Blades, Cutting Fluids and Machine Issues

BLADES

What kinds of band saw blades are available?
Toothed blades are most widely used, but there are other types. Knife edge blades slit soft, low density materials with little or no mess. Grit edge blades cut very hard, brittle, or abrasive materials.

How do I choose between Carbon Steel, Bi-Metal, and Tungsten Carbide blades?
- Carbon steel blades are usually the best choice for sawing wood, plastic, aluminum, and similar easy-to-cut materials.
- Bi-Metal blades have the best balance of heat resistance, wear resistance, and chip resistance to productively saw most steels and other metals.
- Tungsten Carbide blades provide superior heat and wear resistance for sawing extremely tough metals or very abrasive metals and non-metals.

What exactly is a Bi-Metal blade?
These blades begin as a bi-metal strip produced by electron- or laser-beam welding a narrow strip of high speed steel to a wider strip of alloy steel. Teeth are cut into the high speed steel edge. The resulting blade has highly heat and wear resistant teeth and a tough, durable backing.

Why are there so many different Bi-Metal blades?
DoALL Bi-Metal blades include three different high speed steel edge materials and six different tooth forms. Each style was designed for a specific application.

What blade pitch should I use?
In most cases, the blade should engage somewhere between six and 24 teeth in the work. Engaging fewer than three teeth can cause tooth shock and stripping. Engaging too many teeth reduces cutting rates and may lead to tooth stripping due to overfilled gullets. The DoALL blade catalog includes a pitch selector. To request a catalog, call (888)362-5572 x 12009.

How and why do I break in a saw blade?
Breaking in a new band saw blade hones and strengthens ultra-sharp cutting edges and significantly increases band life.
To break in a bi-metal saw blade, run at the recommended band speed, but reduce the normal cutting rate by about half. (Make sure the band keeps pulling chips. If necessary, increase the feed force until the band does pull chips.) Cut at this reduced rate for about 20 minutes, and then increase the feed force in steps until you attain the normal cutting rate.
To break in a carbide blade, reduce both the band speed and cutting rate by 50% and begin sawing. Increase the band speed and feed force in small steps, but never allow the band to squeal or shriek.
I keep stripping teeth in my saw blade. Why?

Check the blade pitch. If the blade engages fewer than six teeth, those teeth are subject to overloading and stripping, especially under heavy feed force. If the blade engages more than 24 teeth, the chips formed may pack the relatively small gullets and strip teeth. Any chips drawn back into the cut contribute to gullet packing and stripping. Cutting fluid must prevent chip welding, and the chip brush must clean the gullets as the blade exits the cut.

A workpiece that spins or moves in the saw vise will destroy a blade abruptly.
**CUTTING FLUIDS**

**How important is coolant in band sawing?**

The term coolant implies that drawing off heat is its only purpose. Cutting fluid is a more precise term. Sawing brings the work and saw teeth together under heat and pressure, and that can weld the two. Components of cutting fluids include additives that prevent chip welding, lubricants that reduce the amount of heat generated, and water that draws away much of the heat that is generated. Use a good, heavy-duty cutting fluid. Get a refractometer to check and maintain the fluid mix ratio according to the manufacturer’s recommendation.

**What’s the right way to replace lost cutting fluid?**

Keep in mind that you are replacing straight mix lost to spilling as well as water lost to evaporation. The mix you add will be less concentrated than the original, generally by about half. Use a refractometer to guide you in mixing the make-up fluid and to confirm the end result.

**Can one metal working fluid be used on top of another metal working fluid?**

We strongly recommend performing a “clean and dump” prior to using new coolant over existing coolant. However, if the customer does not want to do this, then the following questions and answers need to be taken into consideration before dumping new coolant over existing coolant:

- Does the customer have poor coolant housekeeping habits?
- Do you detect an odor from the sump?
- Is there significant tramp oil?

If you answered yes to these questions then a clean and dump needs to be performed. Otherwise, the new coolant will not perform properly.

**NOTE:** Dumping new product over existing product has to be in the same category. You can only do this if you are going from a synthetic to a synthetic; semi-synthetic to a semi-synthetic; or soluble oil to a soluble oil.

