

The ultimate primer on single head wide belt sanding

I will attempt to keep this as short as possible, but there is a lot to learn to really make these machines shine. I am not going to go into trouble shooting the entire machine. Just solid processes for the best quality result possible. For the purposes of this article I am going to assume your single head machine has a combi-head, which is a drum/platen combination in the same head. This is the most common machine in this category. If you just have a single drum the rules all still apply.

Rules for single head machine sanding

1. Know what you want to achieve.

For most cabinet and furniture shops, you need to sand parts flat, but you also need them to accept stain. This means you need to fracture and tear open the wood with your rougher belts and sand to a very fine scratch pattern with your finer belts, leaving the parts open to accept stain. If you are doing cross grain you want the sharpest, softest scratch possible, so it will melt away in seconds with your hand sander, instead of taking minutes per door to grind the surface scratches away. You want the least amount of heat and compression of the wood fibers possible.

2. Know your sander is working right.

I won't go into setting up hold down rollers and such, but there is a very easy way to check the level of your machine and get it right. I use two boards a few feet long. I prefer maple around 1.5" to 3" wide and $\frac{3}{4}$ " thick. I will look closely for warp and set them on a table with the warp in the middle of the part up. I use a coarser belt and just my drum to take a light sanding pass on the boards run through the machine together in the center of the machine somewhere, just enough to hit both parts and true up the surface a bit. I then mark one part for left and the other right. Flip them over and take another .010" off, but run them on their perspective sides about 2" off the edge of the conveyor.

Measure only in the center of the boards as this will be the only truly accurate spot due to the warpage. If it matches, your machine is accurate. If not, almost every machine has a way to level the head to get the machine absolutely dead on side to side. Most have that adjustment on the block you remove to change belts.

3. Multiple passes

It will most likely take more than one pass to level out a part and give you the scratch you desire. I could write a book about this part of the process. Running multiple passes on the same grit is a very bad idea. If you use a 150 grit belt to remove a 100 grit scratch, you have to remove .005" to get to the bottom of the valleys in the original scratch. 50% of what you just sanded away was air. The rest was the little mountains of the scratch pattern. This is no problem.

If you sand with a 150 grit, you leave a scratch that only requires about .002" of stock removal to touch the bottom of those valleys. If you then take another .005" pass, you remove that .002" scratch pattern and .003" of solid wood under that pattern. This means you removed 100% to 150% more actual wood from the surface, than if you followed a 100 grit belt, and only removed the scratch pattern alone.

The issue is heat and pressure. The more of both the less consistency in your stain and the greater amount of hand sanding will be required to grind off that closed surface. You are better off taking 2 or 3 passes with the right removal rates than forcing one belt to do it alone. You will see huge advantages to doing it right at the sanding table and in finishing.

How do we do this right? There is a maximum for each grit when it comes to stock removal. This is well known. What is not well known is that there is a minimum to remove a scratch and that is the really important number. This is not the actual depth of scratch, but the amount that must be removed from the top of the mountain to touch the bottom of the valleys without going further into solid material.

Grit	Maximum	Minimum to remove
60	.035"	.015"
80	.024"	.008"
100	.017"	.005"
120	.010"	.004"
150	.006"	.002"
180	.004"	.001"

4. Drums are for cutting and platens are for the finishing pass only.

A properly set up platen will be just barely lower than the drum it follows. I like to set it up by sanding a part with just the drum head. Then I will stop the machine and run the part back under the head without moving anything. I then drop the platen as I either roll the belt on the head or push the belt side to side with the tension roller released. Once you feel drag on the belt you have your platen set.

This relationship means the platen will never be the primary cutting tool, but will only leave the final scratch pattern. Because this relationship takes effort to master, I don't like to change the adjustment for the platen when I am not using it. I just remove the platen altogether while I am running just the drum. Some machines have the ability to turn the platen off, but it is only on bladder platen machines or machines set up for veneer. In most machines you can just pull it out quickly and easily.

5. Know your stock removal.

If you use an 80 grit to knock down the surface of a cabinet door (my personal favorite starting grit), make sure all the doors go through the same height setting so they are all the same thickness. This is important to the next step. If you refer to the chart above, you need to remove .008" off the tops of the mountain peaks to touch the valley floor below without removing more solid material. If you put in a 100 or 120 grit belt, all you need to remove is .008" and no more. I would choose 120 grit.

Run your first part on the 120 grit and measure the stock removal. Once you took off .008", run the whole load on the back side. Then drop the machine .008" more and run the whole load on the face. This is very light work for the machine so you can run the feed speed pretty fast. 25 to 30 fpm is usually no problem.

Once your whole load is at 120 grit and the same size, put your platen back in and put the 150 or 180 grit belt in. Don't move the height of the machine. Run your first part and see how much comes off. If you look at our chart above, you need to remove about .004" to get rid of the 120 grit. Adjust if necessary, and run the load on the back, then drop the machine .004" and run the faces.

Faster feed speed is your friend for keeping the parts and belts cool. This is easy work for a sanding machine. 25 to 30 fpm is no problem.

6. Understanding your scratch pattern

Your parts may look rougher than you are used to, but this where the magic happens with your hand sander. That scratch will be all long scratch, very shallow scratch. The fact that it looks sharp is because the wood has no polish on it at all. That is the softest scratch pattern you will ever try to sand. It melts away under your random orbital sander. I usually follow with either a 150 or 180 grit disk.

Only sand until the scratches are gone. The point at which the scratches are gone and the surface is level is the point at which the sander will start to dig into the now flat surface and try to peel up new wood. This is where orbital marks come from. If you stop sanding at the moment the scratches are gone you will see almost no orbital marks at all.

7. Two pass process

If you only have a small amount of stock removal you might be able to get away with a two pass process, but this is where most operators lie to themselves. If you measure the stile or rail of your product and only sand off .010", a 120 grit will handle that okay. The problem lies in the joints that may be .010" to .030" thicker than the rest of the door. You can pretend you are only taking off .010", but you aren't fooling the sanding belts or the hand sanders who have to fix your damaged, compressed wood.

On planed solid wood it is easy to just remove .005" or .010" of material. This is when it is acceptable to just do a single pass or double pass. You can keep the sander moving quickly so you don't need to take much time doing it. Use the platen for your final pass for anything where hand sanding is required or going right into stain. Most of the time, when good finish is required, multiple passes are better than one.

I hope this article helps you better understand the capabilities of your single head machine. Using these techniques will yield results that can match any machine out there for quality of result. Patience is required, but this is not meant to be a slow process. You can run stacks of material very quickly using this process. You just need to understand the steps to get through it quickly without fighting the final product. You will soon forget what a burned up belt looks like and your abrasive life will skyrocket.

Adam West