

TOOLS OF THE TRADE

WHAT CONTRACTORS NEED FOR HARDWOOD FLOORING INSTALLATION, SANDING AND FINISHING

Introduction: A Tour of the Trade's Tools

Becoming a hardwood flooring contractor requires more than a truck, an answering machine and a business card. Professional floor mechanics must also be equipped with tools.

But, which tools? For what purposes? This publication is intended to walk a contractor through the tools needed on the jobsite.

Setting yourself up with the tools required to install, sand and finish a floor, from start to finish, is no small task. True, you can opt to rent some pieces, but most professionals prefer to purchase their own high-quality tools, renting only infrequently used items. Contractors who consistently rent equipment are spending money that could go toward their own new equipment. Moreover, rental equipment often is noticeably used and may have improper settings from the previous rental. Thus, owning one's equipment is the best option. Most quality distributors have lease/purchase plans available to help spread out the cost.

The range of tools for the hardwood flooring trade is considerable. The equipment list runs far beyond nailing and sanding machines; indeed, it seems every step of the process demands a unique tool. There are edgers and disc polishers. There are saws — scrollsaws, jigsaws, handsaws, table saws, band saws, jamb saws, portable electric saws, miter saws and radial saws. There are specialty tools — routers, nail sets, scrapers, tape applicators, files, planes, and power boosters.

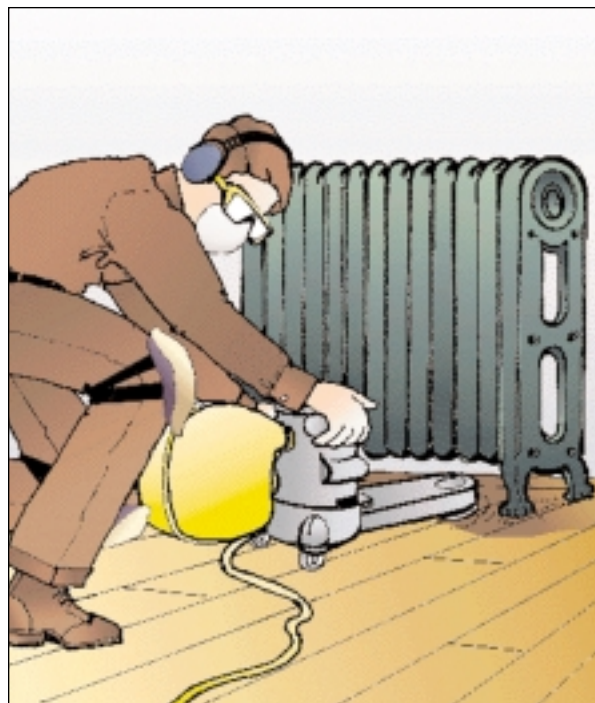
Even within a tool category, there are choices. A pinless moisture meter or probe moisture meter? Manual nailer or pneumatic nailer? Belt sander or drum sander? Finding the kind of tools you are most comfortable with — through on-the-job experience, and maybe even trying them out at a National Wood Flooring Association training seminar — is a starting point for building your inventory. Also, your distributor is an excellent resource and starting point for learning about various tools and products. Distributors often work with manufacturers to educate contractors through “demo days” or workshops. Consult your local distributor for more information.

Safety first

One of the most important tools any contractor has is his own common sense. Safety on the job is a foremost concern for contractors, because accidents with power tools can be critical, even disabling or deadly. No amount of experience or expertise exempts you from the safety risks inherent in using the tools required to install wood floors.

The good news is: These risks are easily managed. Start with these general guidelines:

- * Never work when you are tired.
- * Never work under the influence of alcohol, drugs or medications.
- * Work when others are nearby, if possible.
- * Do not work on a cluttered floor.
- * Use proper lighting and ventilation.
- * Make sure that the electrical power and wiring at the jobsite is sufficient to operate all machines safely.
- * Know your insurance company's policy on cover-



Safety first: Operating any tool involves understanding the manufacturer's guidelines.

age related to accidents or other jobsite situations.

- * Wear proper work clothing and shoes. Do not wear loose clothing that could get caught in a machine.
- * Wear approved hearing protection and dust and fume respirators.
- * Read and fully understand the owner's manuals that are supplied with the equipment.
- * Use tools only as intended.
- * Use all tool and machine safety guards.
- * Turn off and unplug electrical tools and machines when making adjustments and attaching accessories.
- * Turn off all sources of ignition (furnace, hot water, etc.) when using flammables (finishes, sealers, fillers, etc.).
- * Use ground fault circuit interrupters (GFCIs) on electric tools to avoid electric shock.
- * Keep all your electric cords in good condition.
- * Carry and read MSDS (Material Safety Data Sheets) for all products.

This manual is intended to serve as a brief introduction to the tools for hardwood flooring installation. It discusses the specific tools and materials required, how they function, how they're used in the trade, and general safety and maintenance issues related to each.

It should be noted here that this manual is not intended to teach you how to use these tools — for this you must consult the owner's manual and get proper education to operate each tool and understand its warnings. Nor is this an attempt to teach the installation of wood flooring. That is best done through the national and regional seminars offered by NOFMA (National Oak Flooring Manufacturers Association) and the NWFA. *Tools of the Trade* should help you determine if you have all of the tools necessary to get started or improve your existing business.

Creating A Safe Working Environment

The professional floor mechanic arrives at the jobsite with more than just heavy hardware: He or she has protective wear, too, all with eye, ear and respiratory safety in mind. Outfitting for the job means outfitting for safety, with protective glasses or goggles, dust and vapor respirators for respiratory protection and ear plugs or ear muffs for hearing protection.

Here is a look at each of the safety precautions:

Eye protection

Job sites are rife with opportunities for eye injury. These injuries happen literally in the blink of an eye — in the time it takes a piece of wood or metal, or a drop of finishing material to fly from the work area to your face — and range from minor injuries to permanent disabilities. Adopting a habit of always wearing

eye protection, either glasses, goggles or a face shield, greatly reduces the risk of eye injury.

OSHA (Occupational Safety and Health Act) regulations require eye protection when using most power tools.

Glasses: Glasses should meet performance standards set by the American National Standards Institute (ANSI), called ANSI Z87.1-1989 or Canadian code CSA Z94.3.

Many of today's safety glasses resemble athletic fashion eye wear more than "Buddy Holly" glasses. Safety eye wear catalogs are jammed with styles and color choices; it should be easy to find a pair that fits well and looks good, and is light and comfortable enough to wear all day. Normal glasses or contact lenses do not qualify as protective eyewear.

