Carbide Processors, Inc.

Northwest Research Institute, Inc.

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The 'Ripped Shoulders' article - who is right?

In this issue we have a short version of the results of our research on ripped shoulders. It presents three different viewpoints. First is my viewpoint on brazing problems. The second viewpoint comes from several saw filers and it relates to how saws are used in saw mills. The third viewpoint comes from Steve Hartshorn of Peerless Saw Company and Steve talks about metal fatigue as saws get older.

If you ask me about ripped shoulders on saw blades I will talk about the brazing because that is what I know. This may or may not be the cause.

I put together a list of about 20 factors from saw filer comments. One or more of these factors may be right.

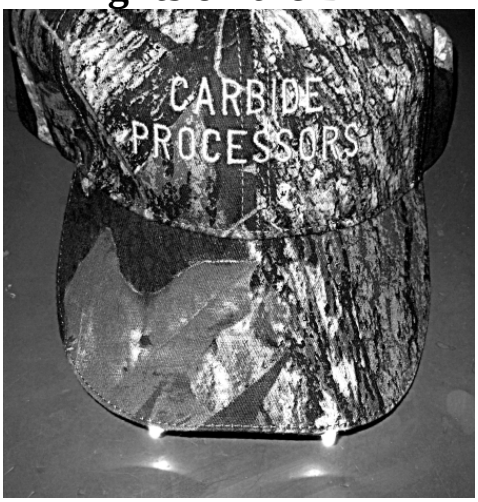
The metallurgy of saw steel does change as the saws get run. This may be the cause when combined with some of the operational factors the saw filers pointed out.

Right or wrong really depends on the circumstances. I would suggest using the article as a checklist to solve or prevent problems.

The Blind Men and the Elephant

Six blind men were asked to determine what an elephant looked like by feeling different parts of the elephant's body. The blind man who feels a leg says the elephant is like a pillar; the one who feels the tail says the elephant is like a rope; the one who feels the trunk says the elephant is like a tree branch; the one who feels the ear says the elephant is like a hand fan; the one who feels the belly says the elephant is like a wall; and the one who feels the tusk says the elephant is like a solid pipe.

Camo Caps with LED Lights on the Brim



Genuine "Mossy Oak" or "Real Tree" Camouflage. Officially licensed. We put our name on it in a low visibility, dull, non-reflective brown so it won't spook game. I thought these were a gimmick until I tried one. There is a simple, easy on/off switch under the brim. The light is bright enough to follow a trail. Do not stare at the lights. They are bright. $18.95 each or free with $250 order for tips, braze alloy and pretinning.

Super Tough saw tips

The toughest grade we have found anywhere and we think we have looked at them all. Available by special order.

Nail Cutting saw tips

Pallet and truss applications. Working with recycled materials.

Super C grade saw tips

High strength and high wear. An excellent Sawmill grade. Replaces C2 and C3

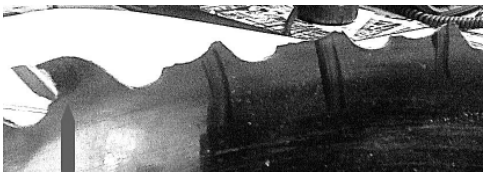
Cermet 2 saw tips

Excellent for long life in man made materials. Tougher and longer wearing than other tips for man made materials.

The Big Ripped Shoulders Article

Short version

This is a condensation of a seven-page document based on an e-mail discussion among filers and others. I will be happy to supply the full document upon request. I did quite a bit of editing and any mistakes are mine. Tom Walz, Carbide Processors 800 346 – 8274 president@carbideprocessors.com



There are two major parts to the ripped shoulder problem. First is the condition of the steel and second is the way the saw blade is used.

Condition of the Steel

If the steel is not brazed or brazed and tempered properly then it becomes brittle and the shoulder will snap off.

As saw steel is used repeatedly it becomes subject to metal fatigue. Metal fatigue increases with additional wear. As the metal becomes more fatigued the saw blade begins to lose its ability to cut straight. As the steel becomes more fatigued, the chances of having ripped shoulders increases.

The Way the Saw Blade Is Run

1. Vibration and timing are major factors. Vibration could be a sprung arbor. Not that the arbor may be bent but sprung from too tight a belt or possibly new bearings were installed.
2. A cog belt would be preferred to a v –belt.
3. Proper horse power can be a factor.