**How do you control bacteria and mold?**

The best way to control bacteria and mold is to consistently maintain your systems. This is done by monitoring the concentration at least a minimum of twice weekly. Skim off the tramp oil and make sure the fluid is aerated throughout the system. If this is not done it is best for the end user to resort to a biocide or fungicide depending on the type of biological growth present.

**What causes dermatitis when using metalworking fluids?**

Ninety-five percent of dermatitis cases are the result of elevated coolant concentration. High concentrations have a higher alkalinity level; therefore causing irritation on skin that comes
in contact with the fluid. Dermatitis can also be caused by bacteria in a sump. It is for these reasons that it is important to stress good maintenance practices.

What causes mix instability in soluble oils?
Mix instability can occur when the operator adds the water to the coolant instead of adding the coolant to the water. In soluble oils this causes an invert emulsion that can interfere with the coolant working properly for your application.

What is a refractometer?
A refractometer is a hand held instrument that measures how light is refracted through a liquid. This reading is then converted to the concentration of the metalworking fluid within the sump. It is important to check the concentration levels, as low refractometer readings mean you lean your alkalinity reserve causing rusting that will encourage bacteria.

What causes foam?
Foam can be caused by soft water, high-pressure machining, soaps or contaminants within the system.

What causes corrosion?
Corrosion is caused when the concentration of the metalworking fluid is too weak or too lean. Contamination levels and plant environment (humidity) can also cause corrosion. Corrosion can also happen when parts are handled improperly. As soon as corrosion is noticed, intervention is necessary to determine the cause and proper corrective action.

Can I use bleach to clean my sump?
We strongly recommend using DoKleen 3004 to clean the sump. Bleach combines with the calcium and magnesium in water leaving behind salt, which is corrosive and exacerbates rust.
SAWING MACHINES

Why are stainless steels such a problem to cut?
Stainless steels may work harden if not machined aggressively. Teeth that rub without cutting can create heat and harden the surface enough to make it impenetrable. Excessive band speed, dull teeth, a blade with too many teeth per inch, and light feed force are among the most common contributors to work hardening.

Why do chips pile up where the band enters the work?
The band carried those chips out of the work and past a worn, misadjusted, or missing chip brush. Chips that make it past the pile re-enter the work and clog up the tooth gullets, frequently causing tooth stripping.
Adjust the brush to wipe through—but not above—the blade gullets.

What is the best band tension setting to use?
Follow the machine manufacturer’s instructions. Band tension stretches the band and keeps it cutting straight despite feed force deflection, but overtensioning causes problems: bands fatigue and break prematurely; band wheels and bearings fail under excessive load, and precise saw head alignments change.
Band saw technicians carry a tensigage (extensometer) to measure band tension. If you suspect your machine is out of calibration and want to schedule service, call (888)362-5572 x 61309.

Why does my machine cut out of square?
There are many possible causes. The cure depends on the nature of the problem.
If the saw cuts out-of-square from top to bottom, make sure the saw is level and secure, the loading and discharge conveyors are in the same plane as the vise bed, and that the saw guide inserts, backup bearings, and thumbscrews are in good condition.
If the saw is cutting out of square from side to side, make sure the band wheel and wheel bearings are in good condition. Check whether the saw head is square to the fixed vise, and inspect the head pivot for wear.
If the saw cut is dished, the cause is usually inadequate band tension or excessive feed force. The feed control system may be out of calibration, or perhaps the operator is simply applying too much feed force to a dull blade.
If the problem persists, call SAM at (888)362-5572 x 12024

The back edges of my used blades have a burr. What causes this?
The band may be tracking heavily against the wheel flanges or saw guide backup bearings due to a misalignment. This can be caused by worn wheel surfaces, wheel bearings, wheel shafts, backup bearings, or backup bearing pivot bolts. If you can’t trace the problem to any of these sources, call for service at (888)362-5572 x 61309.

Should I turn off the electrical disconnect when I leave at night?
Yes. It’s better to be safe than sorry. Overnight power surges can destroy invertors and other components. DoALL CPU and pushbutton stations have battery backup to retain memory.

**Does it hurt my saw to leave the saw head up at night?**

DoALL recommends lowering the saw head at night to relieve pressure on the head lift cylinder seals and packings.

**How close should I put my saw guide arm to the work?**

Set the saw guide arms as close to the material as possible. Leave just enough clearance for the vises to open. This minimizes band camber deflection under feed force, and that ensures straight cuts. A small excess in the guide arm spacing has a major effect on blade deflection.