Goggles: Goggles are best for some conditions: Polycarbonate lenses in goggles, safety glasses and face shields all have the same impact resistance. But goggles seal off the eye socket more effectively than either spectacles or face shields, and because they fit tightly against the face all the way around, they distribute impact force more evenly. Even though face shields and glasses are available with brow guards that keep out material from above, they don't offer the same level of protection that goggles do.

Hardened glass was once the material of choice for safety eye wear, and is still available. However, plastics (principally polycarbonate) a tremendously resilient material, are now more widely used. Although plastic resists impact better, hardened glasses may still be the right choice if materials at the job site are harmful to plastics.

Hearing protection

If you have to shout to be heard, the noise level is probably more than 90 decibels, and you need hearing protection. Prolonged exposure to these sound levels can result in hearing loss. There are too many flooring contractors who never knew about audio hazards when they started in this business. They now have 30 to 70 percent loss of hearing, and some of them are only in their 30s.

The most effective way to combat high noise levels — and the only one for most in the construction trades — is to use ear protection. Unfortunately, wads of cotton offer little or no actual hearing protection. You will need legitimate ear plugs or ear muffs.

Ear plugs: Earplugs are effective and inexpensive, and come in two forms: foam inserts and premolded plugs. Premolded plugs are reusable, flanged plugs that are simply inserted into the ear. Foam inserts are rolled and compressed into tiny cylinders that, once inserted, slowly expand to provide a custom fit. Earplugs should be cleaned with soap and water after use, and most plugs should be discarded after several uses.

Ear muffs: Ear muffs are bulkier than other alternatives, but they can be as effective as foam inserts.

Muffs consist of dome-shaped protectors that fit over the external ear; they keep out sound with a cushion or pad sealing them against the head. Sony Walkman® headphones and similar devices are not considered ear protection.

Respiratory protection

Respiratory protection is needed when sanding, as well as when applying finish.

Wood dust is widely recognized as a potential health hazard. Dust and chips are most likely to directly affect your eyes, skin and respiratory system. Glasses or goggles can protect you against flying debris, but won't prevent dust from settling on your skin or in your lungs.

Sensitivity to dust varies from person to person. It can cause irritation of the upper respiratory tract, inflammation of the nasal tract, tightness of the chest, shortness of breath, dizziness, asthma and mucosal irritations.

The adverse effects of dust can be partially dealt with by keeping the work area as clean as possible, and ensuring proper ventilation. Full protection, however, requires the use of a dust respirator.

Dust respirators range from simple disposable types to more sophisticated models with replaceable filter cartridges. Wearing any dust respirator is a vast improvement on wearing none at all. Remember,

too, that dust from some wood species have been known to affect wood workers.

For the proper respiratory protection to wear when applying finish, always refer to the finish manufacturer's Material Safety Data Sheets (MSDS). Most require use of an organic vapor respirator, with the appropriate cartridge inserted.

Knee pads

Much of the work in installing flooring is executed close to the ground. That is, you will be spending a fair amount of time on your knees. Knee pads will ease the related strain and pain. On nail-down installations, avoid hard plastic versions that will damage the floor. "Hard" pads can "burnish" a freshly sanded floor and cause shiny spots. Instead, look for contractor-grade pad that are adjustable and fit well, with soft non-marring outer surfaces.

Work shoes

Shoes are as much a safety feature as goggles and a dust respirator. Athletic shoes won't do the job of protecting your toes and feet in case something is dropped. Cleated shoes should never be worn on prefinished wood floors.

MATERIALS LIST FOR THE VEHICLE

Here are the recommended items for carrying to the jobsite in your van:

	Installation	Sanding	Finishing
Maps	■	▲	●
Notebook	■	▲	●
Change order cards/color signoff sheets	■	▲	●
Fire extinguisher	■	▲	●
First aid kit	■	▲	●
MSDS/DOT sheets	■	▲	●
Moldings, 3/4-inch and 1/2-inch	■		
Wood filler/putty/floor patch	■	▲	●
Extra abrasives		▲	
Tape and masking materials	■	▲	●
Steel wool or pads		▲	●
Slip tongues/splines	■		
Shingles/shims	■		
Felt paper	■		
Trowels	■	▲	
Mastic/glue/adhesives	■		
Stain	■	▲	●
Finishes (as ordinances or OSHA allow)		▲	●
Applicators, brushes, rags	■	▲	●
Approved container for soiled rags	■	▲	●

Note: Stains, finishes, applicators and soiled rags should only be transported — never stored in the vehicle.

TOOLS CHECKLIST

Here is a basic list of tools to outfit the professional flooring contractor. Some may be supplied by the company, others you may have to supply yourself.

	Installation	Sanding	Finishing
Eye protection	■	▲	●
Knee pads	■	▲	●
Respirator	■	▲	●
Ear plugs	■	▲	●
Moisture meter	■		●
Nailing machines	■		
Assorted nails, cleats, pins	■		
Air tank, hoses and fittings	■		
Jig saw	■		
Band saw	■		
Reciprocating saw	■		
Table saw	■		
Hand saw	■	▲	●
Jamb saw	■		●
Circular saw	■		●
Miter box with saw	■	▲	●
Chalk line	■		
Staplers	■		●
Squares	■		
Level/straight-edge	■		
Compass and protractor	■		
Scrapers, blades and files	■	▲	
Pry bar	■		
Drills and bits	■	▲	●
Router and bits	■	▲	●
Hammers	■	▲	●
Chisels	■	▲	●
Nail sets	■	▲	●
Pliers and wrenches	■	▲	●
Nail pullers	■	▲	●
Screwdrivers	■	▲	●
Rule or tape	■	▲	●
Block plane	■	▲	●
Utility knife	■	▲	●
Electric tester	■	▲	●
Keel or crayon	■	▲	
Fans	■	▲	●
Brooms	■	▲	●
Drop cord light	■	▲	●
General purpose oil (non-detergent for pneumatic tools)	■	▲	●
Extension cord, adequate length, grounded	■	▲	●
Electric plugs, adapters	■	▲	●
Electrical tape	■	▲	●
Vacuum cleaner	■	▲	●
Plastic bags for waste	■	▲	
Sanders		▲	
Edgers		▲	
Oscillating sanders		▲	●
Buffers		▲	●
Sander cords		▲	
Sander bags		▲	
Applicators, brushes			●
Trowels	■		

Moisture Meters

Moisture meters are portable electric or electronic devices that measure the amount of moisture in wood flooring and subfloors; some will even measure moisture in concrete. Determining moisture content levels is crucial to quality control in the flooring installation process. Excess moisture in the flooring lumber, subfloor or concrete slab in particular will have adverse effects on the installed flooring, both short and long-term. Moisture meters are therefore an essential tool for every professional floor mechanic.