(Continued next page)

4. Tooth design is a factor and many people favor an odd number of teeth to dampen harmonic vibration.
5. All the bearings, rolls, clevises, shackles, etc must be in good condition.
6. But more then likely it is timing or clipping. Clipping is when a board is not clear through the edger and the next one is skewed into it. This is a common problem with high speed board edgers and no saw will hold teeth in.
7. It could be the timing is right and possibly, at the out-feed or picker fingers, a flitch or board hits the framework (or a worn spot) from too steep of an exit ramp and is rocketed back into the edger where it hits the piece being sawn and the one in front of that is clipped at the next skew.
8. Also, if the edger has a sharp chain, it may need to be replaced frequently and the hold down rolls may need to be adjusted down so the chain doesn't slip.
9. If you are cutting hemlock and kiln drying it you may be cutting it heavier to compensate for shrinkage which may help it from slipping on the sharp chain. (Hemlock is softer than Fir.)
10. If press rolls are not timed correctly you will shoot boards. The best thing you can do is devote time to watch boards go through. Watch them skew. Watch them at the out-feed and picker fingers. Bring your programmer and millwright.
11. Feed speed too high.
12. Annealing cycle on our Stellite© tipper
13. Board edger? They are tough on shoulders either way.
14. Feed problem like shooting cants / boards
15. Press roll sequencing / timing may not be bad enough to rip teeth out on hemlock but will do so on Fir.
16. Tooth bite. If he is on the edge he may be getting away with it on Hemlock but not on Fir. He may be over feeding for fir.....
17. What has changed recently? If nothing in the mill has changed I would look at something in the filing room.
18. Surge problems on the gang feed. We have seen them double stack 2 inch boards into the board edger.
19. It is usually an abuse problem or a mechanical issue.
20. Uncontrolled piece slippage will increase tooth bite dramatically for a split second and rip ears out.

Dick Bernier, Jeff Connie St Pierre, James Davis, Neal Davis, Bruce Maples, Burl Swigart, Mike West

Steve Hartshorn – Peerless Saw Co.

Variables that have an impact on the life of the steel are:
1. Sharpness of the tool – All the blades pulled out of service before or after they get dull?
2. Impact or force being applied to the body in its application.
3. Machine alignment.
4. Species of wood (or type of metal, plastic, etc) being cut.
5. How well was the carbide brazed? There are many subsets to this topic which include critical temperature of the steel & how well the steel was annealed.
6. Gullet capacity issues.
7. Proper hardening and tempering of the saw plate. In short, is the plate the proper hardness and does it have the proper martensitic structure?

Heat Tint on Saw Steel

Heat tint is damaging because it takes the Chromium out of the alloy in that location. If you try to remove it mechanically all that you do is hide it. Flux all areas that are going to get hot – not warm but hot

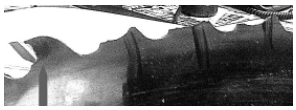
Tempilstik

It is a special wax crayon. You rub it on and the wax melts at a given temperature. We sell the 1400◦ F version. This is really as hot as you should get saw steel. $28.50 each

Buy one today – If you only use it once it is still a real bargain.

Automatic machinery

isn't completely automatic.
It Still Needs Some Maintenance



Shoulders are ripping off the saws in a sawmill. They are using an automatic brazer with an automatic annealer.

Over the years I have seen three problems with these machines.
1. The lens cover over the heat sensor becomes clouded due to flux fumes. As it gets cloudy it lets less light through so the sensor reads lower.
2. There is an induction coil and the induction coil is supposed to put the heat into the carbide saw tip. Often this coil will be moved or changed so that the bottom lines up with the saw tip and the top lines up with the saw plate. This can put too much heat into the saw plate. A simple solution to this is to spread the top part of the coil out so it is further away from the plate. It is generally pretty easy to gently bend the top of that coil out. If you bend it so that the top of the coil is about three times as far from the saw plate as it used to be then you have cut the amount of heat going into the plate 1/9 th.
3. The automatic annealer is set to restore the steel to the proper temper but it depends on the braze settings being correct. If the steel is overheated during brazing or welding then the dealer will still run the same cycle it always has. Because the steel is overheated the standard annealing cycle will not anneal enough and the saw steel will still be brittle.

