Steel Wool vs.

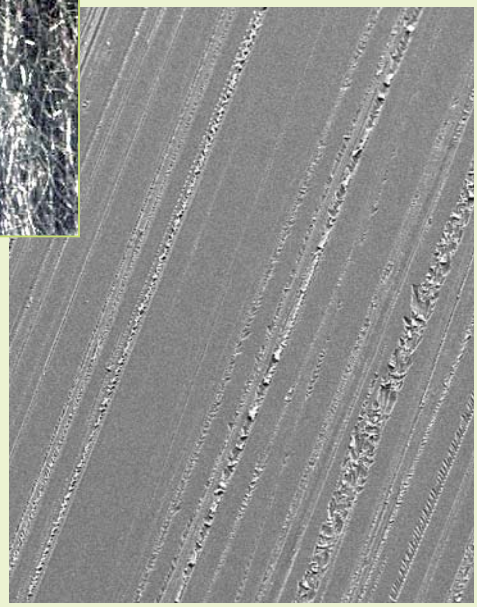
Steel wool leaves more uniform scratches than pads

I had always wondered why one grade of steel wool worked better than another, and why good steel wool seemed to produce a superior-looking surface on a clear finish than a comparable synthetic abrasive pad. Writing this article spurred me to do some real detective work.

With the assistance of Case Western Reserve University in Cleveland, Ohio, I looked at the various grades of steel wool and abrasive pads under an optical microscope. I then rubbed a clear acrylic sheet with 0000 Liberon-brand steel wool and another sheet with a gray Mirlon abrasive pad made by Mirka. The products have roughly similar abrasive powers. I then looked at the scratch pattern using a scanning-electron microscope.

The acrylic samples, coated with a thin layer of palladium to make them electrically conductive, were placed in an ultrahigh vacuum. Electromagnets then bent an electron beam, which produced an image on the screen.

STEEL WOOL



Steel wool magnified 20 times (above) shows uniform, tightly woven strands. Magnified 500 times, the scratch pattern left by 0000 steel wool (right) is more uniform and less harsh than that left by an abrasive pad.

SEM photos, this page and facing page: David H. Matthiesen

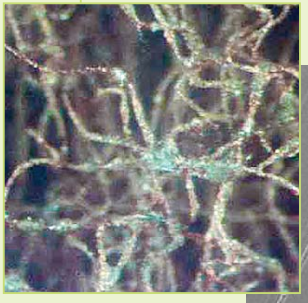
Abrasive Pads

BY JEFF JEWITT

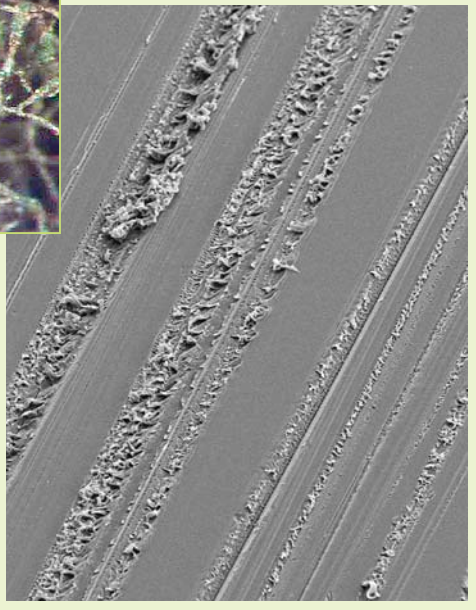
Even with the advent of synthetics, there still is a place for old-fashioned steel wool

I've been finishing and refinishing wood for going on 25 years, and of all the tools I have used consistently in that time, steel wool in one form or another has to rank among the most useful. My dad showed me how to use the stuff, and when I asked him how it was made I remember him saying, "It comes from metal sheep, silly." Since that first time, I've used it for removing, polishing and cleaning finishes, sanding between coats of finish, and once I even experimented with it for applying finishes (with disastrous results).

The major change in this field has been the advent of synthetic steel wool, also known as nonwoven abrasive pads. This product has replaced steel wool for some applications, such as rubbing finishes between coats and stripping paint, and with abrasive pads constantly improving, they may continue to encroach on the uses for steel wool. But for rubbing out the final coat of clear finishes, applying waxes and cleaning old furniture finishes, nothing beats steel wool. Abrasive pads and steel wool differ greatly in quality, so let's start by seeing how both are made and learning how to sort out the (metal) sheep from the goats. Then I'll tell you which products are best for which tasks and how to use them.