Wood is constantly gaining and releasing moisture to and from the surrounding air. As it does so, its shape and size is likely to change slightly. When dried wood reaches a level of balance with its surrounding atmosphere — that is, it is neither taking in or giving off moisture — it has reached its equilibrium moisture content, or EMC. Moisture content is expressed as percentage of the wood's dry weight. Six percent moisture content means that 6 percent of the board's dry weight is water.

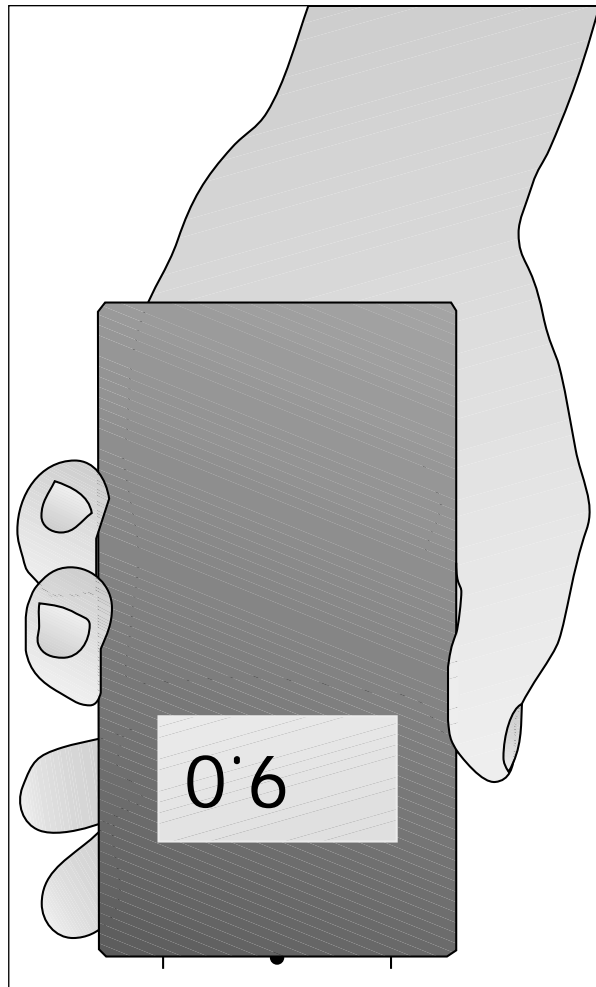
Although it varies slightly with relative humidity, an optimal moisture content is between 6 and 9 percent for most areas of North America. Before installing, the wood flooring's moisture content should be at the level expected under normal living conditions, and the difference between the moisture contents of the wood flooring and the subfloor should be no more than 4 percentage points. In other words, if the average EMC for the wood is 9 percent, the subfloor should be no more than 13 percent.

Moisture meters can also be used to assess water damage, and to determine when subsequent coats of finish can be applied. Readings should be taken in several locations on the floor rather than just a single one. For more information on the effects of moisture on wood flooring, consult *Water and Wood: How Moisture Affects Wood Flooring*, publication A100 in this series. Contact the National Wood Flooring Association, 233 Old Meramec Station Road, Manchester, MO 63021. The toll-free number in the United States is 800/422-4556. In Canada it's 800/848-8824. Local and international call 314/391-5161.

Operation

There are two main types of moisture meters. Probe types have small probes or pins that need to be inserted into the material to determine moisture content. Pinless meters require no penetration of the material. The two types of meters measure different properties to determine moisture content.

Probe-type moisture meters: The probe device measures electrical resistance across the two or more small pins, which are inserted into the wood. The higher the moisture content, the lower the resistance and thus the greater current flow and higher content reading.



A probe-type moisture meter

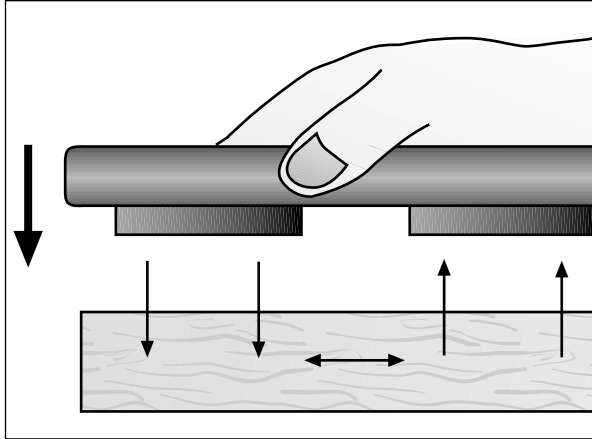
Probe-type meters are fast and easy to use, and are offered with different measurement indicators: some units have L.E.D. display lights indicating different moisture levels, while other units have analog or digital displays and some allow the use of different probes for an assortment of pin sizes.

Some meters also have insulated pins, which allows testing for moisture content at specific depths within the wood.

Pins should be inserted as fully as possible, in line with the grain. With moisture content levels below 10 percent, minimal insertion or mere contact with the wood may be enough: Consult the meter's manufacturer for details.

Pinless moisture meters: The pinless models are also referred to as "non-destructive" moisture meters, because they don't leave any small holes in the wood. Pinless meters work by transmitting low-frequency signals from rubber electrodes at the base of the instrument into the wood, measuring an area beneath the footprint of the meter. Instruments are calibrated to translate this measurement into moisture content by weight, which is displayed on the analog or digital dial.

Signal penetration may be up to one inch deep for



A pinless moisture meter

both hardwood and softwood. The meter can be used to identify pockets of moisture in a wood block or plank. Measurements can also be taken through coatings without damage to the surface.

Options

The best moisture meter for your toolbox is one that combines accuracy with flexibility of use and the features you need. Here are some of the available features to consider:

- A built-in thermo-hygrometer to measure ambient temperature and relative humidity.
- The capability to measure a wide moisture content range, from at least 5 to 30 percent.
- The ability to take readings from concrete.
- The necessary adjustment tables for various species.
- An easily readable indicator.
- On probed meters, the ability to use external probes, and a selection of pin sizes.
- A carrying case.

Be aware, however, that no meter offers all these features.

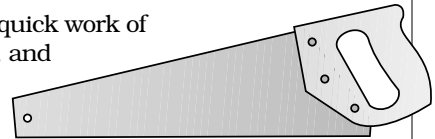
Saws

When selecting a saw, it's best to keep in mind that a saw is only as good as its blade. The blade must be sharp enough to do the job, but it must also be the right type for the work. The teeth on blades designed for ripping wood (cutting with the direction of the grain) are angled for a more aggressive cut. Blades designed for crosscutting (cutting across the grain) have a less aggressive tooth design.