Saw Failure

This came from an anonymous saw filer. His saws "failed" when they tried to cut an Alder log wrapped in barbed wire.

Super "C" Carbide Grade

Tougher than C1 - Better wear than C3

What Makes Super C Tips Truly Superior

1. Superior Abrasion Resistance - Abrasion or straight wear is countered by smaller, better grain size.
2 & 3. Superior Adhesion and Diffusion Resistance (corrosion and chemical attack) Super C grade of carbide has an extremely fine structure so there is very little binder presented to the material being cut. This, combined with the special metallurgical formulation the Super C binder (hint - it's not just plain Cobalt) creates an extremely wear and corrosion material for use in wood, plastic or non-ferrous metals.
4. Superior Fatigue Resistance

And People Really Like Them - Call Today To Try Them – Most Sizes Readily Available

Super C Hardness (HRA)	T.R.S. (psi)
92.2 – 92.4	530,000 +

Typical C2 values

	Hardness (HRA)	T.R.S. (psi)
C2	92.1	334,000
C2	91.8	334,000
C2	91.5	377,000
C2	90.4	435,000

Typical C Values

	Hardness	T.R.S. (psi)
C1	89 - 92.4	350,000 - 360,000
C2	91.2 - 92.9	250,000 - 400,000
C3	91.4 - 93.6	270,000 - 350,000
C4	89.6 – 93	260,000 - 450,000

Sawmill Grade Tips

* Transverse rupture strength well above 500,000 psi.
* Rockwell A hardness above 92
* Alloy binder for corrosion resistance
* Grain structure to inhibit both crack initiation and crack propagation
* Micro grain or mixed grain for superior wear

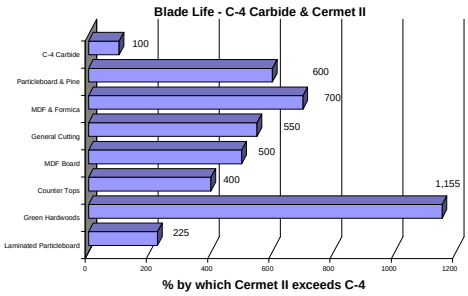
Carbide Processors, Inc.
800 346-8274

Cermet II® 8 days instead of 5 in MDF

Three weeks and three full loads of double side melamine laminate instead of 1 week and 1 load with carbide

1. 5 blades with standard C-4 carbide cutting 45 lb. single and double sided vinyl-laminated particle board
* Cermet II - 15,088 meters / old grade - 6706 meters for **225% as much run life**
2. KM-16 industrial saw cutting 101.6 mm x 152.4 mm (4" x 6") Green hardwoods, oak, hickory, maple and walnut using 11 blades with standard C-4 carbide
*Cermet II / 462 hrs / old grade - 40 hrs
1,155% as much run life
3. 406 mm (16") 100 teeth cutting countertops
* Cermet II - 4 weeks / old grade - 1 week (4 times) **400% as much run life**
4. 406 mm (16") 80 teeth cutting MDF Board
* Cermet II - 10 days / old grade - 2 days (5 times) **500% as much run life**
5. 305 mm (12") 100 teeth TCG Miter cutting oak, Compressed Fiber Board, Plastic
* Cermet II - 154 hrs / old grade - 28 hrs (5.5 times) **550% as much run life**
6. 305 mm (12") 60 teeth cutting MDF, High Pressure Laminate (Formica)
* Cermet II - 56 hrs / old grade - 8 hrs (7 times) **700% as much run life**
7. G 1060A on Chop Saw cutting Particle Board and Pine Dowel Rods
* Cermet II - 48 hrs / old grade - 8 hrs (6 times) **600% as much run life**

Use Cermet 2 instead of carbide and make your life much easier



Cermet II© Successes

1. Several times the life in a window and door plant.
2. 3 times the life in Corian.
3. 8 days instead of 5 in MDF and we have an even better grade coming.
4. Twice the life in beetle killed Lodge Pole pine.

Benefits You Get

* Grinds like regular carbide
* Gives a better edge than carbide
* Stays sharper longer than carbide
* Great increase in fracture toughness.
* More corrosion-resistant
* Better at high temperatures
* Cuts faster
* Cuts faster & longer yet is tougher
* Longer runs and less downtime.

