

Safety Tips

All about Respirators and Dust Masks

The problem

Experienced woodworkers know full well that airborne dust can cause respiratory problems. If you've done much woodworking, you've probably experienced some of these problems at one time or another.

Depending on the woods you've worked with (and how long you've been in the shop), these problems could have ranged from a little sneezing now and then – to flu or pneumonia-like symptoms, headaches or conjunctivitis that resulted in a need for serious medical attention.

Of the domestics, walnut, Western red cedar, chestnut, oak, redwood, hemlock, birch, sassafras and willow are among the most common. In addition, exotics such as cocobolo, ebony, satinwood, rosewoods, wenge and mahogany are also known to cause respiratory distress. However, extended exposure to virtually ANY wood dust will eventually lead to problems.

So, how do you protect yourself?

First, capture as much of the dust as possible at its source by using adequate dust collection. Shopsmith's DC-3300 Dust Collector can be attached to virtually every tool set-up and will go a long way toward eliminating most of the dust you create before it becomes airborne.

Next, never work in an enclosed shop without adequate ventilation. Open some windows. Install powerful window fans to carry away airborne dust. Clean up after yourself to eliminate coatings of dust that can accumulate and be re-circulated again and again.

And finally...AND MOST IMPORTANTLY...**ALWAYS wear a dust mask or respirator.** Yes, it's going to be more uncomfortable than working without one. Yes, it's easy to forget. Yes, you're going to think..."It's just a couple of cuts...and probably won't make any difference." In short, you're bound to come up with reason-after-reason why wearing a respirator or mask isn't necessary...but you know what? **IT'S ALWAYS NECESSARY! ALWAYS!**

OSHA regulations offer some guidelines

According to the Occupational Safety & Health Administration, there are three basic types of respirators. Non-powered air-purifying respirators, powered air-purifying respirators and atmosphere-supplying respirators. Each of the first two are designed to filter-out harmful materials from the air surrounding the wearer...while the final type accomplishes the same task by supplying fresh air from a source other than the air surrounding the operator (such as a tank or airline hook-up).

For the average home woodworker, air-purifying respirators are the most logical solution...both from the standpoint of effectiveness and cost, since atmosphere-supplying respirators are extremely costly and therefore far more appropriate for commercial applications where workers are continuously exposed to high concentrations of contaminants.

Types of contaminants

There are two primary types of contaminants that should concern the home woodworker...airborne particulates and vapors & mists. Let's take a look at each.

The first are particulate contaminants. These are measured in microns with 1 micron equaling 1/25,400 of an inch...pretty small by anyone's standards. Particulates below 10 microns are the most likely to enter the respiratory system...and those below 5 microns are the most likely to reach the deep lungs, where they can do the most damage. In healthy lungs, 5 to 10 micron particles are usually removed from the upper respiratory system by a constant cleansing action. Smaller particulates are not.

It's also important to note that excessive exposure to even the larger-sized particulates can significantly reduce the efficiency of this cleansing action. Woodworkers should be most concerned by 1/2 to 10 micron particles that are most frequently filtered out by "fibrous" filters.

Secondly, vapor and mist particles (measuring five to 100 microns) that are created by fumes and the spraying of toxic finishes should also be a concern for the home woodworker. Organic vapors and sprays such as solvents, glues, thinners and finishes can create a serious hazard in the home shop. These are most often eliminated through the use of a chemical or charcoal-filled cartridge.

Respirator types and styles

Air-purifying dust masks are available as inexpensive throwaway types that are usually designed to capture only airborne dust particulates. There are also rubber or silicon type respirators with replaceable cartridges designed to capture various combinations of dust particles, vapors and mists.

Among these two types, there are three styles to choose from:

- Quarter-face masks and respirators cover the nose and mouth while resting above the chin. Of these, you can select your choice of inexpensive fibrous or paper-like throwaways that typically cost \$1 or \$2 each...or rubber/silicon models that run \$10 to \$15. The latter of these use either one or two replaceable filters costing about \$6 to \$10 each. Most of these are designed **ONLY** for removing dust particles and not vapors or mists. Some throwaway models feature built-in exhalation vents to ease breathing and be "cooler" for the wearer.
- Half-face respirators also cover the nose and mouth, but do so while resting under the chin. These are typically \$25 to \$50 rubber or silicon models...usually with two replaceable filter cartridges costing around \$10 to \$22 for a pair.

Most of these are designed primarily for removing vapors and mists...but will also remove airborne dust particles, providing a fibrous pre-filter is also used. These disposable pre-filters average under \$5. The respirator carried in Shopsmith's catalog falls within this category.

- Full-face respirators seal under the chin and around cheeks, temples and forehead, providing the maximum in respiratory as well as eye protection. Many of these are what OSHA classifies as being of the PAPR (Powered Air-Purifying Respirator) "atmosphere supplying" variety. These "atmosphere-supplying" types can be battery powered or powered by 110-Volt current. They

provide the most effective protection (especially if you have a beard or wear glasses) and are easier to breathe through than non-powered models. However, there is a hefty price to pay for this comfort and convenience....typically in the \$150 to \$400 or \$500 range with replacement filters that range from \$10 to \$22 a pair or more. Non-Powered, full-face respirators range from about \$100 to \$200 with cartridges that average \$12 to \$20 per pair.

Mask seals

A mask that doesn't seal well, won't work well, either. If you have a beard, many of the lower cost quarter and half-face models just won't seal properly. In this case, you may need a full face model to get the proper seal. Throwaways typically don't seal well (particularly around the nose), since they're made of paper-like fibers and are flimsy.

All of the better quality masks are made of silicon or rubber and seal much more effectively. Some even include soft, fabric seals for additional comfort. It's best to go with a rubber or silicon-type mask.

Mask filters

If you're not using the proper filter or cartridge with your mask, you're not going to get the kinds of protection you need. Unfortunately, cartridges and filters are NOT available for every chemical vapor. As an example, there is no cartridge available for isocyanates, which include urethanes and polyurethanes....some of the most common finishes used in today's home shops.

So, if you're working in an enclosed area with a high concentration of fumes from these substances, be sure to provide adequate ventilation. If you're working with lacquers, it's important that you use a respirator with charcoal filters designed to trap these vapors.

If your respirator is doing its job, you shouldn't smell even a hint of these vapors when wearing it. If you do, it's time to replace the cartridges. And once again, most filter cartridges are designed primarily for vapors and mists and will typically **not** effectively remove dust particles without the use of a fibrous pre-filter.

What about cleaning mask filters to extend their lives? This practice is discouraged as it destroys the effectiveness of the filter medium and will render your mask virtually useless.