Saw blades are available in steel, carbide and diamond-toothed designs. Carbide lasts longer than steel, and diamond lasts longer than carbide, but as blade materials get harder, cuts become less "clean." In many situations, the extra blade life may justify giving a little on the quality of cut. But in some instances, a clean cut may be most important.

Hand saws

Hand saws make quick work of small sawing jobs, and cut down on job-site noise and dust. They are



practical and affordable, and are a worthy complement to a floor mechanic's fleet of power saws. Some of the available types:

Standard hand crosscut and rip saws: For basic straight cuts.

Backsaws: A shorter, fine-toothed saw, commonly used with miter boxes. The blade on a backsaw is supported by a U-shaped band of metal, which is also used as a guide for miter boxes.

Coping saws: Used for fine, intricate cuts, as well as curved or circular cuts. Their thin blades are held by a high arched back with a handle.

Hacksaws and mini-hacksaws: Similar to coping saws, with longer, deeper fine-toothed blades and less back clearance, though not usually used on wood. They are more effective in cutting metals and plastics.

Jamb saws: Have an offset handle that allows the saws to be used for undercutting door jambs.

Power saws

There are three basic types of power saws: circular saws, reciprocating-type saws, and band saws. All are highly productive, and are available in different configurations for different jobs.

Circular power saws

Circular saws are basically an electric motor with a circular blade attached to its arbor. Their forte is making fast, straight cuts. Blades range from less than five to more than eight inches in diameter, and feature tooth designs for many kinds of materials — hardwood, softwood, plywood, oriented strand board (OSB), even masonry and tile. The blade angle, or tilt, is usually adjustable. Different horsepower ratings abound, but remember: The higher the power, the heavier the saw. Portable circular saws cut from the bottom, so for the best quality cuts, keep the face of the board down. The following saws, however, cut from the top down, so keep the face of the board up when making cuts.

Power miter saws: A circular saw in a miter box, used for angle cutting of molding and trim. Compound miter saws incorporate blade tilt. With plunging miter saws, the blade and motor pivot from a point behind the fence, allowing the blade to be lowered for quick, precise cuts.

Jamb saws: A saw with the blade mounted horizontally. The blade “height” is adjustable relative to the shroud/base of the unit. Jamb saws are particularly useful for sawing off baseboards and door jambs and casings to allow flooring to be slipped underneath. This can assist in allowing for expansion of flooring.

Radial arm saws: A base-mounted circular saw that travels on an overhead arm across the cutting area. Most models allow for swinging, tilting, raising and lowering motions to adjust the cutting direction.

Table saws: A stationary circular saw that cuts up from under a table. Blade height and angle is adjustable on most models. Precision rip cuts are made by adjusting a guide fence to the desired width. Crosscutting is accomplished by guiding pieces past the blade with the miter gauge, which can be adjusted for cuts of different angles.

Reciprocating-type saws

Saber saws, reciprocating saws and scroll saws all operate on the same principle: a small, straight blade that moves in an up-and-down or back-and-forth motion. These saws cut in one direction – up – so cut with the face of the board down.

Saber/jig saws: A reciprocating-type saw, this is used vertically for intricate and scrolling cuts at slow speeds.

Reciprocating saws: A larger, more powerful version of the saber saw. It's often used for removing flooring and joists, or sawing through walls and ceilings.

Scroll saws: A table-mounted reciprocating-type saw, also used for odd-shaped cuts.

Band saws

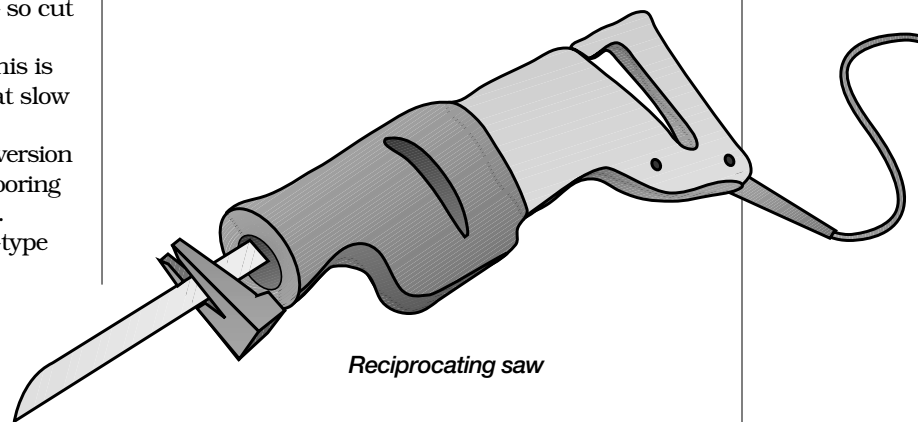
Band saws cut with an endless band blade traveling around an upper and a lower wheel. They are capable of high-production guided cuts, resawing (cutting thinner boards from one thick one), and freehand scrolling cuts, when equipped with a fine blade. They work extremely well on parquet floors.

Band saws cut down, so saw with the face of the board up.

Safety considerations

Saws may be the most dangerous tool you will use. Always follow these guidelines when operating any kind of saw:

- * Read and understand the warnings and operational instructions that are provided by the manufacturer of your saw.
- * Never remove or disable safety guards supplied with any type of saw.
- * Keep the cord clear of the blade's path.
- * Make sure that the saw is grounded properly. Avoid working in damp places.
- * Make all adjustments and change the blade with the saw disconnected from the power source.
- * Set the circular blade depth to no more than ¼ inch greater than stock thickness.
- * Make sure the base is adjusted correctly and locked securely. Check the locking mechanisms periodically while working.
- * Make sure the saw is equipped with the appropriate blade for the job.
- * Never reach under the work or allow your hands to line up with the saw cut (in front or back of the saw).
- * Be sure to wear protective glasses and ear protection.
- * Allow the blade to come up to full speed before starting the cut.
- * Allow the blade to come to a complete stop before removing cut pieces or waste from the saw.
- * Remove dust from the saws occasionally to promote air flow and lubrication, and to prevent fires.
- * Always use a push stick for table sawing.



Reciprocating saw

Nailing Machines

There are varying styles of machines. The ratchet-style and spring-loaded fasteners are struck with a mallet to release each nail. The pneumatic nailers shoot fasteners into wood (some are designed to nail into concrete) with the impact of a mallet or the pull of a trigger and the help of an attached air compressor.

These machines are available in both side (45-degree), and face (90-degree, for work against walls) configurations. And through use of changeable adaptor plates, they can be adjusted for installing varied thicknesses of flooring.

The nailing machines serve to reduce nailing time to an absolute minimum, and eliminate time spent reaching for nails. Nailers work as fast as the user can position the machine.