Report from Marvin Windows

On the saw that we tried. How many times we resharpen a blade before we order new or have retipped we are not sure. Most blades get damaged by hitting something so we have the carbides retipped a lot. How often do regular blades have to be resharpened? We normally have our carbide tipped blades sharpened every week.

The new Cement II blade normally lasts twice as long before it gets damaged. The best so far is four weeks and one and a half million cuts before we changed it out which is four times longer.

Hope this helps and keep up the good work on those tips.
Nathan Hull, Grinderman
Marvin Wood Products

Carbide Processors, Inc.
3847 S. Union Ave.
Tacoma, WA 98409

An Irishman Goes To Confession
An Irishman goes into the confessional box after years of being away from the Church. He is amazed to find a fully equipped bar with Guinness on tap. On the other wall is a dazzling array of the finest cigars and chocolates in the world.
When the priest comes in, the Irishman excitedly begins..."Father, forgive me, for it's been a very long time since I've been to confession, but I must first admit that the confessional box is much more inviting than it used to be."

The priest replies "Get out. You're on my side."

Lisa Robin Kelly (Laurie Forman)

The 70's Show
Laurie was originally portrayed by Lisa Robin Kelly and later by Christina Moore. Kelly was fired from the show after three seasons due to drug and alcohol abuse. In 2010 Kelly got busted for DUI, leading to this mug shot.

Laura Prepon (Donna Pinciotti)
Prepon played the ultimate tomboy next door as Eric's neighbor and girlfriend, Donna.

Talking Dog for Sale
A guy is driving around the back woods of Montana and he sees a sign in front of a broken down shanty-style house: 'Talking Dog for Sale'

He rings the bell and the owner appears and tells him the dog is in the backyard.

The guy goes into the backyard and sees a nice looking Labrador retriever sitting there.

"You talk?" he asks.

"Yep," the Lab replies.

After the guy recovers from the shock of hearing a dog talk, he says "So, what's your story?"

The Lab looks up and says, "Well, I discovered that I could talk when I was pretty young. I wanted to help the government, so I told the CIA. In no time at all they had me jetting from country to country, sitting in rooms with spies and world leaders; because no one figured a dog would be eavesdropping. I was one of their most valuable spies for eight years running.

But the jetting around really tired me out, and I knew I wasn't getting any younger so I decided to settle down. I signed up for a job at the airport to do some undercover security, wandering near suspicious characters and listening in. I uncovered some incredible dealings and was awarded a batch of medals. I got married, had a mess of puppies, and now I'm just retired."

The guy is amazed.

He goes back in and asks the owner what he wants for the dog.

"Ten dollars," the guy says.

"Ten dollars?"

This dog is amazing! Why on earth are you selling him so cheap?"

"Because he's a liar. He's never been out of the yard."

Twins
My wife, who is blonde, came running up to me in the driveway the other day, just jumping for joy! I didn't know why she was jumping for joy but I thought, "What the heck", and I starting jumping up and down along with her.

When she said, "Honey, I have some really great news for you!"

I said, "Great. Tell me what you're so happy about."

She stopped jumping and was breathing heavily from all the jumping up and down, when she told me that she was pregnant!

I was ecstatic! We had been trying for a while, so I grabbed her and kissed her on the lips and told her, "That's great! I couldn't be happier!"

Then, she said "Oh, honey. There's more."

I asked, "What do you mean 'more'?"

She said, "Well, we are not having just one baby. We are going to have TWINS!"

Amazed at how she could know so soon after getting pregnant, I asked her how she knew. She said.....

"Well, that was the easy part. I went to Wal-Mart and they actually had a home pregnancy kit in a twin-pack.
Both tests came out positive!"

Mike West Sawmill Test
One of the questions from the career placement test given applicants for a sawmill job: "Rearrange the letters P N E S I to spell out an important part of the human body that is more useful when erect." Those who spell SPINE will become Teachers; the rest will be sawmill workers.

