## Just How Loud Is That BT3000? By Jim Frye

A lot of times you see people extolling the sound virtues of the induction motor and in the same breath stating that the universal motor is too loud. You almost always see this in relation to the BT3000 (BT3K), which has a universal motor. It's funny that you don't hear people complain that their router or circular saw is too loud, but then no one makes a router or circular saw with an induction motor. You probably couldn't lift one if they did. Only once have I seen, in print, any comparison of the BT3K's noise level with other table saws. A couple of years ago, Fine Woodworking Magazine (FWW), did a comparison test of the contractor type saws on the market, including the BT3K. The noise levels for the contractor saws ranged from a low of 80 decibels to a high of 90 decibels. The BT3K tested at 93 decibels. By comparison, my QSP industrial ShopVac measures 93 decibels when it is connected to the BT3K. The nosiest contractor saw was the Grizzly G1022 at 90 decibels. So, a stock BT3K is 3 decibels noisier than the saw that is usually touted as being a better buy than the BT3K. By the way, it is a bit difficult to discern a 3 decibel difference with the human ear.

The U. S. Department of Labor has published regulations concerning noise in the workplace and a review of the numbers should help the reader understand noise measurements. Because the human ear can hear a vast range of sound levels, the Decibel Scale was created to make it easier to classify sound levels. The scale is logirithimetric so 90 dB is 10 times louder than 80 dB. The decibel scale starts at 0 which is considered to be the Threshold of Hearing and 130 is considered to be the Threshold of Pain. The Other levels of relevance here are:

65 = Norma	l conversation
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- 75 = Average factory
- 80 = Loud music
- 90 = Beginning of unsafe levels
- 110 = Amplified rock music
- 120 = Jet airplane taking off
- 150 = Immediate hearing loss

The recommended exposure times to various noise levels has also been published. Decibel Level Maximum Time per Day

90	8 hours
92	6 hours
95	4 hours
97	3 hours
100	2 hours
102	1 1/2 hours
105	1 hour
110	30 minutes
115	Less than 30 minutes

I measured most of the power tools in my shop that see frequent use. I was somewhat surprised at the noise levels they generated. These measurements were taken with the meter in approximate position of the operator's ear when operating the particular machine.

Delta 6" bench top jointer, 6,000 rpm	86 dB
Delta 6" bench top jointer, 11,000 rpm	96 dB
Dremel 10" bench top band saw, 970 sfpm	68 dB
Dremel 10" bench top band saw, 2,900 sfpm	86 dB
Delta 12" bench top drill press, 620 rpm	71 dB
Delta 12" bench top drill press, 3,100 rpm	74 dB
Shop Vac QSP industrial vac	93 dB
Bosch 2 hp router, 8,000 rpm	70 dB
Bosch 2 hp router, 25,000 rpm	102 dB
Ryobi 3 hp plunge router, 10,000 rpm	92 dB
Ryobi 3 hp plunge router, 28,000 rpm	103 dB
Makita 1/2" corded drill	102 dB
Bosch random orbit sander, setting 1	87 dB
Bosch random orbit sander, setting 6	98 dB
Black & Decker jig saw	97 dB
DeWalt biscuit joiner	106 dB
Black & Decker 1/4 sheet sander	102 dB
Black & Decker 7 1/4" circular saw	109 dB

It is apparent that how the motor is installed in the tool has as much to do with the noise levels the tool generates as the type of motor does. The Dremel band saw with it's induction motor is just as loud as the Delta jointer with it's universal motor.

As an additional comparison, I measured a PowerMatic model 66 table saw. These saws are considered to be the best 10" table saw in the business and I thought it would be interesting to compare it with my BT3000. I have a relative who has a PM66 and his workshop is nearly identical to mine. Both shops are in the basement with open joists above. Both shops have two concrete walls and two wood stud walls. Both shops are 12' x 12' in size. Both saws sit on rubber wheeled stands. I measured both table saws running in the middle of the shop floor with the meter at my ear level standing in front of the saw. The PM66 measured 86 dB and the BT3K measured 87 dB!

The obvious point here is that it is extremely important that you use proper hearing protection when working with power tools in your shop. I have a set of ear muffs that are rated at 29 dB reduction. These muffs will make even my worst noisemaker quiet enough to fall below the federal exposure guidelines.

I have been working on several noise and dust collection projects for the BT3K over the years and they have reduced the noise level of my BT3K to put it in the same noise range as the contractor saws. The modifications I made to my saw were rather simple and inexpensive. They are as follows:

- The interior of the saw cabinet was covered with 1/4" thick by 2" diameter disks of clear silicone sealer to quell noise from vibration. Cost \$5.00.
  Other BT3K users have lined the saw cabinet with sound deadening foam to reduce interior noise of the BT3K.
- 2. The bottom of the saw cabinet was closed off with a dust collection pan to keep stray sawdust out of the area inside of the stand. Cost \$4.00 for the hot melt glue sticks used to glue the corrugated cardboard parts of the pan together and a can of silver spray paint.
- 3. The triangular openings at the top front and rear of the cabinet were closed off with duct tape, but scrap wood would work just as well. Cost \$0.00.
- 4. The vent slots at the left side of the cabinet were closed off with duct tape also. Cost \$0.00.
- 5. The rear dust port opening in the cabinet was closed off with an articulated cover. Cost \$2.00 for a piece of 1/4" plywood.
- 6. The stand was modified to sit on three rubber tired casters. I used two Ryobi BT3K casters at one end and a swiveling, locking castor at the other end. Cost \$25.00.

This leaves only the motor vent slots on the right side of the cabinet open, along with the tilt/elevation hand wheel slot on the front and the blade slot in the throat plate for noise to escape from the cabinet. Total cost for noise reduction on my BT3K was \$36.00. I am in the process of enclosing the metal saw stand with a cabinet made from 3/4" plywood. The mass and sound deading characteristics of this enclosed cabinet should reduce the noise level of my saw even further.