Ratchet nailers: Because they can operate with multiple strikes, ratchet-style nailers are easier for novices to use, but perhaps not as fast as experienced professionals would like.

Spring-loaded nailers: Spring-loaded machines operate on the one-strike, one-nail principle.

Pneumatic fasteners: Pneumatic machines, also known as air nailers, require compressed air to operate. Therefore, they also require more safety consciousness.



Pneumatic nailer

Fasteners

Different applications require different types of fasteners. They allow for wood movement in the most efficient way.

Cleats are barbed nails with a T- or L-hooked head. Most are proprietary designs, for use only with a specified type of nailer. Their thin rectangular shape guards against wood splitting.

Some nailing machines use staples, rather than cleats and these, too, have been proven to be effective fasteners.

Case nails, cut nails, finish nails and screws are also used to fasten wood flooring. Hand nailing is especially useful for the first and last few rows of flooring in a room, when there isn't room to employ a nailing machine. Screws are sometimes used to fasten plank flooring.

Compressors

There are many air compressors on the market designed for jobsite operation of pneumatic staplers and nailers. When choosing a compressor, select the proper size to produce adequate air volume (cubic feet per minute) and air pressure (pounds per square inch) for your pneumatic floor stapler or nailer.

A one-horsepower electric compressor with a four-gallon tank will produce about three cubic feet per minute of air volume at 90 pounds of pressure. It weighs less than 50 pounds and draws very few amps of electricity, and it is adequate for running one tool at medium speed.

A 1.5- to 2-horsepower electric compressor with a five-gallon tank produces approximately six cubic feet per minute at 90 pounds per square inch. Weighing less than 70 pounds and operating on a 15-amp circuit breaker, this compressor is adequate for one fast tool operator or two at medium speed.

A 1.5- to 2-horsepower electric compressor with an eight-gallon tank weighs about 125 pounds and is adequate for two fast tool operators.

You may need to sacrifice portability for volume, but when in doubt, select the larger unit. When you're on the job, you don't want to be forced to wait for the compressor to catch up.

Air-line accessories

Pneumatic tools need dry, clean and regulated air pressure to operate at peak performance. To ensure that, follow these steps:

- For dry air, drain the compressor at the end of each day.
- For clean air, install an air filter at the compressor outlet to catch dust and grit before it gets into your tool.
- To regulate the air pressure, install an air-pressure regulator after the air filter. The pressure in the tank will fluctuate within the setting of the pressure switch — normally 100 to 125 pounds per square inch. The regulator controls the air pressure in the air line. It should never be set higher than the pressure needed to operate the tool properly.
- Use the correct hoses and couplers. Pneumatic staplers and nailers need instant air volume to operate properly. The chambers of the tools must completely refill after each shot, but many hoses and quick-disconnect couplers do not provide adequate air flow. Most pneumatic staplers and nailers operate best with $\frac{3}{8}$ -inch hoses and quick-disconnect couplers with $\frac{3}{16}$ -inch minimum orifices.
- Follow the tool manufacturer's instructions for oiling the tool. Many tools have special O-rings and seals that certain oils will damage, causing the tool to malfunction.



Manual nailer

Safety considerations

Most of the safety issues surrounding nailing machines are rather obvious. Nonetheless:

- * Read and understand the warnings and operational instructions that are provided by the manufacturer of your nailer.
- * Always wear safety glasses, ear protection and safety shoes.
- * Never use a hammer with a loose head or splintered handle.
- * Replace worn or damaged parts on your nailer immediately.

Some additional safety guidelines for using pneumatic tools:

- * Never override the built-in safety features.
- * Always disconnect the air supply before making adjustments, servicing the tool, clearing a jam or moving the tool to a different work area.
- * Always disconnect tools from the air supply when

they are not in use.

- * Don't leave plugged-in air tools unattended.
- * Make it a habit to check the condition of your hoses and fittings frequently. Faulty components can lead not only to tool inefficiency, but also to jobsite hazards.
- * Always respect the power of air under high pressure.
- * Be certain the drive belt cover is secure and intact.
- * Be conscious of the whereabouts of your co-workers.
- * Use the proper mallet: Rubber to metal or metal to rubber, never metal to metal or rubber to rubber.

Sanding Machines

Hardwood flooring contractors have a choice when it comes to sanding machines — using a drum sander or a belt sander. Like many other decisions, the use of either is a matter of personal preference.

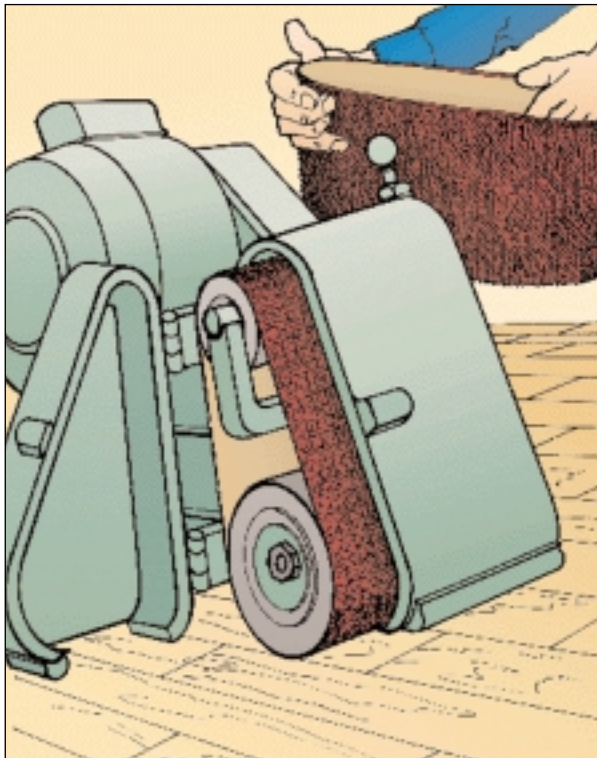
Drum and belt sanders

Drum sanders and belt sanders are both large, heavy walk-behind electric sanding machines designed for high production. They are the sanding workhorse of your tool arsenal, usually available in widths of 8, 10 or 12 inches. Most have integrated dust collection. They are used for sanding wood over large, open areas, as well as removing old stain or finish.