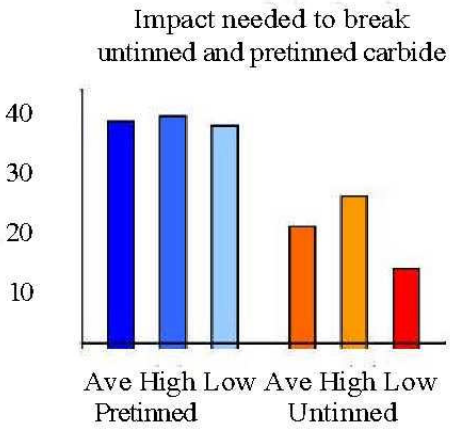
NW Research Institute, Inc. / Carbide Processors, Inc.
3847 S. Union Ave. Tacoma, WA. 98409
253 476-1338 tomwalz@email.msn.com

Why Carbide Processors Pretinned Tips Are The Best In The World

Carbide Processors tips stay on the saw better and are much harder to break than any other pretinned tips.

23 years and an awful lot of money in research have given us tools and techniques to do things no one else can. We routinely do things people say are impossible or that don't make any difference. However, when it is all said and done, **our pretinned carbide works better**.

Our Pretinning Stops Breakage



	Untinned	Pretinned
Average	17.63	33.13
High	22.11	34.17
Low	11.78	32.44

Carbide Processors Tips Are The Easiest To Grind

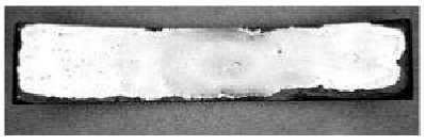
You grind faster with less wheel usage and less dressing. There is no braze alloy on the edges to clog diamond wheels. We also clean the tips so well that you can actually see a reflection in them.

Our Pretinning Stops Tip Loss

Very Good

Bad& disguised

Bad



If the silver solder doesn't stick to the saw tip then the saw tip won't stay on the saw. Our special tools and techniques let us give you much better performance. Above left is our part. The braze alloy is smooth and covers very well. This part will stay on. Above right is a part our competition did. The braze alloy (light color) is blotchy and and only covers a small part of the carbide. This part kept coming off.

Consistent Quality for Consistently Excellent Results

Alloy made to parts per million. (15 x better than AWS requires) We cut it within .001". Proprietary treatments to increase; wettability, cleanliness, etching, priming, bond strength, impact protection. The surface has a slightly rough, micropore finish for greater mechanical and chemical bonding. You can get a tensile as high as 100,000 psi. compared to 10,000 to 20,000 for others.

Flash Rust

Flash Rust is rust that happens really fast. Sometimes you can even watch it happen. One cause of flash rust on saw blades occurs in window plants. The application is cutting vinyl in a window plant. PVC is vinyl is Polyvinyl chloride. The out-gassing of chlorine forms salts and can cause flash rust.

Flash rust is caused by chlorides and other soluble salts (such as sulfates and nitrates,) located on the surface of steel. Phosphorus especially as iron phosphate can be a real problem. If these contaminants are present and water is added a bloom of flash rust quickly appears.

Soluble salts initiate and accelerate corrosion of steel, and become deeply embedded within the corrosion product. The salts stimulate corrosion through an osmotic action by pulling moisture from the air and through any protective coatings. It is in this form that they achieve their highest level of chemical stability.

All liquid coatings are permeable, thereby allowing the salt on a substrate to "pull" moisture through the coating, causing active corrosion of the substrate long before the protective coating fails. This is commonly seen on structures or objects with blistered paint, which when removed, rust is seen on the surface. In nearly all cases, the coating was applied over salts.

Also, when the moisture is combined with chlorides, a mild hydrochloric acid is often formed, causing degradation of the substrate.

Salts left on a surface prior to the application of protective coatings can be the cause of several occurrences.

Prevention of Flash Rust

To prevent flash rust, the soluble salt contaminants must be removed from the steel.

It is nearly impossible to totally remove all contaminants from surfaces; there are usually some very low levels of salt contaminants remaining after decontamination. There are chemical soluble salt removers that may be added to aid in the removal of soluble salts. They are typically a liquid, organic, non-hazardous and biodegradable and are designed to solubilize both chlorides and sulfates. The soluble salt remover must come in contact with salt ions in order to solubilize them, therefore, any barrier, such as rust, must be removed.

To protect against flash rusting, a small amount of fluid concentrate (0.5% to 1.0%) should be added to the rinse water. This is done to prevent any flash rust.

This gentleman is an expert on flash rust and his company makes chemicals to prevent it.