**My DoALL saw has a servo valve on it. What does it do?**

The sawing servo is a hydraulic device that senses and maintains feed force by controlling the travel rate of the saw head. As a result, the saw head travels faster in narrow sections and slower in wider sections. A balance valve performs the same function in newer saws.

**How do I know what model of saw I have?**

Your saw’s model number, serial number, electrical data, schematic numbers, belt numbers and band length are stamped on an escutcheon plate attached somewhere on the machine. This red plate is roughly six inches square. Used machinery dealers commonly remove the escutcheon.

**The rubber tires on my upright saw are imbedded with saw chips. What should I do?**

Nothing. The chips actually improve traction, especially when coolants are applied. When you adjust the wheel brush, clear the tire by about 0.005 inch.

**Does it matter what type of hydraulic oil I put in my saw?**

Yes. Consult your machine manual for the recommended oil. Oil with the wrong aniline point can destroy seals and create oil leaks. An oil of the wrong viscosity can cause a pressure drop, overheating, leakage, and even cavitation, which can destroy the pump.

**My saw starts vibrating when cutting. What can I do?**

Harmonic vibrations can arise at particular combinations of band speed and tooth spacing. Modern variable pitch blades all but eliminate harmonic vibrations, but in some cases you may need to change the band speed slightly.

High pitched vibrations occur when the blade alternates between penetrating the work and skidding across it. To ensure consistent penetration, you can slow the band speed, increase the feed force, replace a dull blade, and select a blade pitch that engages between 6 and 24 teeth.
Low pitched shuddering or bouncing result from overfeeding. The saw needs some combination of faster band speed and lighter feed force. Make sure the blade engages more than six teeth.

Machine sources of vibration include worn or improperly adjusted saw guide inserts, worn band wheel bearings, shafts, backup bearings, or insert adjusting screws. Low band tension or inadequate band preload may contribute.

**My saw starts but wouldn’t stay on. What’s wrong?**

Saws are designed to shut off under conditions such as a broken or stalled band, an open wheel door, an expired piece counter, or out-of-stock. Any one of those conditions will interrupt the electrical holding circuit and cause the symptom you describe until you rectify the condition.

**Why do my blades break before the teeth wear out?**

The most likely causes are excessive band tension or saw head misalignment. If the saw guide inserts and backups are in good condition, schedule a service call at (888)362-5572 x 61309.

**What do the terms feed force, feed rate and cutting rate mean?**

- Feed force is the force exerted on a saw blade to cause it to penetrate the work material.
- Feed rate is the resulting lineal speed at which the blade penetrates the material.
- Cutting rate is the area of the cross section the blade cuts in one minute.

**Should I cut my rectangular pieces standing up or laying down?**

In general, the saw cuts more accurately when the guide arms are closer together, so normally you would saw the piece standing up. However, other considerations, including safety, may dictate that you lay the work down and cut it across the wider dimension. In either case, your blade should engage between 6 and 24 teeth.

**My upright saw slips out of gear when I feed heavily. Any ideas why?**

The transmission linkage may be incorrectly adjusted or worn. A woodruff key or roll pin may be broken. Worn bearings inside the transmission can misalign the input and output shafts, but you won’t know without removing and disassembling the transmission.

**When do I need to replace my saw guide inserts?**

If your cut-off saw is cutting crooked, and you suspect the saw guides, remove the inserts and inspect them for obvious damage. For each pair of inserts, invert one of them and press the pair together with the carbide surfaces in contact. If you can feel or hear them rocking, they are worn. If either pair is worn, replace both pairs. To order parts, have your machine model and serial number handy, and then call (888)362-5572 x 12020.
The head on my saw bounces when it reaches the head up position. It didn’t do this before.

This can occur when the seals wear out and hydraulic oil leaks out of the cylinder. The air causes the bounce as it is compressed under the weight of the saw head. Hydraulic oil needs to be added to the system. Check your saw adjustment summary for the proper procedures.

How can I replace lost machine manuals?

The manuals for many DoALL machines are available free from the DoALL Sawing Products website. If you don’t find your machine listed, you can order manuals, schematics, and other documentation from (888)362-5572 x 12020. Have your machine model and serial number handy.