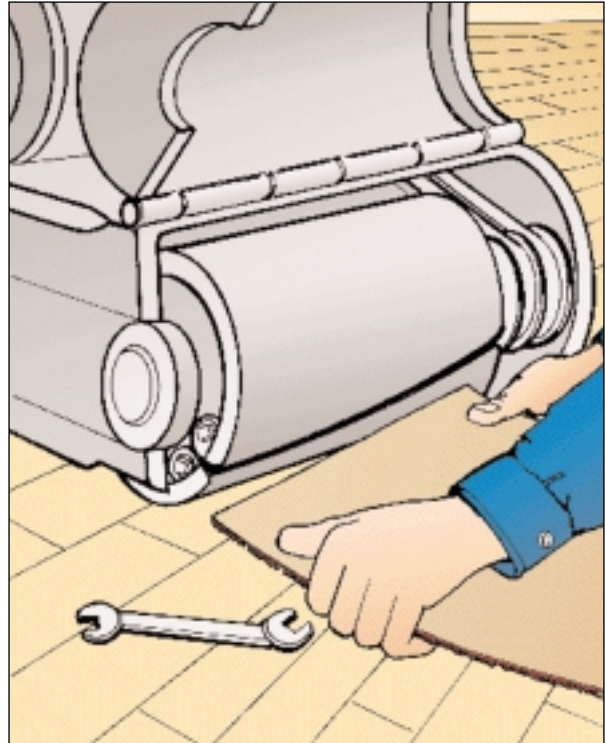
Belt sanders (below) are of a newer design than drum sanders, with abrasive belts traveling over a main powered roller or drum (not to be confused with drum sanders, right) and a smaller tensioning roller located above. The drum, which brings the abrasive into contact with the floor, has a soft rubber surface.

Abrasive belts are easy to change. They literally slip on and off when the tension is loosened. The continuous abrasive belts and solid drum feature adjustments to align the tracking of the belt.

Drum sanders have just a single drum, on which a sheet of abrasive is placed. A cam slot running the width of the drum holds and tensions the abrasive



Belt sander



Drum sander

sheet. These sanders are more common than the belt version, but loading paper can be somewhat more difficult for the novice.

Drum levels are adjustable, and most users set them so there is greater pressure on the motor drive belt side.

Safety considerations

Standard safety precautions apply for both kinds of sanding machines:

- * Proper electrical connections are essential. Refer to manufacturers' guidelines.
- * Read and understand the warnings and operational instructions that are provided by the manufacturer of your sanding machine.
- * Eye and ear protection and a dust respirator are recommended.
- * Safe work shoes (with laces tied!) are important.
- * Make sure you are always in complete control of the tool.
- * Keep the cord away from the drum and out from underfoot and off your shoulders.
- * Keep an eye on the dust collection bag. Empty it often in the proper container.
- * Always empty dust collection bags before transporting the machine or leaving it at the jobsite — even when you take a break for lunch.

Disc Polishers, Buffers and Oscillating Machines

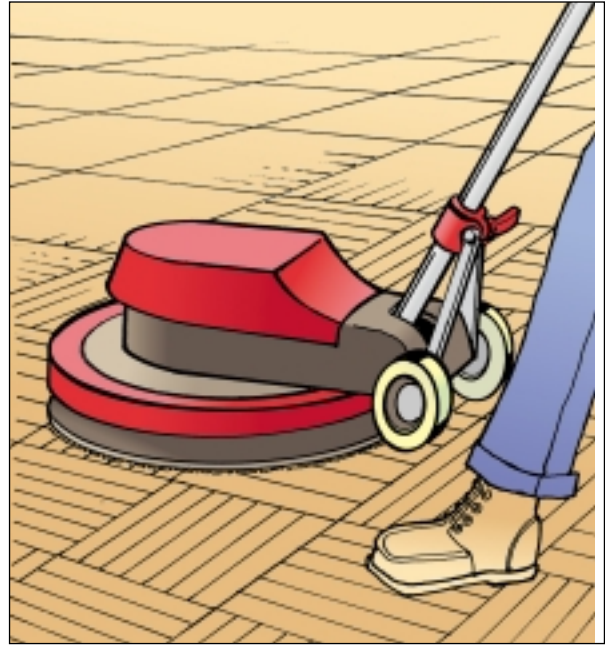
Disc machines use circular sanding paper, screens, pads or polishing brushes — sizes vary from around 15 to more than 22 inches. They are walk-behind machines that abrade in a circular pattern. There are also oscillating machines available which move in an oval or back-and-forth pattern. Oscillating machines provide a less aggressive cut, but with more random and harder-to-see scratch patterns.

Disc machines run at low speeds, usually in the 175-rpm range, and are used for finish sanding, screening, screening between finish coats, and low-speed buffing. Some models are designed for dedicated use as either sanders or polishers — be sure to match the machine with your main application. These machines generally do not have integrated dust collection, although the newest models incorporate this feature as a system.

One of the primary uses of these machines is to blend drum or belt sander and edger marks to get rid of the “picture frame” effect around a room. Some finish manufacturers also recommend using buffer screens or pads after sealer or finish application to smooth imperfections and to lightly abrade the surface for better adhesion between coats. However, other finish suppliers recommend different methods. As always, rely on the recommendations made by the manufacturer of the finish you are applying.



Oscillating polisher



Disc polisher

Smooth, sweeping motions

Disc polishers can be difficult for beginners to operate. On start-up, they tend to “kick” to one side, usually the left. It’s best to practice initially with a polishing pad in the middle of a large room. Start with the handle at waist height. You will notice that as you raise it, it will move to the right. And as you lower it, it moves to the left. An easy way to remember this is raise-right (R-R) and lower-left (L-L).

Safety considerations

- * Read and understand the warnings and operational instructions that are provided by the manufacturer of your machine.
- * As buffing and polishing can potentially launch small projectiles and kick up dust, eye protection is required and a dust respirator is recommended.
- * Make sure you are always in complete control of the tool.
- * Do not let go of the buffer’s handles until the machine has stopped rotating.
- * Unplug the machine when you are adjusting the machine or attaching paper.
- * When attaching paper to the machine, carefully center the abrasive.
- * Use the same caution you would apply to other electrical tools: Keep the cord out of the pad, out from underfoot and off your shoulders.

Edgers

Edgers, or spinners, are small circular sanding machines designed to reach the areas where bigger machines can't. Several types of edgers are available, most consisting of a seven-inch shrouded disc connected to a large motor. Two wheels on the shroud hold most of the machine's weight; each is adjustable to vary the depth and angle of cut. The spinner plate, a rubber-faced disc, is set to hold the sandpaper disc at a slight angle to the floor.

The offset edger drives a smaller disc, three to seven inches in diameter and offset from the motor, with a belt-and-pulley arrangement. This configuration allows reaching under difficult areas like cabinet toe kicks and radiators, or between stair spindles.