James Ueberfluss
Applications Research Chemist
WPC Technologies, Inc.
Milwaukee, WI 53204
Tell: 414-225-2400
E-mail: jueberfluss@wpctech.com

Copper Wire Discovered

After having dug to a depth of 10 feet last year outside of New York City, New York scientists found traces of copper cable dating back 100 years. They came to the conclusion that their ancestors already had a telephone network more than 100 years ago.

Not to be outdone by the New Yorkers, in the weeks that followed, a Los Angeles, California archaeologist dug to a depth of 20 feet somewhere just outside Oceanside. Shortly after, a story in the LA Times read:

"California archaeologists report a finding of 200 year old copper cable; have concluded that their ancestors already had an advanced high-tech communications network a hundred years earlier than the New Yorkers."

One week later, a local newspaper in Canton, MO reported the following: "After digging down about 30 feet deep in his pasture near the community of Pilot Knob, Bubba, a self-taught archaeologist, reported that he found absolutely nothing. Bubba has therefore concluded that 300 years ago, Missouri had already gone wireless".

Just makes a person proud to be from Missouri.

Three contractors are bidding to fix a broken fence at a government owned house

One is from Vancouver, another is from Toronto and the third, is from St. John's, NFLD. All three go with a Government official to examine the fence.

The Vancouver contractor takes out a tape measure and does some measuring, then works some figures with a pencil. "Well," he says, "I figure the job will run about $900: $400 for materials, $400 for my crew and $100 profit for me."

The Toronto contractor also does some measuring and figuring, then says, "I can do this job for $700: $300 for materials, $300 for my crew and $100 profit for me.

"The NFLD contractor doesn't measure or figure, but leans over to the government official and whispers, "$2,700."

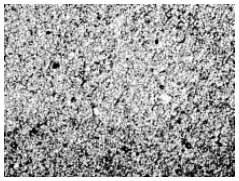
The official, incredulous, says, "You didn't even measure like the other guys! How did you come up with such a high figure?" The NFLD contractor whispers back, "$1,000 for me, $1,000 for you, and we hire the guy from Toronto to fix the fence."

"Done!" replies the government official.

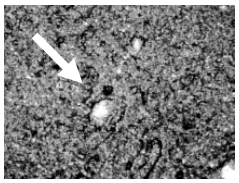
Purified Flux

30% To 100% Better Braze Joints
(50x magnification)

Purified flux
Smooth &
consistent



Standard flux
Large grains of
foreign material



You can see and feel the difference immediately.

Purified flux is black flux that has had extra processing steps. These processing steps take the black article out and leave the flux a rich, creamy brown color. If you take a little of each flux and rub it between your fingers you can feel that Purified Flux is not only smoother but the particles are smaller and there are no extra large particles.

Flux is made to prevent oxygen from getting to the parts as they are heated. Steel and especially tungsten carbide oxidize at room temperature. The hotter they get the more they oxidize. Above 1,000 F tungsten carbide oxidizes extremely rapidly and forms an unbrazeable surface. Purified flux is good for more time at higher temperatures, up to 1,700 F.

The original idea with flux was that it was to be applied on top of the braze area. However the critical part of saw and tool brazing is what goes on inside the braze joint. Ordinary flux is inexpensively made and has up to 10% odd size particles and non-active minerals in it. These odd size particles and non-active minerals get lodged in the braze area and can seriously effect the strength of the braze joint.

Purified flux is cleaner, smoother, creamier and much more effective.

5 # jars
Case (6 jars @ 5#) $ 498.75
Single jar $ 87.50

Flux - Black 1 lb. jar	13.00
Flux - Black 1 lb. jar - Case of 24	296.4
Flux - Black 5 lb. tub	54.00
Flux - Black 5 lb. tub - Case of 6	307.8
Flux - Black 30 lb. Pail	299.39
Flux - Purified Black 1 pound jar	21.00
Flux - Purified Black 1 lb. jar - Case of 24	478.8
Flux - Purified Black 5 lb. tub	87.50
Flux - Purified Black 5 lb. tub - Case of 6	498.75
Flux - White 1 lb. Jar	10.50
Flux - White 1 lb. jar - Case of 24	239.4
Flux - White 5 lb. tub	50.00
Flux - White 5 lb. tub - Case of 6	285
Flux - Squeezy Bottle (Refillable)	9.00