ABRASIVE PAD



A gray abrasive pad magnified 40 times (above) shows how the abrasive/glue mixture forms irregular lumps on the strands. When magnified 500 times (right), the scratches left by the abrasive pad are deeper and more uneven than those left by steel wool.

Size of individual strands determines steel-wool grade

Steel wool begins life as a 3,000-lb. roll of ⅛-in.-dia. steel wire. This wire is drawn across serrated knives that scrape off tiny wire shavings from the larger wire. These shavings are carded into an irregular, interlocked steel-wool mat, which is formed into rolls or pads and cut to final shape. The larger the diameter of the shavings, the coarser the texture of the steel wool. The machine oil used in the manufacturing process may cause problems with certain finishes, which I'll talk about later.

Steel wool is graded in a numerical "aught" (a bastardization of the word naught or zero) scale, the coarsest being graded 4 and the finest graded 0000 (pronounced four aught).

Over the years I've used a lot of steel wool, and some brands have given me good results every time: For everyday use, Pro's Best by International Steel Wool was my favorite for years, but the company recently shut down operations, so I now use Rhodes American's product. My first choice for finishing is steel wool made by Liberon, which is hands down the best. One advantage

Photos, except where noted: Mark Schofield

SMOOTHING BETWEEN COATS

Jewitt prefers to use an abrasive pad for large, flat surfaces. To lessen the risk of cutting through the finish, he uses short, controlled strokes near the edges. Steel wool's ability to scrunch down makes it ideal for smoothing complex shapes.

of Liberon's product is that it is manufactured with less machine oil, though it's hard to quantify exactly how much less.

Abrasive pads are color-coded based on grit

About 20 years ago, the Scotch-Brite dishwashing pad was introduced by the 3M Co. Made from a nonwoven plastic, the pad has real sandpaper-type grit (aluminum oxide or silicon carbide) impregnated throughout its ⅛-in. thickness. Unlike steel wool, the grade of the pad is determined by the coarseness of the grit, not by the thickness of the individual plastic strands. It quickly became obvious that this material had some real advantages over steel wool. The tough synthetic pad doesn't tear apart or shred little bits of metal wire, making it ideal for sanding between coats of finish and, in particular, on items such as chairs and table legs, where broken bits of steel wool collect. Like sandpaper, the pad does shed some abrasive particles, but a gentle blast of compressed air or a swipe with a tack cloth removes them.

Steel-wool grade	Abrasive-pad color	Grade	Sandpaper equivalent
	White	Extrafine	Not available**
0000		Finest	400-600
000	Gray	Fine	280
00		Medium	180-220
	Maroon	Medium	180
0		Coarse	120-150
	Green	Coarse	100

**The mineral impregnated in white pads is talc, which is too soft to grade for a definitive scratch.

Most manufacturers offer a wide selection of pads and grades, and there seems to be an agreement among manufacturers to color-code the pad based on the abrasive grade (see the table above). For woodworking you really need only three or four grades. In general, look for a pad that's flexible and durable.

Use steel wool and abrasive pads to abrade an intermediate layer of finish

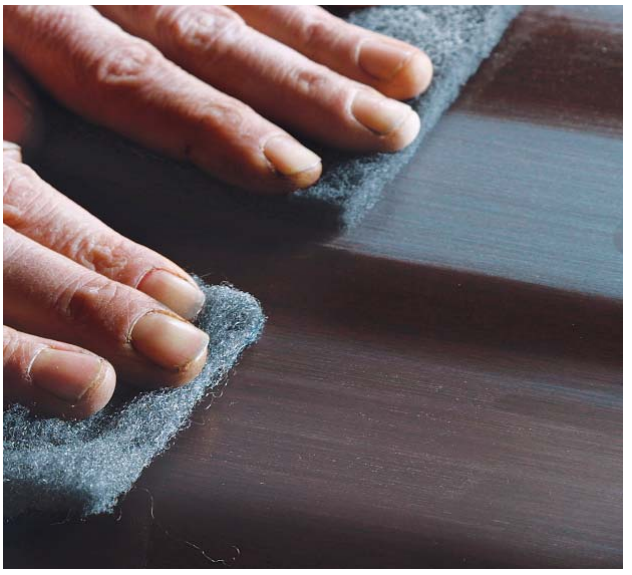
The process of smoothing and leveling intermediate layers of finish is known as cutting back. For large, flat surfaces, my choice is an abrasive pad regardless of the type of finish. Lacking oil or metal, they are compatible with water-based finishes. The shed particles of abrasive are much easier to remove than shavings of steel wool before applying the next coat of finish.