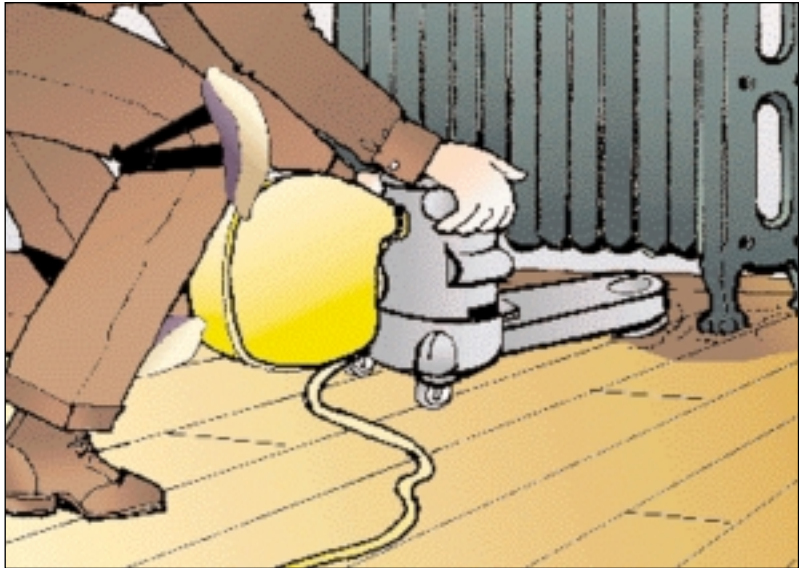
Some companies now offer integrated dust collection for edgers, directly connecting a portable vacuum system to the edger to gather sawdust as it is produced.

An edger can be set to cut on the left, right or near center of the leading edge of the paper. The best place to adjust the edger is to the right side of the disc, at approximately 1 o'clock. The pad contact should be about one inch in length.

Because edgers usually cut more aggressively on the right side of the disc, they should be moved



Edger sander



Offset edger

along the floor from the left to the right, in semicircular, or other similar, motions.

Never apply weight or bear down on the edger to produce extra cutting power. This is not only hard on the machine; it almost always results in ugly "dish" markings in the floor.

Safety considerations

- * Read and understand the warnings and operational instructions that are provided by the manufacturer of your edger.
- * Edgers create dust and are capable of kicking up harmful objects; eye and ear protection and a dust respirator are musts.
- * Maintain control of the tool.
- * Unplug the machine when you are not working with it.
- * When not in use, always store the edger on its side, with the spinner plate out of touch with the floor.
- * Keep the cord away from the sanding disc and out from underfoot.
- * Keep an eye on the dust collection bag. Empty it often in the proper container.
- * Always empty dust collection bags before transporting the machine or leaving it at the jobsite — even when you take a break for lunch.

Vacuums, Fans and Brooms

Keeping the work area clean and cool not only makes your job more pleasant; it also enhances the quality of the work you'll do. Heavy-duty vacuums, brooms and fans may sound like basic tools, but don't discount them as inconsequential.

Vacuums

A powerful vacuum is essential for cleaning up wood dust and other debris, especially in the finishing phases. Dust and waste may be stored in bags or tanks for easy disposal, and the vacuum contents must be emptied after each use. One feature to look for are wheels of large-enough diameter to prevent damage or marring to the flooring. Some manufacturers have systems that link their vacuums directly to dust-producing tools, to collect dust and debris right at its source.

Fans

Although many high-powered portable utility fans are available, most users still stick by their box-style department store models. You don't really need all that power if you are merely using it to cool the work area. Besides, too much wind kicks up too much dust. If you are using fans to assist in drying finishing materials, the best solution is to actually point them away from the finished floor to enhance air movement. Too much direct air may distort the finish surface, or introduce unwanted contaminants that stick to the wet finish.

Brooms

Basic but very effective, a high-quality push broom is still the most convenient choice for moving and gathering sawdust and other matter. Augment it with a matching hand sweeper and a dust pan, and you're all set. Many old pros, in fact, prefer using a natural bristle (horsehair) broom. They push more dust with each sweep, and don't kick up as much dust as with thin synthetic counterparts.

Safety considerations

Use of fans and vacuums should follow that for any electrical appliance.

- * Don't use them near water (unless your vacuum is rated for it).
- * Always make sure cords and extension cords are in good working condition.
- * Empty the dust bag on vacuum cleaners often.
- * Always empty dust collection bags before transporting the machine or leaving it at the jobsite — even when you take a break for lunch.

Specialty Tools

In addition to the tools specific to flooring installation, your inventory should also include a range of specialty and miscellaneous tools. These extras will solve problems that may arise, and will make your job easier and safer. Here are some of them:

Routers

Routers are popular general-purpose power tools, yet extremely dangerous to handle. They are, essentially, motors with a cutting bit on an arbor, and handles. A wide range of bits and jigs are available, and on many models the cut depth is adjustable while in use. The result is a very versatile part of your tool collection.

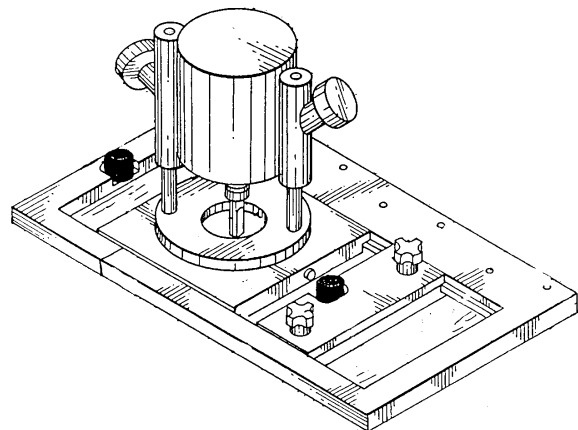
In flooring applications, routers are often used for removing wood for decorative inlay and borders. Special bits also allow them to cut grooves on end joints for tongue-and-groove strip fits and molding.

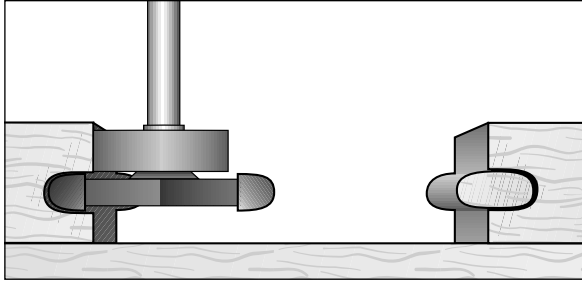
For engineered (laminated) flooring products, check with the flooring manufacturer for the proper bits to use.

Laid flooring end-jointer

A power tool for multiple-board repairs on strip and plank flooring. Uses a plunge router and a mobile adjustable template for fast and accurate end-joint cutting. An alternative to manual techniques, such as the hammer-and-chisel method.

This type of tool takes advantage of a flooring mechanic's body weight to hold the adjustable template to the floor, allowing the plunge router to cut and move laterally, creating a 90-degree end-joint, minimizing chisel work.