Braze Alloys (Silver Solders)

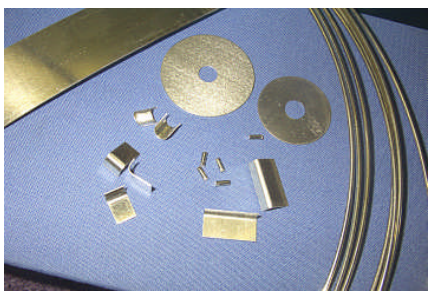
The right braze alloy can make a huge difference in performance

Braze Alloy Impact & Bond Strength Tests	
High Impact	**100%**
S50N - 50% Silver with Cadmium	100%
A50N - 50% Silver - Cadmium free	75%
A56T - 56% Silver with Tin	0%
S50N - 50% Silver with Cadmium	100%
A50N - 50% Silver - Cadmium free	64%
A50N with copper spheres added	67%

Stop tip Loss - Prevent Carbide Breakage

Saw tips are brazed onto a steel saw using braze alloy. When a tungsten carbide saw tip breaks it is usually bad carbide, the wrong grade of carbide, the wrong braze alloy or a combination of these.

The brazing process forms a three part composite. The success of the composite depends on the tungsten carbide, the steel, the braze alloy and the way it is all put together. The braze alloy has to do three things. l. It has to keep the tip on the saw. 2. It has to cushion the tip because the tip suffers a lot of impact stress when the saw cuts. 3. It has to compensate for the difference in expansion between steel and tungsten carbide as they are heated and cooled during brazing.



We sell braze alloys (also called silver solders, high temperature silver solders, or braze filler metals.)

We supply the finest information in the world on the selection and use of braze alloys for carbide brazing.

The Finest, Most Consistent Braze Alloys for Tungsten Carbide

- 26 Different braze Alloys
- All AWS approved
- All inspected to parts per million
- All alloys exceed AWS specifications
- Cadmium free
- With Cadmium
- Hi Impact – developed for Weyerhaeuser
- Ultra Hi Strength – High Temp.
- Low Silver – Very High Strength
- Low Temp. with high strength
- Wire – all diameters
- Ribbon - all sizes
- Sandwich alloy ribbon
- Brazing preforms

Why Quality Makes a Difference

(American Welding Society AWS 5.8) Braze alloy can be within AWS specifications but it can vary in brazing temperature by as much as twenty degrees. This means that you can have cold joints and tip one end or zinc loss and more broken tungsten carbide tips at the other end.

Our braze alloy is accurate and measured within parts per million. It is typically four times better than it has to be or more according to government certified analysis. It brazes the same way every time.

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The Big Ripped Shoulders Article

Causes and Prevention
Twenty Things to Look For

100% Satisfaction Guarantee

Best Guarantee Anywhere

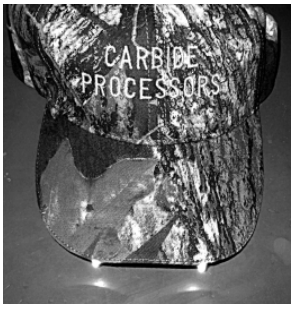
If you are not happy with anything from us we will take it back and give you a full refund. Even if you just ordered the wrong size.

Scrap

15-Mar-12

Clean 9.00 (Carbide inserts, end mills, drills, dies, wear parts, etc.)
Dirty 7.50 (Has silver braze on it)
Carbide Grinding sludge - depends on analysis

Camo Caps with Lights



$18.95 or maybe free

We Sell Flux That Meets the new Standards

White, Black and Purified Black

Really good prices on Braze Alloy (Silver Solder) – probably low $30's per tr. oz.

(Silver Solder) Braze Alloy in Small Quantities at Good Prices – Save $2/ tr. Oz if you buy 10 tr. Oz. (Unless silver goes crazy again) 800 346-8274

Want $1,000.00 or more?

We Buy:
1. Carbide Scrap
2. Grinding Sludge - any kind of coolant, from Carbide or Stellite® grinding.
3. Old Carbide inventory

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It is a special wax crayon. You rub it on and the wax melts at a given temperature. We sell the 1400◦ F version. This is really as hot as you should get saw steel. $28.50 each