You can, however, use steel wool to cut back solvent lacquer, oil-based varnishes and shellac. Do not use it between coats of water-based finishes or paint. There are always some tiny bits of steel wool left behind that can rust. Another problem is that the machine oil used in the wool's production can throw the chemistry of water-based finishes into rebellious fits.

To cut back a finish, take a piece of 000 steel wool, or a maroon or gray abrasive pad, and rub around the edges of the workpiece in short, choppy strokes. Then do the center section in long, straight stokes going with the grain.

On contoured areas like thumbnail molding and concave surfaces like crown molding, steel wool does a better job than any

RUBBING OUT A FINISH



Use steel wool for a satin finish. *The scratch pattern left by a gray abrasive pad on the top is more aggressive and uneven than that left by 0000 steel wool.*

Use a white pad for rubbing out. *Rubbing the pumice with a white pad is less likely to form clumps than rubbing with a damp cloth. Spray the surface with soapy water, shake the pumice evenly onto it and rub away.*

other rubbing material I know. It conforms to contours better than stiff abrasive pads. Just immerse a chunk of the wool in some rubbing oil or soapy water and rub away.

Steel wool is better for achieving a satin finish

Regardless of the finish, you get a better surface by rubbing out the final coat with steel wool than with an abrasive pad. The steel wool tends to cut the surface of the finish, while pads tend to tear it.

Once the finish has cured, sand the surface with 600- or 800-grit sandpaper to shear off any dust pimples and to level brush marks and drips. Then use 0000 steel wool wrapped around a softwood or cork block to produce a hand-rubbed, satin finish. If you use a pad of steel wool, unravel it and wrap it around the block. If you use a roll, cut off enough that can wrap the block several times.

Squirt the surface with soapy water (a capful of dishwashing detergent per quart of water) or diluted Murphy Oil Soap, or use a lubricant designed for use with steel wool, such as Wool-Lube. Rub the block around the perimeter first, then do the center section with long, straight strokes, keeping the pressure uniform and your strokes parallel to the grain.

You can use a white abrasive pad for a slight deglossing of a finish. For increased abrasiveness, use the pad with pumice and rottenstone. This method will leave a glossier surface than one produced using 0000 steel wool. I prefer a pad to a felt block because it holds the abrasive better and doesn't allow clumping.

For rejuvenating an old finish and polishing metal, steel wool has the edge

Steel wool has several advantages over abrasive pads when it comes to cleaning and polishing wood or metal. One is its ability to hold a liquid. Second, unlike a pad, it conforms to tight contours. Recently introduced abrasive pads show improved ability to mold to contours, but steel wool still is superior. There's no better way to revive an old finish without stripping it than to use steel wool to clean and then wax it. The gentle action of 0000 steel wool removes grime without cutting through thin finishes.

First, unravel a 0000 steel-wool pad and squirt some naphtha on the surface of the metal (about an ounce). Then rub the surface gently with the steel wool. Periodically, stop and wipe the residue with a clean cloth. This method quickly cuts through oil-based dirt and grime. When the surface is both clean and smooth, you can use a new piece of 0000 steel wool to apply a coat of paste wax.

For removing light rust on cast-iron machine tops, abrasive pads are handy on these flat surfaces. The grade you begin with depends on the severity of the rust, but apply some wax to the pad and some mineral spirits to the tabletop and rub away. Gradually move up to finer pads until the luster of the damaged area matches the rest of the surface. □

Jeff Jewitt is a furniture finisher and restorer in Cleveland, Ohio.

CLEANING MACHINE SURFACES

A clean bed. *Apply paste wax to the tool bed, splash on some mineral spirits and then rub away with abrasive pads in successive grits to remove rust.*