Spline-groove router bits

Used to cut a ¼-by-¼-inch spline groove in ¾-inch flooring. Can be used for border installations, nosings, headers or other areas where a new tongue-and-groove joint is needed.

Taping machines

These devices apply tape to floors, usually sports floors, to create lines. Most models are rolled along on small wheels, and use guides to lay a precise line of tape. Radius rods are used for circular patterns. They apply two strips of tape at the same time for painted lines.

Power boosters

Power boosters are safe, inexpensive ways to protect your expensive floor-sanding equipment from low-voltage power situations.

Use a power booster to centrally connect your installation, floor sanding and vacuum equipment. Use a booster whenever extra-long power cords are necessary (more than 75 feet), when drawing power from temporary power poles or when the local power it cut with excessive demands.

Use a booster to run 220-volt sanders and 115-volt edgers, buffers and vacuums. Professional equipment requires no less than 30-amp breakers and should be on 10-3 cable. Boosters should be placed no more than 75 feet from your equipment.

Scrapers

Scrapers are essentially knives. They come in a variety of designs, from wide-blade spatula-like versions, to razor blade holders for taking paint and tape off of windows. You will find them valuable in many situations. Many scrapers have two-handed handle configurations for leverage and control.

Files

Files come in a variety of shapes and tooth configurations for several different uses. Their general purpose is to remove small amounts of material from whatever surface they are designed for. A typical application is smoothing or sharpening scrapers. Files should always be used with a properly sized handle.

Nail sets

Nail sets are small, hardened steel devices used to drive nails below the surface of the wood. When hand nailing tongue-and-groove flooring, use the nail set on its side to avoid damaging the corner of the flooring strip.

Appliance movers

There are several different methods for moving heavy appliances. One of the most basic is to place a series of thick plastic sheets under the appliance, and slide it out of the room. Dollies and hand trucks also work well, but beware of debris in the wheels that could damage a new wood floor when moving appliances back into a newly finished room. One of the latest innovations is a device that uses air bags under the appliance and a blower motor to lift it off the floor, allowing it to be easily moved.

Planes

Planes are tools with knives that protrude below a flat surface and at an angle, for removing wood in passes. Block planers are designed for general surface smoothing and squaring. Jack or joiner planers are larger, for removing more material along the grain of the wood. Some small electric planers are also available.

Electric testers

Electric testers check for the presence and amount of current in an outlet. They are used to determine if a certain machine can be safely run from that outlet — too little power will burn out an electric motor.

Applicators

The first place to look for guidelines on how to properly apply a sealer, finish, filler or adhesive is the manufacturer's recommendations. Certain materials may only be compatible with one or a few types of applicators, and even then, only effective when applied a certain way.

Trowels

Trowels are rectangular metal devices with a handle. Trowels with notches on the edges are used for application of adhesives. Different adhesives will require different notch configurations. Some contractors use trowels without notches for application of finishes and fillers.

Finish applicators

Finishes are applied with a wide range of tools. Be aware that some finishing material will dissolve some applicators. Always check the manufacturer's recommendations.

Cut-in pads and small brushes are used for tight areas and edges.

Applicator bars are wide (12, 18 and 24 inches), thin bars around which coater sleeves are slid. Applicator bars have swivel handles with extension handles attached. Used primarily with water-based finishes.

Lambswool applicators are natural or synthetic cloths that are wrapped around wooden blocks with extension handles, predominantly used for applying solvent-based finishes.

Squeegees are useful for applying fillers and some finishes.

Rollers are made of synthetic materials or natural fibers, such as mohair, and are used to spread solvent- and water-based finishes.

Brushes can be made from natural, china-bristle, foam or other synthetic products. Consult the finish manufacturer for recommendations on compatible brush types.

Tank or reservoir-type applicators are available for use in large areas, such as gymnasiums.

Material Safety Data Sheets

Material Safety Data Sheets (MSDS) are issued by manufacturers. They list the hazardous characteristics of each material. They also list emergency procedures should an accident occur. Some states require that these sheets be present wherever these materials are used or transported.

Safety considerations

- * Read and understand the warnings and operational instructions that are provided by the manufacturer of your materials.
- * Care should of course be taken to keep all chemicals out of eyes, off of skin, and out of the lungs. Therefore, eye protection, rubber gloves and dust masks or respirators should always be worn when applying finishes.

Spare Parts

It would be impossible to carry every spare part you might need to keep your tools running on the job. There are, however, some basic parts and accessories for every tool. Keeping a supply handy can save you time and money on the job.

For electric tools in general, it's helpful to have some basic items: electrician's tape, spare plugs and brushes, extension cords, soldering iron and solder. For others, here is what to keep back in the vehicle:

Moisture meters: Spare probe tips, external probe, batteries.

Saws: A variety of blades.

Nailing machines: O-rings, a spare length of air hose, extra drive blades and pins, springs and fittings.

Vacuums: An ample supply of waste bags.

Belt and drum sanders: Extra drive belts.

Disc polishers/oscillating machines/edgers: Spare disc pads.

Finish applicators: Long handles.

Edgers: Spare spinner plate, wheels.

Also, duct tape, wire and a needle and thread (for bags) are smart back-up choices.

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SOURCES AND CREDITS

NWFA TECHNICAL AND EDUCATION COMMITTEE

- John Hoopes, 3M Company, committee chair
- Coley Armstrong, Basic Coatings
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- Bob Vanderlinden, Bruce Hardwood Floors

THE FOLLOWING COMPANIES AND INDIVIDUALS CONTRIBUTED INFORMATION FOR THIS PUBLICATION, SERVED AS REVIEWERS, OR BOTH:

- BonaKemi USA,
Mike Hodges
- Dura Seal,
Bill Costello
- Erickson's Flooring and Supply,
Dick Walters
- Floor Style Products,
Brian Mattson
- Galaxy Floor Sanding Machines,
Jim Tasikas
- Golden State Flooring Company,
Chris Coates
- McSwain Hardwood Floor Company,
Jonny and Ralph McSwain
- Magee Industries,
Kenn Parr
- Porta-Nails Inc.,
Jerry Coleman
- Pownail Company,
Bill McLaughlin
- Primatech,
Richard Poirier
- Rode Brothers Floors,
Greg Rudolph
- Squar-Buff,
John Kelleher
- Stanley-Bostitch,
Chris Dutra and Lew Oliver
- Start to Finish Hardwood Floors,
Mike Osborn
- Treska Products,
Larry Dean

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- Victor Klouse, Clarke Industries
- Kay Lum, Athletic Business Publications
- Michael Roberts, Athletic Business Publications