After 2 or 3 days you will see growth.

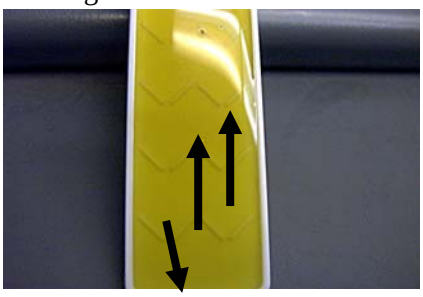
This is what you see



You compare it to this chart



If your coolant is clean you may not see anything. Below is a strip with three very tiny dots on it from a very clean sump. Compare this with Sump #4 above which is as about as bad as coolant gets.



Cobalt & pH Test Strips

Use them like pH paper. Dip them in the coolant and then compare the color. Boeing feels that 10 or under is good. This picture is pretty good. At 10 or under you can just possibly see a very faint blue color. Hold by the arrows when you dip. $75 plus shipping for a tube of 100. However once a month is usually more than often enough.

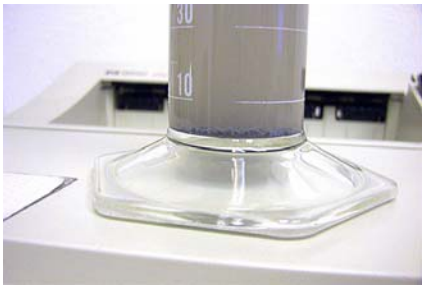
pH Test Strips

The indicators in colorpHast® strips give you sharp, clear color changes. It's easy to make accurate readings. All you have to do is match the color scale on the side of the colorpHast® package to the pH strip. $25.90 per box of 100

pH tells you whether your coolant is acid or caustic. Either one can promote bacteria growth and affect skin. You need to keep your coolant at the proper pH with water and additives.

Graduated Cylinder

Above is the top of the cylinder. You can see the oils and grease. These can clog wheels and dramatically cut wheel life. You can see the different oils and help identify leaks.



You can also use the graduated cylinder to detect suspended grit. How much grit and how fast it falls out tells you how much you have and how big the particles are.

Complete starter kit $559.30 save $21

Not only a pretty face but also great customer service

Here is Emily, who is always perky and always happy to help customers. Emily's job is to help people find carbide, silver solder, filter systems and everything else we sell. If we can't supply you but we know who can we will refer you. No matter what you want we will work really hard to find it. Sometimes people want 5,000 tips that we have on the shelf. Sometimes we work a couple hours to sell 250 tips.

Free Pens & Calendars

Emily is just certain she should give away my money and it will be good for business. Her latest purchase is pens and calendars. The pens are pretty good for lows cast pens and they are free to you. The calendars are about the size of ruler and go across the top of a monitor or a shelf really well. Emily 800 346-8274

All kinds of flux including our own Purified flux and Emily's Squeezy flux

Comet Grade Tips

They are a little more expensive and there is a wait to get them but, boy, are they selling.

Grade X for extended wear in man made materials – up to 5 times the life.
Grade M - an impact grade for nail cutting, frozen wood and similar.
Grade A – a metal alloy material - extremely good in aluminum, red oak and similar.

Do what everyone else does. Buy 500 to try, test them and then buy 5,000 to use.

Pins & fines

The Newsletter of the Southern Sawfilers' Education Association
Mike Pate 4300 HWY 365 S
Jefferson, AR 72079
Cell (870) 543-9917

Our Customers Say

Don Brady of Optibit, "Carbide Processors pretinning is lovely and good. Don't want to use any other source."
Greg Pero of All Trades Blades Services, "I really love the Purified Flux."

HOT ROD saw tip poker $12.95

Probably our simplest and yet one of our most popular inventions

Filter Systems Available Through Top Quality Distributors such as
Peerless Saw Co., Smith Sawmill Supply, Burton/Fitt Saw & Supply, Equipment Ltd., Jack Sigrist, Moon's and wherever you buy saw supplies

Braze alloy – top quality at very good prices
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www.therightcarbide.com
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